

# *Planck* 2018 Results: Cosmological Parameter Tables

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## Abstract

These tables summarize the results of *Planck* 2018 parameter estimation exploration results. They are based on *Planck* HFI data and *Planck* lensing, as well as additional non-CMB data as detailed in the main parameter papers.

## 1 Introduction

The tables are arranged in groups, firstly by cosmological model, and then by data combination. The name tags match those of the full chains also provided on the PLA. The names all start with **base** to denote the baseline model, followed by the parameter tags of any additional parameters that are also varied (as defined in the parameter paper). Data combination tags are as follows (see the parameters paper for full description and references):

Data tag	Data used
<b>plikHM</b>	Baseline high- $\ell$ <i>Planck</i> power spectra ( <b>plik</b> cross-half-mission, $30 \leq \ell \leq 2508$ ).
<b>CamSpecHM</b>	<b>CamSpec</b> high- $\ell$ <i>Planck</i> power spectra.
<b>CleanedCamSpecHM</b>	Foreground-cleaned <b>CamSpec</b> high- $\ell$ <i>Planck</i> power spectra.
<b>lowl</b>	Low- $\ell$ <i>Planck</i> temperature ( <b>Commander</b> , $2 \leq \ell \leq 29$ ).
<b>lowE</b>	Low- $\ell$ HFI <i>EE</i> polarization only ( <b>SimAll</b> , $2 \leq \ell \leq 29$ ).
<b>lensing</b>	<i>Planck</i> lensing power spectrum reconstruction. When used without other CMB likelihoods, it is marginalized over the theory CMB spectra given.
<b>BAO</b>	Baryon oscillation data from BOSS DR12, MGS, and 6DF.
<b>Pantheon18</b>	Supernova data from the Pantheon sample, with updated main distance file with heliocentric redshifts.
<b>JLA</b>	Supernova data from the SDSS-II/SNLS3 Joint Light-curve Analysis.
<b>Riess18</b>	Hubble parameter measurement from SHOES (Riess et al. 2018a, $H_0 = 73.45 \pm 1.66$ ).
<b>BK15</b>	Bicep-Keck (+Planck/WMAP) 2015 analysis (arXiv:1810.05216).
<b>zre6p5</b>	A hard prior, $z_{\text{re}} > 6.5$ .
<b>reion</b>	A hard prior, $z_{\text{re}} > 6.5$ , combined with a Gaussian prior, $z_{\text{re}} = 7 \pm 1$ .
<b>lenspriors</b>	Standard base parameters with $n_s = 0.96 \pm 0.02$ , $\Omega_b h^2 = 0.0222 \pm 0.0005$ , $100 > H_0 > 40$ , $\tau = 0.055$ .
<b>DESpriors</b>	DES cosmological parameter priors (flat on $0.1 < \Omega_m < 0.9$ , $0.03 < \Omega_b < 0.07$ , $55 < H_0 < 91$ , $0.5 < 10^9 A_s < 5$ , $Y_P = 0.245341$ and, if varied, $0.05\text{eV} < \sum m_\nu < 1\text{eV}$ ).
<b>CookeDH</b>	A Gaussian prior $\Omega_b h^2 = 0.0222 \pm 0.0005$ (conservative, motivated by Cooke et al. 2017).
<b>Cooke17</b>	A Gaussian prior on D/H (Cooke et al. 2017), mean and error adjusted to approximately agree with <b>CookeDH</b> for $N_{\text{eff}} = 3.046$ .
<b>Aver15</b>	A Gaussian constraint on $Y_P^{\text{BBN}} = 0.2449 \pm 0.0040$ (Aver et al. 2015).
<b>theta</b>	A Gaussian prior $100\theta_{\text{MC}} = 1.0409 \pm 0.0006$ (acoustic scale from <i>Planck</i> CMB without LCDM assumption).
<b>WMAP</b>	The full WMAP (temperature and polarization) 9-year data.
<b>DES</b>	DES 1yr, cosmic shear+galaxy auto+cross.
<b>DESlens</b>	DES 1yr, cosmic shear only.
<b>DESw</b>	DES 1yr, galaxy auto+cross only.

The high- $\ell$  *Planck* likelihoods have TT, TE, EE variants from each spectrum alone, plus the TTTEEE joint constraint. Note that unless **nnu** is specified in the file name, the neutrino mass sum is fixed to  $\sum_\nu m_\nu = 0.06\text{eV}$  (including for DES chains). Non-linear corrections are modelled with HMCode in all cases (including when using DESpriors).

Data likelihoods are either included when running the chains, or by importance sampling. Data combinations that are added by importance sampling appear at the end of the list, following the **post\_** tag. Note that the best fits are merely examples of parameter combinations that fit the data well; due to parameter degeneracies there may be other combinations of parameters that fit the data nearly equally well.

Beneath each table is the  $\chi_{\text{eff}}^2 = -2\log(\text{likelihood})$  for each best-fit model, and also the contributions coming from each separate part of the likelihood. Mean minus log likelihoods are also given, as  $\bar{\chi}_{\text{eff}}^2$ . The tables also give the  $\chi_{\text{eff}}^2$  of the various component parts of the likelihood, where quoted values are the best-fit and mean, standard



deviation (in the case of  $1\sigma$  tables), or effective degrees of freedom ( $\nu$ , defined by  $\sigma^2/2$ ). Normalization of likelihoods is arbitrary, i.e., a constant can be added to log likelihoods without affecting any results. Only some likelihoods normalize so that the number is immediately interpretable as similar to a  $\chi^2$  for some number of data points.

The  $R - 1$  value is also given, which measures the convergence of the sampling chains, with small values being better converged. The sampling uncertainty on quoted mean values are typically of order  $R - 1$  in units of the standard deviation.

Parameter constraints were calculated from Monte Carlo chains from **CosmoMC** using **GetDist** ([getdist.readthedocs.org](http://getdist.readthedocs.org)).

Parameters and derived parameters, along with the name tags used in the chain files, are briefly described in the tables below.

Additional nuisance parameters for each likelihood are described in more detail in the respective papers.

Parameter	Tag	baseline	Definition
$\Omega_b h^2$	omegab2	...	Baryon density today
$\Omega_c h^2$	omegac2	...	Cold dark matter density today
$100\theta_{\text{MC}}$	theta	...	$100\times$ approximation to $r_s/D_M$ ( <b>CosmoMC</b> )
$\tau$	tau	...	Thomson scattering optical depth due to reionization
$\Omega_K$	omegak	0	$\Omega_{\text{tot}} = 1 - \Omega_K$
$\Sigma m_\nu$	mnu	0.06	Sum of active neutrino masses in eV
$m_{\nu, \text{sterile}}^{\text{eff}}$	meffsterile	0	Effective mass in sterile neutrinos in eV
$w_0$	w	-1	Dark energy equation of state, $w(a) = w_0 + (1 - a)w_a$
$w_a$	wa	0	As above (perturbations modelled using PPF)
$N_{\text{eff}}$	nnu	3.046	Total effective number of massive and massless neutrinos (see text)
$Y_P$	yhe	BBN	Fraction of baryonic mass in helium (only if varied independently of BBN)
$\alpha_{-1}$	alpha1	0	Fully correlated isocurvature amplitude parameter
$A_L$	Alens	1	Amplitude of the lensing power relative to the physical value
$A_L^{\phi\phi}$	Aphiphi	1	Amplitude of the lensing reconstruction power relative to the physical value
$A_L^{\text{fid}}$	Alensf	...	Amplitude of the lensing power relative to a fixed fiducial spectrum
$n_s$	ns	...	Scalar spectrum power-law index ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$n_t$	nt	Inflation	Tensor spectrum power-law index ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$d \ln n_s / d \ln k$	nrun	0	Running of the spectral index
$\log[10^{10} A_s]$	logA	...	Log power of the primordial curvature perturbations ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$r_{0.05}$	r	0	Tensor power spectrum amplitude ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$H_0$	H0	...	Current expansion rate in $\text{km s}^{-1}\text{Mpc}^{-1}$
$\Omega_m$	omegam	...	Matter density (incl. massive neutrinos) today divided by the critical density
$\Omega_\Lambda$	omegal	...	Dark energy density divided by the critical density today
$\Omega_m h^2$	omegamh2	...	Total matter density today (incl. massive neutrinos)
$\Omega_m h^3$	omegamh3	...	$h \times$ total matter density today
$\sigma_8$	sigma8	...	RMS matter fluctuations today in linear theory
$S_8$	S8	...	$\sigma_8(\Omega_m/0.3)^{0.5}$
$\sigma_8 \Omega_m^{0.5}$	s8omegamp5	...	$\sigma_8 \Omega_m^{0.5}$ constrained by low-redshift lensing
$\sigma_8 \Omega_m^{0.25}$	s8omegamp25	...	$\sigma_8 \Omega_m^{0.25}$ constrained by CMB lensing
$\sigma_8 / h^{0.5}$	s8h5	...	$\sigma_8 / h^{0.5}$
$\sigma_8 / h^{0.5}$	rdragh	...	$r_{\text{drag}} h$ in Mpc
$\langle d^2 \rangle^{1/2}$	rmsdeflect	...	RMS CMB lensing deflection angle in arcmin (approx. using $2 \leq L \leq 2000$ )
$z_{\text{re}}$	zrei	...	Redshift at which Universe is half reionized
$10^9 A_s$	A	...	Power of the primordial curvature perturbations ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$10^9 A_s e^{-2\tau}$	clamp	...	Parameter determining the small-scale CMB power
$Y_P$	yheused	bbn	Fraction of baryonic mass in helium
$Y_P^{\text{BBN}}$	YpBBN	bbn	Nucleon fraction in helium
$10^5 \text{D/H}$	DHBBN	bbn	$10^5$ deuterium-helium ratio from <b>Parthenope</b> BBN prediction (pre-Marcucci rates)
Age/Gyr	age	...	Time since the start of the hot big bang



Parameter	Tag	baseline	Definitions
$z_*$	zstar	...	Redshift for which the optical depth equals unity
$r_* = r_s(z_*)$	rstar	...	Comoving size of the sound horizon at $z = z_*$
$100\theta_*$	thetastar	...	$100\times$ Angular size of the sound horizon at last scattering
$D_M/\text{Gpc}(z_*)$	DAstar	...	Comoving angular diameter distance to last scattering
$z_{\text{drag}}$	zdrag	...	Redshift at which baryon-drag optical depth equals unity
$r_{\text{drag}} = r_s(z_{\text{drag}})$	rdrag	...	Comoving size of the sound horizon at $z = z_{\text{drag}}$
$k_D$	kd	...	Characteristic damping comoving wavenumber ( $\text{Mpc}^{-1}$ )
$100\theta_D$	thetad	...	$100\times$ angular extent of photon diffusion at last scattering
$z_{\text{eq}}$	zeq	...	Redshift of matter-radiation equality (massless neutrinos)
$k_{\text{eq}}$	keq	...	$[a(z_{\text{eq}})H(z_{\text{eq}})]^{-1}$
$100\theta_{\text{eq}}$	thetaeq	...	$100\times$ angular size of the comoving Horizon at matter-radiation equality
$100\theta_{s,\text{eq}}$	thetarseq	...	$100\times$ angular size of the comoving sound Horizon at matter-radiation equality
$D_{40}$	D40	...	$\ell(\ell+1)C_\ell^{TT}/2\pi$ at $\ell = 40$ in $\mu\text{K}^2$
$D_{220}$	D200	...	$\ell(\ell+1)C_\ell^{TT}/2\pi$ at $\ell = 220$ in $\mu\text{K}^2$
$D_{810}$	D810	...	$\ell(\ell+1)C_\ell^{TT}/2\pi$ at $\ell = 810$ in $\mu\text{K}^2$
$D_{1420}$	D1420	...	$\ell(\ell+1)C_\ell^{TT}/2\pi$ at $\ell = 1420$ in $\mu\text{K}^2$
$D_{2000}$	D2000	...	$\ell(\ell+1)C_\ell^{TT}/2\pi$ at $\ell = 2000$ in $\mu\text{K}^2$
$n_{s,0.002}$	ns02	...	Scalar spectral index at $k = 0.002\text{Mpc}^{-1}$
$r_{0.002}$	r02	0	Tensor/scalar ratio at $k = 0.002\text{Mpc}^{-1}$
$r_{0.01}$	rBB	0	Tensor/scalar ratio at $k = 0.01\text{Mpc}^{-1}$ (roughly BB peak)
$r_{10}$	r10	0	Tensor-scalar temperature $C_\ell$ amplitude at $\ell = 10$
$A_t$	AT	0	$10^9 A_t$ ( $k_0 = 0.05\text{Mpc}^{-1}$ )
$10^9 A_t e^{-2\tau}$	ctlamp	0	Parameter determining $\ell \simeq 100$ tensor $C_\ell$ amplitude
$H(z)$	Hubble{100z}	...	Hubble parameter at redshift $z$ ( $\text{km s}^{-1}\text{Mpc}^{-1}$ )
$D_M(z)$	DM{100z}	...	Comoving angular diameter distance to redshift $z$ in Mpc
$f\sigma_8(z)$	fsigma8z{100z}	...	Growth parameter $f\sigma_8$ at redshift $z$
$\sigma_8(z)$	sigma8z{100z}	...	$\sigma_8$ at redshift $z$
$f_{2000}^{143}$	f2000_143	...	Total temperature foreground power at $\ell = 2000$ in 143GHz $C_\ell$
$f_{2000}^{143\times 217}$	f2000_x	...	Total temperature foreground power at $\ell = 2000$ in $217\text{GHz} \times 143\text{GHz}$ $C_\ell$
$f_{2000}^{217}$	f2000_217	...	Total temperature foreground power at $\ell = 2000$ in 217GHz $C_\ell$
$\chi_x^2$	chi2_x	...	$-2\log(\text{likelihood})$ for likelihood $x$ ; (most are normalized like a $\chi^2$ ).



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## 2 Baseline model

### 2.1 base\_CamSpecHM\_TT\_lowl\_lowE/base\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.038$	$D_M(0.15)$	$647.2 \pm 8.0$
$\Omega_c h^2$	$0.1206 \pm 0.0021$	$z_{\text{re}}$	$7.50 \pm 0.82$	$H(0.38)$	$82.55 \pm 0.57$
$100\theta_{MC}$	$1.04080 \pm 0.00047$	$10^9 A_s$	$2.090 \pm 0.034$	$D_M(0.38)$	$1541 \pm 16$
$\tau$	$0.0521 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.014$	$H(0.51)$	$89.35 \pm 0.44$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{40}$	$1232 \pm 16$	$D_M(0.51)$	$1995 \pm 19$
$n_s$	$0.9632 \pm 0.0058$	$D_{220}$	$5708 \pm 43$	$H(0.61)$	$95.03 \pm 0.35$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2535 \pm 14$	$D_M(0.61)$	$2321 \pm 20$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.4 \pm 5.2$	$H(2.33)$	$236.7 \pm 1.3$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$D_M(2.33)$	$5777 \pm 16$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.9632 \pm 0.0058$	$f\sigma_8(0.15)$	$0.463 \pm 0.012$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.24529^{+0.00010}_{-0.000085}$	$\sigma_8(0.15)$	$0.7489 \pm 0.0075$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24662^{+0.00011}_{-0.000085}$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0096$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.632 \pm 0.042$	$\sigma_8(0.38)$	$0.6629 \pm 0.0060$
$A^{kSZ}$	$< 5.79$	Age/Gyr	$13.828 \pm 0.037$	$f\sigma_8(0.51)$	$0.4769 \pm 0.0082$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$z_*$	$1090.28 \pm 0.41$	$\sigma_8(0.51)$	$0.6200 \pm 0.0055$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.48 \pm 0.48$	$f\sigma_8(0.61)$	$0.4712 \pm 0.0073$
$H_0$	$66.93 \pm 0.92$	$100\theta_*$	$1.04101 \pm 0.00047$	$\sigma_8(0.61)$	$0.5897 \pm 0.0051$
$\Omega_\Lambda$	$0.680 \pm 0.013$	$D_M(z_*)/\text{Gpc}$	$13.879 \pm 0.044$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0025$
$\Omega_m$	$0.320 \pm 0.013$	$z_{\text{drag}}$	$1059.41 \pm 0.46$	$\sigma_8(2.33)$	$0.3059 \pm 0.0027$
$\Omega_m h^2$	$0.1433 \pm 0.0020$	$r_{\text{drag}}$	$147.22 \pm 0.48$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$\Omega_m h^3$	$0.09591 \pm 0.00045$	$k_D$	$0.14054 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\sigma_8$	$0.8114 \pm 0.0089$	$100\theta_D$	$0.16107 \pm 0.00026$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$S_8$	$0.838 \pm 0.024$	$z_{\text{eq}}$	$3410 \pm 48$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.459 \pm 0.013$	$k_{\text{eq}}$	$0.01041 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$23.7 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8113 \pm 0.0089$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.016$	$100\theta_{s,\text{eq}}$	$0.4485 \pm 0.0046$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$98.5 \pm 1.6$	$H(0.15)$	$72.30 \pm 0.79$		

Best-fit  $\chi_{\text{eff}}^2 = 7471.74$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.16$ ;  $\bar{\chi}_{\text{eff}}^2 = 7491.54$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.96$ ;  $R - 1 = 0.00710$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.83 ( $\Delta$  -0.04) commander\_dx12\_v3\_2\_29: 23.40 ( $\Delta$  -0.21) CamSpec like\_10.7HM: 7050.34



## 2.2 base\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$z_{\text{re}}$	$7.63 \pm 0.82$	$D_{\text{M}}(0.38)$	$1529.3 \pm 9.4$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$10^9 A_s$	$2.090 \pm 0.035$	$H(0.51)$	$89.67 \pm 0.29$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$D_{\text{M}}(0.51)$	$1981 \pm 11$
$\tau$	$0.0538 \pm 0.0081$	$D_{40}$	$1224 \pm 13$	$H(0.61)$	$95.28 \pm 0.25$
$\ln(10^{10} A_s)$	$3.039 \pm 0.017$	$D_{220}$	$5716 \pm 42$	$D_{\text{M}}(0.61)$	$2306 \pm 12$
$n_s$	$0.9669 \pm 0.0043$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$235.72 \pm 0.78$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$815.3 \pm 5.0$	$D_{\text{M}}(2.33)$	$5766 \pm 12$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.9 \pm 1.8$	$f\sigma_8(0.15)$	$0.4540 \pm 0.0077$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9669 \pm 0.0043$	$\sigma_8(0.15)$	$0.7458 \pm 0.0069$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.245331^{+0.000088}_{-0.000073}$	$f\sigma_8(0.38)$	$0.4726 \pm 0.0065$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246658^{+0.000088}_{-0.000074}$	$\sigma_8(0.38)$	$0.6613 \pm 0.0059$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.037$	$f\sigma_8(0.51)$	$0.4714 \pm 0.0059$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.805 \pm 0.028$	$\sigma_8(0.51)$	$0.6189 \pm 0.0055$
$A^{kSZ}$	$< 5.72$	$z_*$	$1090.02 \pm 0.30$	$f\sigma_8(0.61)$	$0.4665 \pm 0.0054$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.82 \pm 0.32$	$\sigma_8(0.61)$	$0.5890 \pm 0.0052$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04122 \pm 0.00041$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0026$
$H_0$	$67.64 \pm 0.54$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.031$	$\sigma_8(2.33)$	$0.3063 \pm 0.0027$
$\Omega_{\Lambda}$	$0.6900 \pm 0.0073$	$z_{\text{drag}}$	$1059.51 \pm 0.44$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$\Omega_m$	$0.3100 \pm 0.0073$	$r_{\text{drag}}$	$147.54 \pm 0.35$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_{\text{D}}$	$0.14028 \pm 0.00045$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^3$	$0.09591 \pm 0.00045$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00026$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\sigma_8$	$0.8070 \pm 0.0078$	$z_{\text{eq}}$	$3373 \pm 29$	$\chi_{\text{lowl}}^2$	$22.95 \pm 0.92$
$S_8$	$0.820 \pm 0.015$	$k_{\text{eq}}$	$0.010296 \pm 0.000087$	$\chi_{6\text{DF}}^2$	$0.057 \pm 0.074$
$\sigma_8 \Omega_m^{0.5}$	$0.4493 \pm 0.0082$	$100\theta_{\text{eq}}$	$0.8182 \pm 0.0053$	$\chi_{\text{MGS}}^2$	$1.37 \pm 0.53$
$\sigma_8 \Omega_m^{0.25}$	$0.6021 \pm 0.0080$	$100\theta_{\text{s,eq}}$	$0.4521 \pm 0.0027$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.012$	$H(0.15)$	$72.90 \pm 0.47$	$\chi_{\text{prior}}^2$	$7.6 \pm 3.6$
$r_{\text{drag}} h$	$99.80 \pm 0.94$	$D_{\text{M}}(0.15)$	$641.1 \pm 4.6$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.028$	$H(0.38)$	$82.98 \pm 0.35$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 7497.55; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.53; R - 1 = 0.01113$$



### 2.3 base\_CamSpecHM\_TT\_lowl\_lowE\_post\_Riess18/base\_plikHM\_TT\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.398 \pm 0.036$	$D_M(0.15)$	$633.7 \pm 7.0$
$\Omega_c h^2$	$0.1171 \pm 0.0019$	$z_{\text{re}}$	$7.78 \pm 0.81$	$H(0.38)$	$83.54 \pm 0.54$
$100\theta_{MC}$	$1.04130 \pm 0.00046$	$10^9 A_s$	$2.091 \pm 0.036$	$D_M(0.38)$	$1514 \pm 14$
$\tau$	$0.0560 \pm 0.0082$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.013$	$H(0.51)$	$90.12 \pm 0.43$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{40}$	$1215 \pm 15$	$D_M(0.51)$	$1964 \pm 17$
$n_s$	$0.9714^{+0.0059}_{-0.0053}$	$D_{220}$	$5728 \pm 43$	$H(0.61)$	$95.63 \pm 0.35$
$y_{\text{cal}}$	$1.0007 \pm 0.0026$	$D_{810}$	$2534 \pm 14$	$D_M(0.61)$	$2287 \pm 18$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$816.9 \pm 5.0$	$H(2.33)$	$234.7 \pm 1.1$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.7$	$D_M(2.33)$	$5751 \pm 16$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$n_{s,0.002}$	$0.9714^{+0.0059}_{-0.0053}$	$f\sigma_8(0.15)$	$0.444 \pm 0.011$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.245396 \pm 0.000086$	$\sigma_8(0.15)$	$0.7421 \pm 0.0077$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246723 \pm 0.000086$	$f\sigma_8(0.38)$	$0.4646 \pm 0.0091$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$10^5 D/H$	$2.584 \pm 0.040$	$\sigma_8(0.38)$	$0.6593 \pm 0.0063$
$A^{kSZ}$	$< 5.61$	Age/Gyr	$13.772 \pm 0.035$	$f\sigma_8(0.51)$	$0.4648 \pm 0.0079$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$z_*$	$1089.66 \pm 0.37$	$\sigma_8(0.51)$	$0.6176 \pm 0.0057$
$c_{217}$	$0.9997 \pm 0.0018$	$r_*$	$145.17 \pm 0.44$	$f\sigma_8(0.61)$	$0.4609 \pm 0.0071$
$H_0$	$68.52 \pm 0.85$	$100\theta_*$	$1.04148 \pm 0.00046$	$\sigma_8(0.61)$	$0.5880 \pm 0.0053$
$\Omega_\Lambda$	$0.701 \pm 0.011$	$D_M(z_*)/\text{Gpc}$	$13.939 \pm 0.041$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0026$
$\Omega_m$	$0.299 \pm 0.011$	$z_{\text{drag}}$	$1059.75 \pm 0.46$	$\sigma_8(2.33)$	$0.3068 \pm 0.0027$
$\Omega_m h^2$	$0.1401 \pm 0.0018$	$r_{\text{drag}}$	$147.85 \pm 0.45$	$f_{2000}^{143}$	$30.0 \pm 2.9$
$\Omega_m h^3$	$0.09601 \pm 0.00046$	$k_D$	$0.14008 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$32.5 \pm 2.1$
$\sigma_8$	$0.8018 \pm 0.0090$	$100\theta_D$	$0.16090 \pm 0.00026$	$f_{2000}^{217}$	$107.2 \pm 2.0$
$S_8$	$0.800 \pm 0.021$	$z_{\text{eq}}$	$3334 \pm 42$	$\chi_{\text{small}}^2$	$397.3 \pm 2.0$
$\sigma_8 \Omega_m^{0.5}$	$0.438 \pm 0.012$	$k_{\text{eq}}$	$0.01017 \pm 0.00013$	$\chi_{\text{lowl}}^2$	$22.24 \pm 0.96$
$\sigma_8 \Omega_m^{0.25}$	$0.593 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8262 \pm 0.0082$	$\chi_{\text{H073p45}}^2$	$9.1 \pm 3.0$
$\sigma_8/h^{0.5}$	$0.969 \pm 0.015$	$100\theta_{s,\text{eq}}$	$0.4561 \pm 0.0042$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$101.3 \pm 1.5$	$H(0.15)$	$73.66 \pm 0.73$	$\chi_{\text{CMB}}^2$	$4341 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7502.88$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6290.80$ ;  $R - 1 = 0.07941$



## 2.4 base\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.453 \pm 0.037$	$D_M(0.15)$	$646.9 \pm 7.9$
$\Omega_c h^2$	$0.1205 \pm 0.0021$	$z_{\text{re}}$	$7.67^{+0.54}_{-0.82}$	$H(0.38)$	$82.57 \pm 0.56$
$100\theta_{MC}$	$1.04082 \pm 0.00047$	$10^9 A_s$	$2.097^{+0.025}_{-0.034}$	$D_M(0.38)$	$1541 \pm 16$
$\tau$	$0.0538^{+0.0047}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.014$	$H(0.51)$	$89.37 \pm 0.44$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.016}$	$D_{40}$	$1231 \pm 15$	$D_M(0.51)$	$1995 \pm 18$
$n_s$	$0.9635 \pm 0.0058$	$D_{220}$	$5709 \pm 42$	$H(0.61)$	$95.04 \pm 0.35$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2535 \pm 14$	$D_M(0.61)$	$2320 \pm 20$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.4 \pm 5.2$	$H(2.33)$	$236.6 \pm 1.3$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$D_M(2.33)$	$5776 \pm 16$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.9635 \pm 0.0058$	$f\sigma_8(0.15)$	$0.463 \pm 0.012$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.24529^{+0.00010}_{-0.000084}$	$\sigma_8(0.15)$	$0.7499 \pm 0.0070$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24662^{+0.00010}_{-0.000085}$	$f\sigma_8(0.38)$	$0.4797 \pm 0.0095$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.631 \pm 0.042$	$\sigma_8(0.38)$	$0.6639^{+0.0051}_{-0.0058}$
$A^{kSZ}$	$< 5.75$	Age/Gyr	$13.826 \pm 0.037$	$f\sigma_8(0.51)$	$0.4774 \pm 0.0081$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$z_*$	$1090.27 \pm 0.41$	$\sigma_8(0.51)$	$0.6209^{+0.0044}_{-0.0053}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.49 \pm 0.48$	$f\sigma_8(0.61)$	$0.4717 \pm 0.0071$
$H_0$	$66.97 \pm 0.92$	$100\theta_*$	$1.04102 \pm 0.00046$	$\sigma_8(0.61)$	$0.5906^{+0.0040}_{-0.0050}$
$\Omega_\Lambda$	$0.680 \pm 0.013$	$D_M(z_*)/\text{Gpc}$	$13.880 \pm 0.044$	$f\sigma_8(2.33)$	$0.2975^{+0.0019}_{-0.0025}$
$\Omega_m$	$0.320 \pm 0.013$	$z_{\text{drag}}$	$1059.42 \pm 0.45$	$\sigma_8(2.33)$	$0.3064^{+0.0019}_{-0.0026}$
$\Omega_m h^2$	$0.1433 \pm 0.0020$	$r_{\text{drag}}$	$147.23 \pm 0.48$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$\Omega_m h^3$	$0.09592 \pm 0.00045$	$k_D$	$0.14053 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\sigma_8$	$0.8124 \pm 0.0085$	$100\theta_D$	$0.16106 \pm 0.00026$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$S_8$	$0.839 \pm 0.024$	$z_{\text{eq}}$	$3408 \pm 48$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.459 \pm 0.013$	$k_{\text{eq}}$	$0.01040 \pm 0.00014$	$\chi_{\text{lowl}}^2$	$23.7 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8117 \pm 0.0089$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$100\theta_{s,\text{eq}}$	$0.4487 \pm 0.0046$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$98.6 \pm 1.6$	$H(0.15)$	$72.33 \pm 0.78$		

$\bar{\chi}_{\text{eff}}^2 = 7491.26$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.94$ ;  $R - 1 = 0.00680$



## 2.5 base\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$z_{\text{re}}$	$7.76^{+0.59}_{-0.84}$	$D_{\text{M}}(0.38)$	$1529.1 \pm 9.4$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$10^9 A_s$	$2.095^{+0.026}_{-0.036}$	$H(0.51)$	$89.68 \pm 0.29$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$D_{\text{M}}(0.51)$	$1981 \pm 11$
$\tau$	$0.0551^{+0.0053}_{-0.0085}$	$D_{40}$	$1224 \pm 13$	$H(0.61)$	$95.28 \pm 0.25$
$\ln(10^{10} A_s)$	$3.042^{+0.013}_{-0.017}$	$D_{220}$	$5716 \pm 42$	$D_{\text{M}}(0.61)$	$2305 \pm 12$
$n_s$	$0.9670 \pm 0.0043$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$235.71 \pm 0.78$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$815.3 \pm 5.0$	$D_{\text{M}}(2.33)$	$5766 \pm 12$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.7$	$f\sigma_8(0.15)$	$0.4545 \pm 0.0075$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9670 \pm 0.0043$	$\sigma_8(0.15)$	$0.7468^{+0.0057}_{-0.0069}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.245333^{+0.000087}_{-0.000073}$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0063$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246659^{+0.000087}_{-0.000074}$	$\sigma_8(0.38)$	$0.6621^{+0.0047}_{-0.0059}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.037$	$f\sigma_8(0.51)$	$0.4719 \pm 0.0056$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.805 \pm 0.028$	$\sigma_8(0.51)$	$0.6197^{+0.0043}_{-0.0054}$
$A^{kSZ}$	$< 5.69$	$z_*$	$1090.01 \pm 0.29$	$f\sigma_8(0.61)$	$0.4671 \pm 0.0051$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.82 \pm 0.32$	$\sigma_8(0.61)$	$0.5897^{+0.0040}_{-0.0051}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04122 \pm 0.00041$	$f\sigma_8(2.33)$	$0.2974^{+0.0020}_{-0.0026}$
$H_0$	$67.65 \pm 0.54$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.031$	$\sigma_8(2.33)$	$0.3067^{+0.0020}_{-0.0027}$
$\Omega_{\Lambda}$	$0.6901 \pm 0.0073$	$z_{\text{drag}}$	$1059.52 \pm 0.44$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_m$	$0.3099 \pm 0.0073$	$r_{\text{drag}}$	$147.54 \pm 0.35$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_{\text{D}}$	$0.14028 \pm 0.00045$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^3$	$0.09592 \pm 0.00045$	$100\theta_{\text{D}}$	$0.16101 \pm 0.00026$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\sigma_8$	$0.8080^{+0.0066}_{-0.0077}$	$z_{\text{eq}}$	$3373 \pm 28$	$\chi_{\text{lowl}}^2$	$22.97 \pm 0.92$
$S_8$	$0.821 \pm 0.015$	$k_{\text{eq}}$	$0.010295 \pm 0.000087$	$\chi_{6\text{DF}}^2$	$0.056 \pm 0.073$
$\sigma_8 \Omega_m^{0.5}$	$0.4498 \pm 0.0080$	$100\theta_{\text{eq}}$	$0.8183 \pm 0.0053$	$\chi_{\text{MGS}}^2$	$1.38 \pm 0.53$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0077$	$100\theta_{\text{s,eq}}$	$0.4521 \pm 0.0027$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$H(0.15)$	$72.91 \pm 0.47$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$99.81 \pm 0.94$	$D_{\text{M}}(0.15)$	$641.0 \pm 4.6$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.027$	$H(0.38)$	$82.98 \pm 0.35$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 7497.31; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.56; R - 1 = 0.01176$$



## 2.6 base\_CamSpecHM\_TT\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.400 \pm 0.035$	$D_M(0.15)$	$633.6 \pm 7.0$
$\Omega_c h^2$	$0.1171 \pm 0.0018$	$z_{\text{re}}$	$7.89^{+0.66}_{-0.82}$	$H(0.38)$	$83.54 \pm 0.53$
$100\theta_{MC}$	$1.04130 \pm 0.00046$	$10^9 A_s$	$2.095^{+0.028}_{-0.035}$	$D_M(0.38)$	$1514 \pm 14$
$\tau$	$0.0570^{+0.0064}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.013$	$H(0.51)$	$90.12 \pm 0.43$
$\ln(10^{10} A_s)$	$3.042^{+0.014}_{-0.016}$	$D_{40}$	$1216 \pm 15$	$D_M(0.51)$	$1964 \pm 17$
$n_s$	$0.9715^{+0.0058}_{-0.0053}$	$D_{220}$	$5728 \pm 43$	$H(0.61)$	$95.64 \pm 0.35$
$y_{\text{cal}}$	$1.0007 \pm 0.0026$	$D_{810}$	$2534 \pm 14$	$D_M(0.61)$	$2287 \pm 18$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$816.9 \pm 5.0$	$H(2.33)$	$234.7 \pm 1.1$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.7$	$D_M(2.33)$	$5751 \pm 16$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$n_{s,0.002}$	$0.9715^{+0.0058}_{-0.0053}$	$f\sigma_8(0.15)$	$0.444 \pm 0.011$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.245398 \pm 0.000086$	$\sigma_8(0.15)$	$0.7429^{+0.0067}_{-0.0076}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246724 \pm 0.000086$	$f\sigma_8(0.38)$	$0.4650 \pm 0.0089$
$A_{217}^{PS}$	$107^{+10}_{-10}$	$10^5 D/H$	$2.584 \pm 0.040$	$\sigma_8(0.38)$	$0.6599^{+0.0051}_{-0.0062}$
$A^{kSZ}$	$< 5.61$	Age/Gyr	$13.772 \pm 0.035$	$f\sigma_8(0.51)$	$0.4652 \pm 0.0077$
$c_{100}$	$0.9986 \pm 0.0014$	$z_*$	$1089.65 \pm 0.37$	$\sigma_8(0.51)$	$0.6182^{+0.0046}_{-0.0056}$
$c_{217}$	$0.9997 \pm 0.0018$	$r_*$	$145.18 \pm 0.44$	$f\sigma_8(0.61)$	$0.4613 \pm 0.0069$
$H_0$	$68.53 \pm 0.84$	$100\theta_*$	$1.04148 \pm 0.00045$	$\sigma_8(0.61)$	$0.5886^{+0.0042}_{-0.0052}$
$\Omega_\Lambda$	$0.701 \pm 0.011$	$D_M(z_*)/\text{Gpc}$	$13.939 \pm 0.041$	$f\sigma_8(2.33)$	$0.2973^{+0.0021}_{-0.0026}$
$\Omega_m$	$0.299 \pm 0.011$	$z_{\text{drag}}$	$1059.76 \pm 0.46$	$\sigma_8(2.33)$	$0.3071^{+0.0022}_{-0.0026}$
$\Omega_m h^2$	$0.1401 \pm 0.0018$	$r_{\text{drag}}$	$147.85 \pm 0.45$	$f_{2000}^{143}$	$30.0 \pm 2.9$
$\Omega_m h^3$	$0.09602 \pm 0.00046$	$k_D$	$0.14008 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$32.5 \pm 2.0$
$\sigma_8$	$0.8025 \pm 0.0086$	$100\theta_D$	$0.16089 \pm 0.00026$	$f_{2000}^{217}$	$107.1 \pm 2.0$
$S_8$	$0.801 \pm 0.021$	$z_{\text{eq}}$	$3333 \pm 42$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\sigma_8 \Omega_m^{0.5}$	$0.439 \pm 0.012$	$k_{\text{eq}}$	$0.01017 \pm 0.00013$	$\chi_{\text{lowl}}^2$	$22.25 \pm 0.96$
$\sigma_8 \Omega_m^{0.25}$	$0.593 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8263 \pm 0.0082$	$\chi_{\text{H073p45}}^2$	$9.0 \pm 3.0$
$\sigma_8/h^{0.5}$	$0.970 \pm 0.015$	$100\theta_{s,\text{eq}}$	$0.4561 \pm 0.0042$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$101.3 \pm 1.5$	$H(0.15)$	$73.67 \pm 0.72$	$\chi_{\text{CMB}}^2$	$4341 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7502.64$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6290.83$ ;  $R - 1 = 0.09766$



## 2.7 base\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.029$	$D_M(0.15)$	$643.6 \pm 5.3$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$z_{\text{re}}$	$7.60 \pm 0.81$	$H(0.38)$	$82.84 \pm 0.38$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$10^9 A_s$	$2.095 \pm 0.034$	$D_M(0.38)$	$1534 \pm 11$
$\tau$	$0.0536 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$H(0.51)$	$89.60 \pm 0.30$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{40}$	$1229 \pm 13$	$D_M(0.51)$	$1987 \pm 12$
$n_s$	$0.9653 \pm 0.0044$	$D_{220}$	$5724 \pm 39$	$H(0.61)$	$95.25 \pm 0.24$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$D_M(0.61)$	$2311 \pm 13$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.4 \pm 4.9$	$H(2.33)$	$236.46 \pm 0.85$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.5 \pm 1.7$	$D_M(2.33)$	$5766 \pm 11$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9653 \pm 0.0044$	$f\sigma_8(0.15)$	$0.4591 \pm 0.0084$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.245376^{+0.000067}_{-0.000057}$	$\sigma_8(0.15)$	$0.7482 \pm 0.0068$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246702^{+0.000068}_{-0.000057}$	$f\sigma_8(0.38)$	$0.4766 \pm 0.0069$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.594 \pm 0.029$	$\sigma_8(0.38)$	$0.6629 \pm 0.0057$
$A^{kSZ}$	$< 5.29$	Age/Gyr	$13.802 \pm 0.025$	$f\sigma_8(0.51)$	$0.4747 \pm 0.0061$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$z_*$	$1089.97 \pm 0.28$	$\sigma_8(0.51)$	$0.6202 \pm 0.0053$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$144.49 \pm 0.32$	$f\sigma_8(0.61)$	$0.4695 \pm 0.0055$
$H_0$	$67.34 \pm 0.61$	$100\theta_*$	$1.04108 \pm 0.00031$	$\sigma_8(0.61)$	$0.5900 \pm 0.0050$
$\Omega_\Lambda$	$0.6848 \pm 0.0086$	$D_M(z_*)/\text{Gpc}$	$13.878 \pm 0.030$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0025$
$\Omega_m$	$0.3152 \pm 0.0086$	$z_{\text{drag}}$	$1059.83 \pm 0.33$	$\sigma_8(2.33)$	$0.3064 \pm 0.0026$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$r_{\text{drag}}$	$147.16 \pm 0.32$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$\Omega_m h^3$	$0.09622 \pm 0.00032$	$k_D$	$0.14076 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\sigma_8$	$0.8101 \pm 0.0077$	$100\theta_D$	$0.16082 \pm 0.00019$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$S_8$	$0.830 \pm 0.016$	$z_{\text{eq}}$	$3399 \pm 32$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4548 \pm 0.0090$	$k_{\text{eq}}$	$0.010375 \pm 0.000097$	$\chi_{\text{lowl}}^2$	$23.35 \pm 0.98$
$\sigma_8 \Omega_m^{0.25}$	$0.6070 \pm 0.0085$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4496 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.1 \pm 1.1$	$H(0.15)$	$72.66 \pm 0.52$		

Best-fit  $\chi_{\text{eff}}^2 = 11920.76$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.99$ ;  $\bar{\chi}_{\text{eff}}^2 = 11942.46$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.69$ ;  $R - 1 = 0.01233$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.90 ( $\Delta$  -0.15) commander\_dx12\_v3\_2\_29: 23.00 ( $\Delta$  -0.26) CamSpec like\_10.7HM\_1400\_unified: 11499.65



## 2.8 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$z_{\text{re}}$	$7.70 \pm 0.81$	$D_{\text{M}}(0.38)$	$1528.0 \pm 7.8$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$10^9 A_s$	$2.096 \pm 0.035$	$H(0.51)$	$89.76 \pm 0.23$
$100\theta_{MC}$	$1.04099 \pm 0.00029$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$D_{\text{M}}(0.51)$	$1979.6 \pm 9.1$
$\tau$	$0.0548 \pm 0.0080$	$D_{40}$	$1225 \pm 12$	$H(0.61)$	$95.37 \pm 0.19$
$\ln(10^{10} A_s)$	$3.043 \pm 0.017$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2303.7 \pm 9.8$
$n_s$	$0.9672 \pm 0.0038$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$236.01 \pm 0.65$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.8$	$D_{\text{M}}(2.33)$	$5760.4 \pm 9.2$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.15)$	$0.4549 \pm 0.0067$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9672 \pm 0.0038$	$\sigma_8(0.15)$	$0.7470 \pm 0.0066$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245397^{+0.000062}_{-0.000051}$	$f\sigma_8(0.38)$	$0.4735 \pm 0.0057$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246723^{+0.000062}_{-0.000051}$	$\sigma_8(0.38)$	$0.6623 \pm 0.0057$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.584^{+0.025}_{-0.029}$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0052$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.791 \pm 0.021$	$\sigma_8(0.51)$	$0.6198 \pm 0.0053$
$A^{kSZ}$	$< 5.28$	$z_*$	$1089.83 \pm 0.23$	$f\sigma_8(0.61)$	$0.4673 \pm 0.0049$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.65 \pm 0.25$	$\sigma_8(0.61)$	$0.5898 \pm 0.0051$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04117 \pm 0.00029$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0026$
$H_0$	$67.69 \pm 0.45$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.024$	$\sigma_8(2.33)$	$0.3067 \pm 0.0027$
$\Omega_\Lambda$	$0.6897 \pm 0.0062$	$z_{\text{drag}}$	$1059.89^{+0.33}_{-0.30}$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_m$	$0.3103 \pm 0.0062$	$r_{\text{drag}}$	$147.31 \pm 0.27$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$k_{\text{D}}$	$0.14064 \pm 0.00033$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^3$	$0.09622 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\sigma_8$	$0.8083 \pm 0.0074$	$z_{\text{eq}}$	$3382 \pm 24$	$\chi_{\text{lowl}}^2$	$23.00 \pm 0.83$
$S_8$	$0.822 \pm 0.013$	$k_{\text{eq}}$	$0.010322 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.051 \pm 0.062$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8171 \pm 0.0044$	$\chi_{\text{MGS}}^2$	$1.31 \pm 0.44$
$\sigma_8 \Omega_m^{0.25}$	$0.6033 \pm 0.0071$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.010$	$H(0.15)$	$72.96 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$r_{\text{drag}} h$	$99.71 \pm 0.79$	$D_{\text{M}}(0.15)$	$640.6 \pm 3.9$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.025$	$H(0.38)$	$83.05 \pm 0.29$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11948.28; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.37; R - 1 = 0.01864$$



## 2.9 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245^{+0.00016}_{-0.00014}$	$\langle d^2 \rangle^{1/2}$	$2.419 \pm 0.028$	$D_M(0.15)$	$637.4 \pm 4.8$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$z_{\text{re}}$	$7.81 \pm 0.81$	$H(0.38)$	$83.29 \pm 0.36$
$100\theta_{MC}$	$1.04109 \pm 0.00030$	$10^9 A_s$	$2.099 \pm 0.036$	$D_M(0.38)$	$1521.6 \pm 9.7$
$\tau$	$0.0563 \pm 0.0082$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.012$	$H(0.51)$	$89.95 \pm 0.28$
$\ln(10^{10} A_s)$	$3.044 \pm 0.017$	$D_{40}$	$1222 \pm 13$	$D_M(0.51)$	$1972 \pm 11$
$n_s$	$0.9691 \pm 0.0043$	$D_{220}$	$5735 \pm 39$	$H(0.61)$	$95.52 \pm 0.23$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$D_M(0.61)$	$2296 \pm 12$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.7 \pm 4.8$	$H(2.33)$	$235.56 \pm 0.81$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.1 \pm 1.6$	$D_M(2.33)$	$5754 \pm 10$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9691 \pm 0.0043$	$f\sigma_8(0.15)$	$0.4506 \pm 0.0080$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.245425^{+0.000062}_{-0.000050}$	$\sigma_8(0.15)$	$0.7458 \pm 0.0070$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.246752^{+0.000062}_{-0.000050}$	$f\sigma_8(0.38)$	$0.4703 \pm 0.0067$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.571^{+0.025}_{-0.029}$	$\sigma_8(0.38)$	$0.6617 \pm 0.0059$
$A^{kSZ}$	$< 5.16$	Age/Gyr	$13.777 \pm 0.023$	$f\sigma_8(0.51)$	$0.4696 \pm 0.0060$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.67 \pm 0.26$	$\sigma_8(0.51)$	$0.6196 \pm 0.0055$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$r_*$	$144.80 \pm 0.31$	$f\sigma_8(0.61)$	$0.4651 \pm 0.0055$
$H_0$	$68.07 \pm 0.58$	$100\theta_*$	$1.04126 \pm 0.00030$	$\sigma_8(0.61)$	$0.5897 \pm 0.0052$
$\Omega_\Lambda$	$0.6946 \pm 0.0078$	$D_M(z_*)/\text{Gpc}$	$13.906 \pm 0.029$	$f\sigma_8(2.33)$	$0.2976 \pm 0.0026$
$\Omega_m$	$0.3054 \pm 0.0078$	$z_{\text{drag}}$	$1060.01^{+0.34}_{-0.29}$	$\sigma_8(2.33)$	$0.3071 \pm 0.0027$
$\Omega_m h^2$	$0.1414 \pm 0.0013$	$r_{\text{drag}}$	$147.44 \pm 0.32$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$\Omega_m h^3$	$0.09627 \pm 0.00031$	$k_D$	$0.14056 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\sigma_8$	$0.8064 \pm 0.0078$	$100\theta_D$	$0.16072^{+0.00017}_{-0.00020}$	$f_{2000}^{217}$	$106.5 \pm 1.8$
$S_8$	$0.814 \pm 0.016$	$z_{\text{eq}}$	$3364 \pm 30$	$\chi_{\text{small}}^2$	$397.4 \pm 2.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4456 \pm 0.0085$	$k_{\text{eq}}$	$0.010269 \pm 0.000092$	$\chi_{\text{lowl}}^2$	$22.69 \pm 0.86$
$\sigma_8 \Omega_m^{0.25}$	$0.5994 \pm 0.0082$	$100\theta_{\text{eq}}$	$0.8205 \pm 0.0057$	$\chi_{\text{H073p45}}^2$	$10.6 \pm 2.3$
$\sigma_8/h^{0.5}$	$0.977 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4531 \pm 0.0029$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.6$
$r_{\text{drag}} h$	$100.4 \pm 1.0$	$H(0.15)$	$73.29 \pm 0.49$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11954.26$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.10$ ;  $R - 1 = 0.03390$



## 2.10 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.028$	$D_M(0.15)$	$643.4 \pm 5.2$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$z_{\text{re}}$	$7.74^{+0.55}_{-0.82}$	$H(0.38)$	$82.85 \pm 0.38$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s$	$2.100^{+0.024}_{-0.035}$	$D_M(0.38)$	$1534 \pm 10$
$\tau$	$0.0550^{+0.0050}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$H(0.51)$	$89.61 \pm 0.30$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{40}$	$1229 \pm 13$	$D_M(0.51)$	$1986 \pm 12$
$n_s$	$0.9655 \pm 0.0044$	$D_{220}$	$5724 \pm 39$	$H(0.61)$	$95.25 \pm 0.24$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$D_M(0.61)$	$2311 \pm 13$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.4 \pm 4.9$	$H(2.33)$	$236.44 \pm 0.85$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.7$	$D_M(2.33)$	$5765 \pm 11$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9655 \pm 0.0044$	$f\sigma_8(0.15)$	$0.4595 \pm 0.0083$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.245377^{+0.000067}_{-0.000057}$	$\sigma_8(0.15)$	$0.7491^{+0.0056}_{-0.0066}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246704^{+0.000067}_{-0.000057}$	$f\sigma_8(0.38)$	$0.4770 \pm 0.0067$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.593 \pm 0.029$	$\sigma_8(0.38)$	$0.6637^{+0.0045}_{-0.0056}$
$A^{kSZ}$	$< 5.26$	Age/Gyr	$13.802 \pm 0.025$	$f\sigma_8(0.51)$	$0.4752 \pm 0.0059$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$z_*$	$1089.96 \pm 0.28$	$\sigma_8(0.51)$	$0.6209^{+0.0040}_{-0.0052}$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$144.49 \pm 0.32$	$f\sigma_8(0.61)$	$0.4699 \pm 0.0053$
$H_0$	$67.36 \pm 0.61$	$100\theta_*$	$1.04109 \pm 0.00031$	$\sigma_8(0.61)$	$0.5907^{+0.0038}_{-0.0050}$
$\Omega_\Lambda$	$0.6850 \pm 0.0085$	$D_M(z_*)/\text{Gpc}$	$13.879 \pm 0.030$	$f\sigma_8(2.33)$	$0.2977^{+0.0018}_{-0.0025}$
$\Omega_m$	$0.3150 \pm 0.0085$	$z_{\text{drag}}$	$1059.83 \pm 0.33$	$\sigma_8(2.33)$	$0.3068^{+0.0019}_{-0.0026}$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$r_{\text{drag}}$	$147.17 \pm 0.32$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$\Omega_m h^3$	$0.09622 \pm 0.00032$	$k_D$	$0.14075 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\sigma_8$	$0.8110^{+0.0066}_{-0.0074}$	$100\theta_D$	$0.16082 \pm 0.00019$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$S_8$	$0.831 \pm 0.016$	$z_{\text{eq}}$	$3398 \pm 32$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4552 \pm 0.0089$	$k_{\text{eq}}$	$0.010372 \pm 0.000097$	$\chi_{\text{lowl}}^2$	$23.36 \pm 0.98$
$\sigma_8 \Omega_m^{0.25}$	$0.6076 \pm 0.0083$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4497 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.1 \pm 1.1$	$H(0.15)$	$72.68 \pm 0.52$		

$\bar{\chi}_{\text{eff}}^2 = 11942.19$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.65$ ;  $R - 1 = 0.01099$



2.11 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$z_{\text{re}}$	$7.81^{+0.58}_{-0.82}$	$D_{\text{M}}(0.38)$	$1527.8 \pm 7.7$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$10^9 A_s$	$2.100^{+0.026}_{-0.035}$	$H(0.51)$	$89.76 \pm 0.23$
$100\theta_{MC}$	$1.04099 \pm 0.00029$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$D_{\text{M}}(0.51)$	$1979.4 \pm 9.1$
$\tau$	$0.0559^{+0.0053}_{-0.0083}$	$D_{40}$	$1225 \pm 12$	$H(0.61)$	$95.38 \pm 0.19$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.017}$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2303.4 \pm 9.8$
$n_s$	$0.9673 \pm 0.0038$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$235.99 \pm 0.65$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.9 \pm 4.8$	$D_{\text{M}}(2.33)$	$5760.1 \pm 9.2$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9673 \pm 0.0038$	$\sigma_8(0.15)$	$0.7477^{+0.0053}_{-0.0066}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245398^{+0.000061}_{-0.000051}$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0055$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246725^{+0.000061}_{-0.000051}$	$\sigma_8(0.38)$	$0.6630^{+0.0045}_{-0.0058}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.584^{+0.025}_{-0.028}$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0050$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.790 \pm 0.021$	$\sigma_8(0.51)$	$0.6205^{+0.0041}_{-0.0054}$
$A^{kSZ}$	$< 5.26$	$z_*$	$1089.83 \pm 0.23$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0046$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.65 \pm 0.25$	$\sigma_8(0.61)$	$0.5904^{+0.0039}_{-0.0051}$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04117 \pm 0.00029$	$f\sigma_8(2.33)$	$0.2978^{+0.0019}_{-0.0026}$
$H_0$	$67.70 \pm 0.45$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.024$	$\sigma_8(2.33)$	$0.3070^{+0.0020}_{-0.0027}$
$\Omega_\Lambda$	$0.6898 \pm 0.0062$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_m$	$0.3102 \pm 0.0062$	$r_{\text{drag}}$	$147.31 \pm 0.27$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$k_{\text{D}}$	$0.14064 \pm 0.00033$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^3$	$0.09623 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.1 \pm 2.0$
$\sigma_8$	$0.8091^{+0.0061}_{-0.0073}$	$z_{\text{eq}}$	$3381 \pm 24$	$\chi_{\text{lowl}}^2$	$23.01 \pm 0.82$
$S_8$	$0.823 \pm 0.013$	$k_{\text{eq}}$	$0.010320 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.050 \pm 0.061$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0069$	$100\theta_{\text{eq}}$	$0.8172 \pm 0.0044$	$\chi_{\text{MGS}}^2$	$1.32 \pm 0.44$
$\sigma_8 \Omega_m^{0.25}$	$0.6038 \pm 0.0068$	$100\theta_{\text{s,eq}}$	$0.4514 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.9833 \pm 0.0099$	$H(0.15)$	$72.97 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$r_{\text{drag}} h$	$99.73 \pm 0.79$	$D_{\text{M}}(0.15)$	$640.5 \pm 3.9$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.024$	$H(0.38)$	$83.06 \pm 0.29$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11947.99; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.27; R - 1 = 0.01741$$



2.12 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246^{+0.00016}_{-0.00014}$	$\langle d^2 \rangle^{1/2}$	$2.421 \pm 0.027$	$D_M(0.15)$	$637.3 \pm 4.8$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$z_{\text{re}}$	$7.91^{+0.63}_{-0.83}$	$H(0.38)$	$83.30 \pm 0.36$
$100\theta_{MC}$	$1.04109 \pm 0.00030$	$10^9 A_s$	$2.102^{+0.027}_{-0.036}$	$D_M(0.38)$	$1521.4 \pm 9.7$
$\tau$	$0.0572^{+0.0060}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.012$	$H(0.51)$	$89.95 \pm 0.28$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.017}$	$D_{40}$	$1222 \pm 13$	$D_M(0.51)$	$1972 \pm 11$
$n_s$	$0.9692 \pm 0.0043$	$D_{220}$	$5735 \pm 39$	$H(0.61)$	$95.53 \pm 0.23$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2537 \pm 13$	$D_M(0.61)$	$2295 \pm 12$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.7 \pm 4.8$	$H(2.33)$	$235.55 \pm 0.81$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.1 \pm 1.6$	$D_M(2.33)$	$5754 \pm 10$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9692 \pm 0.0043$	$f\sigma_8(0.15)$	$0.4509 \pm 0.0079$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.245426^{+0.000061}_{-0.000050}$	$\sigma_8(0.15)$	$0.7464^{+0.0059}_{-0.0070}$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.246753^{+0.000062}_{-0.000050}$	$f\sigma_8(0.38)$	$0.4706 \pm 0.0066$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.570^{+0.025}_{-0.029}$	$\sigma_8(0.38)$	$0.6623^{+0.0048}_{-0.0060}$
$A^{kSZ}$	$< 5.15$	Age/Gyr	$13.776 \pm 0.023$	$f\sigma_8(0.51)$	$0.4699 \pm 0.0058$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.67 \pm 0.26$	$\sigma_8(0.51)$	$0.6201^{+0.0043}_{-0.0055}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$r_*$	$144.80 \pm 0.31$	$f\sigma_8(0.61)$	$0.4655 \pm 0.0053$
$H_0$	$68.08 \pm 0.57$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(0.61)$	$0.5902^{+0.0041}_{-0.0053}$
$\Omega_\Lambda$	$0.6948 \pm 0.0077$	$D_M(z_*)/\text{Gpc}$	$13.907 \pm 0.029$	$f\sigma_8(2.33)$	$0.2978^{+0.0020}_{-0.0026}$
$\Omega_m$	$0.3052 \pm 0.0077$	$z_{\text{drag}}$	$1060.01^{+0.34}_{-0.29}$	$\sigma_8(2.33)$	$0.3074^{+0.0021}_{-0.0027}$
$\Omega_m h^2$	$0.1414 \pm 0.0013$	$r_{\text{drag}}$	$147.45 \pm 0.32$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$\Omega_m h^3$	$0.09627 \pm 0.00031$	$k_D$	$0.14056 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\sigma_8$	$0.8070^{+0.0069}_{-0.0078}$	$100\theta_D$	$0.16072^{+0.00017}_{-0.00020}$	$f_{2000}^{217}$	$106.5 \pm 1.8$
$S_8$	$0.814 \pm 0.015$	$z_{\text{eq}}$	$3364 \pm 30$	$\chi_{\text{small}}^2$	$397.4 \pm 2.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4458 \pm 0.0084$	$k_{\text{eq}}$	$0.010267 \pm 0.000092$	$\chi_{\text{lowl}}^2$	$22.70 \pm 0.86$
$\sigma_8 \Omega_m^{0.25}$	$0.5998 \pm 0.0080$	$100\theta_{\text{eq}}$	$0.8206 \pm 0.0057$	$\chi_{\text{H073p45}}^2$	$10.6 \pm 2.2$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4531 \pm 0.0029$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$r_{\text{drag}} h$	$100.4 \pm 1.0$	$H(0.15)$	$73.30 \pm 0.49$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11954.01$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.12$ ;  $R - 1 = 0.03572$



### 2.13 base\_CamSpecHM\_TE\_lowE/base\_plikHM\_TE\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02249 \pm 0.00025$	$D_{220}$	$5704 \pm 60$	$H(0.38)$	$83.62 \pm 0.59$
$\Omega_c h^2$	$0.1173 \pm 0.0021$	$D_{810}$	$2526 \pm 32$	$D_M(0.38)$	$1513 \pm 16$
$100\theta_{MC}$	$1.04140 \pm 0.00050$	$D_{1420}$	$816 \pm 15$	$H(0.51)$	$90.20 \pm 0.47$
$\tau$	$0.0500 \pm 0.0086$	$D_{2000}$	$230.5 \pm 5.2$	$D_M(0.51)$	$1962 \pm 18$
$\ln(10^{10} A_s)$	$3.024 \pm 0.021$	$n_{s,0.002}$	$0.973 \pm 0.013$	$H(0.61)$	$95.72^{+0.36}_{-0.40}$
$n_s$	$0.973 \pm 0.013$	$Y_P$	$0.24544 \pm 0.00010$	$D_M(0.61)$	$2285 \pm 20$
$y_{cal}$	$0.99999 \pm 0.0025$	$Y_P^{BBN}$	$0.24676 \pm 0.00010$	$H(2.33)$	$234.9 \pm 1.3$
$H_0$	$68.58 \pm 0.93$	$10^5 D/H$	$2.565 \pm 0.046$	$D_M(2.33)$	$5746 \pm 17$
$\Omega_\Lambda$	$0.701 \pm 0.012$	Age/Gyr	$13.759 \pm 0.038$	$f\sigma_8(0.15)$	$0.441 \pm 0.012$
$\Omega_m$	$0.299 \pm 0.012$	$z_*$	$1089.54 \pm 0.42$	$\sigma_8(0.15)$	$0.737 \pm 0.010$
$\Omega_m h^2$	$0.1404 \pm 0.0020$	$r_*$	$145.05 \pm 0.50$	$f\sigma_8(0.38)$	$0.461 \pm 0.010$
$\Omega_m h^3$	$0.09628 \pm 0.00053$	$100\theta_*$	$1.04157 \pm 0.00050$	$\sigma_8(0.38)$	$0.6546 \pm 0.0087$
$\sigma_8$	$0.796 \pm 0.012$	$D_M(z_*)/\text{Gpc}$	$13.926 \pm 0.047$	$f\sigma_8(0.51)$	$0.4615 \pm 0.0093$
$S_8$	$0.794 \pm 0.024$	$z_{\text{drag}}$	$1060.00 \pm 0.55$	$\sigma_8(0.51)$	$0.6132 \pm 0.0080$
$\sigma_8 \Omega_m^{0.5}$	$0.435 \pm 0.013$	$r_{\text{drag}}$	$147.69 \pm 0.52$	$f\sigma_8(0.61)$	$0.4576 \pm 0.0085$
$\sigma_8 \Omega_m^{0.25}$	$0.589 \pm 0.013$	$k_D$	$0.14032 \pm 0.00060$	$\sigma_8(0.61)$	$0.5839 \pm 0.0076$
$\sigma_8/h^{0.5}$	$0.961 \pm 0.018$	$100\theta_D$	$0.16077 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2949 \pm 0.0038$
$r_{\text{drag}} h$	$101.3 \pm 1.6$	$z_{\text{eq}}$	$3340 \pm 48$	$\sigma_8(2.33)$	$0.3046 \pm 0.0039$
$\langle d^2 \rangle^{1/2}$	$2.377 \pm 0.044$	$k_{\text{eq}}$	$0.01019 \pm 0.00015$	$\chi^2_{\text{small}}$	$396.8 \pm 1.6$
$z_{\text{re}}$	$7.14^{+0.92}_{-0.75}$	$100\theta_{\text{eq}}$	$0.8254 \pm 0.0092$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$10^9 A_s$	$2.058 \pm 0.044$	$100\theta_{s,\text{eq}}$	$0.4556 \pm 0.0047$	$\chi^2_{\text{CMB}}$	$2117 \pm 900$
$10^9 A_s e^{-2\tau}$	$1.862 \pm 0.022$	$H(0.15)$	$73.73 \pm 0.80$		
$D_{40}$	$1206 \pm 27$	$D_M(0.15)$	$633.1 \pm 7.7$		

Best-fit  $\chi^2_{\text{eff}} = 2981.64$ ;  $\Delta\chi^2_{\text{eff}} = 1732.66$ ;  $\bar{\chi}^2_{\text{eff}} = 2988.91$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1724.91$ ;  $R - 1 = 0.00640$

$\chi^2_{\text{eff}}$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.67 ( $\Delta$  -0.02) CamSpec like\_10.7HM\_1400\_unified: 2575.95



## 2.14 base\_CamSpecHM\_TE\_lowE\_post\_zre6p5/base\_plikHM\_TE\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02250 \pm 0.00025$	$D_{220}$	$5704 \pm 60$	$H(0.38)$	$83.64 \pm 0.59$
$\Omega_c h^2$	$0.1172 \pm 0.0021$	$D_{810}$	$2527 \pm 32$	$D_M(0.38)$	$1512 \pm 15$
$100\theta_{MC}$	$1.04140 \pm 0.00050$	$D_{1420}$	$816 \pm 15$	$H(0.51)$	$90.22 \pm 0.47$
$\tau$	$0.0532^{+0.0037}_{-0.0081}$	$D_{2000}$	$230.7 \pm 5.2$	$D_M(0.51)$	$1961 \pm 18$
$\ln(10^{10} A_s)$	$3.031^{+0.015}_{-0.019}$	$n_{s,0.002}$	$0.973 \pm 0.013$	$H(0.61)$	$95.74^{+0.36}_{-0.40}$
$n_s$	$0.973 \pm 0.013$	$Y_P$	$0.24544 \pm 0.00010$	$D_M(0.61)$	$2284 \pm 20$
$y_{cal}$	$0.99999 \pm 0.0025$	$Y_P^{BBN}$	$0.24677 \pm 0.00010$	$H(2.33)$	$234.9 \pm 1.3$
$H_0$	$68.62 \pm 0.93$	$10^5 D/H$	$2.564 \pm 0.046$	$D_M(2.33)$	$5745 \pm 17$
$\Omega_\Lambda$	$0.702 \pm 0.012$	Age/Gyr	$13.758 \pm 0.038$	$f\sigma_8(0.15)$	$0.442 \pm 0.012$
$\Omega_m$	$0.298 \pm 0.012$	$z_*$	$1089.52 \pm 0.42$	$\sigma_8(0.15)$	$0.7393 \pm 0.0093$
$\Omega_m h^2$	$0.1403 \pm 0.0020$	$r_*$	$145.07 \pm 0.50$	$f\sigma_8(0.38)$	$0.463 \pm 0.010$
$\Omega_m h^3$	$0.09629 \pm 0.00053$	$100\theta_*$	$1.04158 \pm 0.00049$	$\sigma_8(0.38)$	$0.6568^{+0.0072}_{-0.0082}$
$\sigma_8$	$0.799 \pm 0.011$	$D_M(z_*)/\text{Gpc}$	$13.927 \pm 0.047$	$f\sigma_8(0.51)$	$0.4628 \pm 0.0090$
$S_8$	$0.796 \pm 0.024$	$z_{\text{drag}}$	$1060.02 \pm 0.55$	$\sigma_8(0.51)$	$0.6153^{+0.0065}_{-0.0075}$
$\sigma_8 \Omega_m^{0.5}$	$0.436 \pm 0.013$	$r_{\text{drag}}$	$147.70 \pm 0.52$	$f\sigma_8(0.61)$	$0.4590 \pm 0.0081$
$\sigma_8 \Omega_m^{0.25}$	$0.590 \pm 0.012$	$k_D$	$0.14032 \pm 0.00060$	$\sigma_8(0.61)$	$0.5858^{+0.0061}_{-0.0071}$
$\sigma_8/h^{0.5}$	$0.964 \pm 0.017$	$100\theta_D$	$0.16076 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2959^{+0.0030}_{-0.0035}$
$r_{\text{drag}} h$	$101.4 \pm 1.6$	$z_{\text{eq}}$	$3338 \pm 47$	$\sigma_8(2.33)$	$0.3057^{+0.0031}_{-0.0037}$
$\langle d^2 \rangle^{1/2}$	$2.383 \pm 0.042$	$k_{\text{eq}}$	$0.01019 \pm 0.00014$	$\chi^2_{\text{simall}}$	$396.4 \pm 1.2$
$z_{\text{re}}$	$7.48^{+0.37}_{-0.85}$	$100\theta_{\text{eq}}$	$0.8257 \pm 0.0091$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$10^9 A_s$	$2.072^{+0.031}_{-0.040}$	$100\theta_{s,\text{eq}}$	$0.4558 \pm 0.0047$	$\chi^2_{\text{CMB}}$	$2117 \pm 900$
$10^9 A_s e^{-2\tau}$	$1.862 \pm 0.022$	$H(0.15)$	$73.76 \pm 0.80$		
$D_{40}$	$1206 \pm 27$	$D_M(0.15)$	$632.8 \pm 7.7$		

$$\bar{\chi}^2_{\text{eff}} = 2988.52; \Delta\bar{\chi}^2_{\text{eff}} = 1724.88; R - 1 = 0.00517$$



## 2.15 base\_CamSpecHM\_EE\_lowE/base\_plikHM\_EE\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.0236^{+0.0011}_{-0.0013}$	$D_{220}$	$5955 \pm 190$	$H(0.38)$	$84.0^{+1.8}_{-2.1}$
$\Omega_c h^2$	$0.1175 \pm 0.0050$	$D_{810}$	$2594 \pm 39$	$D_M(0.38)$	$1507 \pm 49$
$100\theta_{MC}$	$1.03964 \pm 0.00095$	$D_{1420}$	$842 \pm 19$	$H(0.51)$	$90.7^{+1.5}_{-1.8}$
$\tau$	$0.0516 \pm 0.0089$	$D_{2000}$	$240.0 \pm 7.2$	$D_M(0.51)$	$1954 \pm 59$
$\ln(10^{10} A_s)$	$3.055 \pm 0.022$	$n_{s,0.002}$	$0.974^{+0.015}_{-0.016}$	$H(0.61)$	$96.2^{+1.3}_{-1.6}$
$n_s$	$0.974^{+0.015}_{-0.016}$	$Y_P$	$0.24589^{+0.00042}_{-0.00053}$	$D_M(0.61)$	$2275 \pm 64$
$y_{cal}$	$0.99997 \pm 0.0025$	$Y_P^{BBN}$	$0.24722^{+0.00042}_{-0.00054}$	$H(2.33)$	$236.1^{+2.1}_{-2.4}$
$H_0$	$68.9 \pm 2.9$	$10^5 D/H$	$2.38^{+0.19}_{-0.21}$	$D_M(2.33)$	$5719^{+74}_{-64}$
$\Omega_\Lambda$	$0.699^{+0.036}_{-0.029}$	Age/Gyr	$13.70^{+0.16}_{-0.15}$	$f\sigma_8(0.15)$	$0.445 \pm 0.031$
$\Omega_m$	$0.301^{+0.029}_{-0.036}$	$z_*$	$1088.3^{+1.7}_{-1.8}$	$\sigma_8(0.15)$	$0.742^{+0.016}_{-0.014}$
$\Omega_m h^2$	$0.1418 \pm 0.0040$	$r_*$	$144.12 \pm 0.67$	$f\sigma_8(0.38)$	$0.465 \pm 0.025$
$\Omega_m h^3$	$0.0976^{+0.0016}_{-0.0019}$	$100\theta_*$	$1.03969 \pm 0.00091$	$\sigma_8(0.38)$	$0.659^{+0.011}_{-0.0096}$
$\sigma_8$	$0.802 \pm 0.019$	$D_M(z_*)/\text{Gpc}$	$13.862 \pm 0.062$	$f\sigma_8(0.51)$	$0.465 \pm 0.021$
$S_8$	$0.803^{+0.058}_{-0.065}$	$z_{\text{drag}}$	$1062.6 \pm 2.4$	$\sigma_8(0.51)$	$0.6175^{+0.0093}_{-0.0081}$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.032}_{-0.035}$	$r_{\text{drag}}$	$146.38 \pm 0.70$	$f\sigma_8(0.61)$	$0.461^{+0.019}_{-0.017}$
$\sigma_8 \Omega_m^{0.25}$	$0.594 \pm 0.029$	$k_D$	$0.1425 \pm 0.0013$	$\sigma_8(0.61)$	$0.5879^{+0.0082}_{-0.0073}$
$\sigma_8/h^{0.5}$	$0.967 \pm 0.041$	$100\theta_D$	$0.1591^{+0.0012}_{-0.0014}$	$f\sigma_8(2.33)$	$0.2969 \pm 0.0035$
$r_{\text{drag}} h$	$100.9 \pm 4.2$	$z_{\text{eq}}$	$3373 \pm 95$	$\sigma_8(2.33)$	$0.3068 \pm 0.0037$
$\langle d^2 \rangle^{1/2}$	$2.412 \pm 0.084$	$k_{\text{eq}}$	$0.01029 \pm 0.00029$	$\chi^2_{\text{small}}$	$396.8 \pm 1.6$
$z_{\text{re}}$	$7.08^{+0.88}_{-0.74}$	$100\theta_{\text{eq}}$	$0.822 \pm 0.020$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s$	$2.123 \pm 0.047$	$100\theta_{s,\text{eq}}$	$0.4527 \pm 0.0098$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$
$10^9 A_s e^{-2\tau}$	$1.914 \pm 0.026$	$H(0.15)$	$74.1^{+2.4}_{-2.7}$		
$D_{40}$	$1245 \pm 34$	$D_M(0.15)$	$631 \pm 24$		

Best-fit  $\chi^2_{\text{eff}} = 2292.16$ ;  $\Delta\chi^2_{\text{eff}} = 1157.61$ ;  $\bar{\chi}^2_{\text{eff}} = 2299.35$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1157.74$ ;  $R - 1 = 0.00959$

$\chi^2_{\text{eff}}$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.62 ( $\Delta$  0.02) CamSpec like\_10.7HM\_1400\_unified: 1886.52



## 2.16 base\_CamSpecHM\_EE\_lowE\_post\_zre6p5/base\_plikHM\_EE\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.0236^{+0.0012}_{-0.0013}$	$D_{220}$	$5949 \pm 190$	$H(0.38)$	$84.0^{+1.8}_{-2.2}$
$\Omega_c h^2$	$0.1175 \pm 0.0050$	$D_{810}$	$2593 \pm 39$	$D_M(0.38)$	$1507 \pm 50$
$100\theta_{MC}$	$1.03964 \pm 0.00095$	$D_{1420}$	$842 \pm 19$	$H(0.51)$	$90.6^{+1.5}_{-1.9}$
$\tau$	$0.0549^{+0.0048}_{-0.0081}$	$D_{2000}$	$240.0 \pm 7.2$	$D_M(0.51)$	$1954 \pm 59$
$\ln(10^{10} A_s)$	$3.061^{+0.018}_{-0.020}$	$n_{s,0.002}$	$0.974^{+0.014}_{-0.016}$	$H(0.61)$	$96.2^{+1.3}_{-1.6}$
$n_s$	$0.974^{+0.014}_{-0.016}$	$Y_P$	$0.24588^{+0.00042}_{-0.00053}$	$D_M(0.61)$	$2275 \pm 64$
$y_{cal}$	$0.99998 \pm 0.0025$	$Y_P^{BBN}$	$0.24721^{+0.00043}_{-0.00053}$	$H(2.33)$	$236.0^{+2.1}_{-2.4}$
$H_0$	$68.9 \pm 2.9$	$10^5 D/H$	$2.38^{+0.19}_{-0.21}$	$D_M(2.33)$	$5720^{+74}_{-64}$
$\Omega_\Lambda$	$0.699^{+0.036}_{-0.029}$	Age/Gyr	$13.70^{+0.16}_{-0.15}$	$f\sigma_8(0.15)$	$0.446 \pm 0.031$
$\Omega_m$	$0.301^{+0.029}_{-0.036}$	$z_*$	$1088.3 \pm 1.8$	$\sigma_8(0.15)$	$0.745^{+0.015}_{-0.013}$
$\Omega_m h^2$	$0.1417 \pm 0.0040$	$r_*$	$144.14 \pm 0.67$	$f\sigma_8(0.38)$	$0.467 \pm 0.025$
$\Omega_m h^3$	$0.0976^{+0.0016}_{-0.0019}$	$100\theta_*$	$1.03970 \pm 0.00091$	$\sigma_8(0.38)$	$0.661^{+0.010}_{-0.0091}$
$\sigma_8$	$0.805 \pm 0.019$	$D_M(z_*)/\text{Gpc}$	$13.864 \pm 0.062$	$f\sigma_8(0.51)$	$0.467 \pm 0.021$
$S_8$	$0.806 \pm 0.062$	$z_{\text{drag}}$	$1062.5 \pm 2.4$	$\sigma_8(0.51)$	$0.6196 \pm 0.0081$
$\sigma_8 \Omega_m^{0.5}$	$0.441 \pm 0.034$	$r_{\text{drag}}$	$146.41 \pm 0.70$	$f\sigma_8(0.61)$	$0.463^{+0.019}_{-0.017}$
$\sigma_8 \Omega_m^{0.25}$	$0.596 \pm 0.029$	$k_D$	$0.1424 \pm 0.0013$	$\sigma_8(0.61)$	$0.5899 \pm 0.0071$
$\sigma_8/h^{0.5}$	$0.971 \pm 0.041$	$100\theta_D$	$0.1591^{+0.0012}_{-0.0014}$	$f\sigma_8(2.33)$	$0.2979^{+0.0029}_{-0.0032}$
$r_{\text{drag}} h$	$100.9 \pm 4.3$	$z_{\text{eq}}$	$3372 \pm 95$	$\sigma_8(2.33)$	$0.3078^{+0.0030}_{-0.0034}$
$\langle d^2 \rangle^{1/2}$	$2.419 \pm 0.083$	$k_{\text{eq}}$	$0.01029 \pm 0.00029$	$\chi^2_{\text{simall}}$	$396.5 \pm 1.4$
$z_{\text{re}}$	$7.43^{+0.32}_{-0.83}$	$100\theta_{\text{eq}}$	$0.822 \pm 0.020$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s$	$2.136^{+0.037}_{-0.043}$	$100\theta_{s,\text{eq}}$	$0.4528 \pm 0.0099$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$
$10^9 A_s e^{-2\tau}$	$1.914 \pm 0.026$	$H(0.15)$	$74.1^{+2.4}_{-2.7}$		
$D_{40}$	$1244 \pm 34$	$D_M(0.15)$	$631 \pm 24$		

$\bar{\chi}^2_{\text{eff}} = 2298.97$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1157.66$ ;  $R - 1 = 0.00869$



## 2.17 base\_CamSpecHM\_TE\_lowE\_BAO/base\_plikHM\_TE\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02244 \pm 0.00023$	$D_{810}$	$2527 \pm 32$	$H(0.51)$	$90.04 \pm 0.30$
$\Omega_c h^2$	$0.1180 \pm 0.0012$	$D_{1420}$	$815 \pm 14$	$D_M(0.51)$	$1968 \pm 11$
$100\theta_{MC}$	$1.04132 \pm 0.00046$	$D_{2000}$	$230.2 \pm 5.1$	$H(0.61)$	$95.59 \pm 0.26$
$\tau$	$0.0492^{+0.0085}_{-0.0076}$	$n_{s,0.002}$	$0.970 \pm 0.011$	$D_M(0.61)$	$2292 \pm 12$
$\ln(10^{10} A_s)$	$3.025^{+0.022}_{-0.020}$	$Y_P$	$0.245418 \pm 0.000093$	$H(2.33)$	$235.34 \pm 0.81$
$n_s$	$0.970 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.246744 \pm 0.000093$	$D_M(2.33)$	$5751 \pm 13$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$10^5 D/H$	$2.574 \pm 0.043$	$f\sigma_8(0.15)$	$0.4445 \pm 0.0085$
$H_0$	$68.25 \pm 0.54$	Age/Gyr	$13.770 \pm 0.030$	$\sigma_8(0.15)$	$0.7385 \pm 0.0098$
$\Omega_\Lambda$	$0.6971 \pm 0.0070$	$z_*$	$1089.66 \pm 0.33$	$f\sigma_8(0.38)$	$0.4645 \pm 0.0077$
$\Omega_m$	$0.3029 \pm 0.0070$	$r_*$	$144.90 \pm 0.34$	$\sigma_8(0.38)$	$0.6556 \pm 0.0086$
$\Omega_m h^2$	$0.1411 \pm 0.0012$	$100\theta_*$	$1.04150 \pm 0.00046$	$f\sigma_8(0.51)$	$0.4641 \pm 0.0072$
$\Omega_m h^3$	$0.09629 \pm 0.00053$	$D_M(z_*)/\text{Gpc}$	$13.913 \pm 0.033$	$\sigma_8(0.51)$	$0.6139 \pm 0.0080$
$\sigma_8$	$0.798 \pm 0.011$	$z_{\text{drag}}$	$1059.94 \pm 0.53$	$f\sigma_8(0.61)$	$0.4599 \pm 0.0068$
$S_8$	$0.802 \pm 0.016$	$r_{\text{drag}}$	$147.55 \pm 0.38$	$\sigma_8(0.61)$	$0.5844 \pm 0.0076$
$\sigma_8 \Omega_m^{0.5}$	$0.4393 \pm 0.0088$	$k_D$	$0.14043 \pm 0.00052$	$f\sigma_8(2.33)$	$0.2950 \pm 0.0038$
$\sigma_8 \Omega_m^{0.25}$	$0.5922 \pm 0.0096$	$100\theta_D$	$0.16080 \pm 0.00031$	$\sigma_8(2.33)$	$0.3045 \pm 0.0040$
$\sigma_8/h^{0.5}$	$0.966 \pm 0.014$	$z_{\text{eq}}$	$3356 \pm 29$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$r_{\text{drag}} h$	$100.71 \pm 0.93$	$k_{\text{eq}}$	$0.010243 \pm 0.000088$	$\chi_{6\text{DF}}^2$	$0.039 \pm 0.053$
$\langle d^2 \rangle^{1/2}$	$2.390 \pm 0.033$	$100\theta_{\text{eq}}$	$0.8222 \pm 0.0053$	$\chi_{\text{MGS}}^2$	$1.91 \pm 0.59$
$z_{\text{re}}$	$7.09^{+0.92}_{-0.74}$	$100\theta_{s,\text{eq}}$	$0.4540 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$3.95 \pm 0.82$
$10^9 A_s$	$2.059 \pm 0.044$	$H(0.15)$	$73.45 \pm 0.47$	$\chi_{\text{prior}}^2$	$9.2 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.865 \pm 0.021$	$D_M(0.15)$	$635.8 \pm 4.6$	$\chi_{\text{BAO}}^2$	$5.90 \pm 0.96$
$D_{40}$	$1211 \pm 25$	$H(0.38)$	$83.41 \pm 0.36$	$\chi_{\text{CMB}}^2$	$2117 \pm 900$
$D_{220}$	$5705 \pm 59$	$D_M(0.38)$	$1518.4 \pm 9.3$		

Best-fit  $\chi_{\text{eff}}^2 = 2987.15$ ;  $\Delta\chi_{\text{eff}}^2 = 1732.92$ ;  $\bar{\chi}_{\text{eff}}^2 = 2994.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 1724.69$ ;  $R - 1 = 0.00951$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.89 ( $\Delta$  0.14) DR12BAO: 3.37 ( $\Delta$  -0.07) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.71 ( $\Delta$  0.04) CamSpec like\_10.7HM\_1400\_unified: 2576.15



## 2.18 base\_CamSpecHM\_TE\_lowE\_BAO\_post\_lensing/base\_plikHM\_TE\_lowE\_BAO\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02248 \pm 0.00023$	$D_{810}$	$2542 \pm 24$	$H(0.51)$	$89.99 \pm 0.30$
$\Omega_c h^2$	$0.1185 \pm 0.0012$	$D_{1420}$	$821 \pm 12$	$D_M(0.51)$	$1971 \pm 11$
$100\theta_{MC}$	$1.04129 \pm 0.00045$	$D_{2000}$	$232.2 \pm 4.1$	$H(0.61)$	$95.57 \pm 0.26$
$\tau$	$0.0535 \pm 0.0075$	$n_{s,0.002}$	$0.972 \pm 0.011$	$D_M(0.61)$	$2294 \pm 12$
$\ln(10^{10} A_s)$	$3.040 \pm 0.015$	$Y_P$	$0.245434 \pm 0.000091$	$H(2.33)$	$235.72 \pm 0.77$
$n_s$	$0.972 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.246761 \pm 0.000092$	$D_M(2.33)$	$5751 \pm 13$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$10^5 D/H$	$2.567 \pm 0.042$	$f\sigma_8(0.15)$	$0.4506 \pm 0.0064$
$H_0$	$68.10 \pm 0.53$	Age/Gyr	$13.769 \pm 0.030$	$\sigma_8(0.15)$	$0.7456 \pm 0.0063$
$\Omega_\Lambda$	$0.6945 \pm 0.0069$	$z_*$	$1089.66 \pm 0.33$	$f\sigma_8(0.38)$	$0.4702 \pm 0.0053$
$\Omega_m$	$0.3055 \pm 0.0069$	$r_*$	$144.74 \pm 0.32$	$\sigma_8(0.38)$	$0.6615 \pm 0.0056$
$\Omega_m h^2$	$0.1416 \pm 0.0012$	$100\theta_*$	$1.04146 \pm 0.00045$	$f\sigma_8(0.51)$	$0.4695 \pm 0.0048$
$\Omega_m h^3$	$0.09644 \pm 0.00051$	$D_M(z_*)/\text{Gpc}$	$13.898 \pm 0.032$	$\sigma_8(0.51)$	$0.6194 \pm 0.0053$
$\sigma_8$	$0.8062 \pm 0.0069$	$z_{\text{drag}}$	$1060.08 \pm 0.52$	$f\sigma_8(0.61)$	$0.4650 \pm 0.0045$
$S_8$	$0.814 \pm 0.012$	$r_{\text{drag}}$	$147.37 \pm 0.36$	$\sigma_8(0.61)$	$0.5895 \pm 0.0051$
$\sigma_8 \Omega_m^{0.5}$	$0.4456 \pm 0.0068$	$k_D$	$0.14065 \pm 0.00050$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0026$
$\sigma_8 \Omega_m^{0.25}$	$0.5993 \pm 0.0066$	$100\theta_D$	$0.16072 \pm 0.00031$	$\sigma_8(2.33)$	$0.3070 \pm 0.0028$
$\sigma_8/h^{0.5}$	$0.9770 \pm 0.0095$	$z_{\text{eq}}$	$3369 \pm 28$	$\chi^2_{\text{lensing}}$	$10.0 \pm 1.6$
$r_{\text{drag}} h$	$100.35 \pm 0.90$	$k_{\text{eq}}$	$0.010283 \pm 0.000085$	$\chi^2_{\text{small}}$	$396.8 \pm 1.5$
$\langle d^2 \rangle^{1/2}$	$2.410 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8199 \pm 0.0051$	$\chi^2_{6\text{DF}}$	$0.035 \pm 0.048$
$z_{\text{re}}$	$7.53 \pm 0.76$	$100\theta_{s,\text{eq}}$	$0.4528 \pm 0.0026$	$\chi^2_{\text{MGS}}$	$1.69 \pm 0.55$
$10^9 A_s$	$2.090 \pm 0.031$	$H(0.15)$	$73.32 \pm 0.46$	$\chi^2_{\text{DR12BAO}}$	$4.1 \pm 1.0$
$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.015$	$D_M(0.15)$	$637.1 \pm 4.5$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$D_{40}$	$1216 \pm 25$	$H(0.38)$	$83.33 \pm 0.36$	$\chi^2_{\text{CMB}}$	$2127 \pm 900$
$D_{220}$	$5726 \pm 56$	$D_M(0.38)$	$1520.9 \pm 9.2$	$\chi^2_{\text{BAO}}$	$5.83 \pm 0.86$
$\bar{\chi}^2_{\text{eff}} = 3003.21; \Delta\bar{\chi}^2_{\text{eff}} = 1722.52; R - 1 = 0.01219$					



## 2.19 base\_CamSpecHM\_TE\_lowE\_BAO\_post\_zre6p5/base\_plikHM\_TE\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00023$	$D_{810}$	$2528 \pm 32$	$H(0.51)$	$90.05 \pm 0.30$
$\Omega_c h^2$	$0.1180 \pm 0.0012$	$D_{1420}$	$816 \pm 14$	$D_M(0.51)$	$1968 \pm 11$
$100\theta_{MC}$	$1.04132 \pm 0.00046$	$D_{2000}$	$230.5 \pm 5.1$	$H(0.61)$	$95.60 \pm 0.26$
$\tau$	$0.0526^{+0.0034}_{-0.0079}$	$n_{s,0.002}$	$0.971 \pm 0.011$	$D_M(0.61)$	$2291 \pm 12$
$\ln(10^{10} A_s)$	$3.032^{+0.015}_{-0.018}$	$Y_P$	$0.245422 \pm 0.000093$	$H(2.33)$	$235.33 \pm 0.81$
$n_s$	$0.971 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.246748 \pm 0.000093$	$D_M(2.33)$	$5750 \pm 13$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$10^5 D/H$	$2.573 \pm 0.043$	$f\sigma_8(0.15)$	$0.4460 \pm 0.0081$
$H_0$	$68.27 \pm 0.54$	Age/Gyr	$13.769 \pm 0.030$	$\sigma_8(0.15)$	$0.7412 \pm 0.0085$
$\Omega_\Lambda$	$0.6973 \pm 0.0070$	$z_*$	$1089.65 \pm 0.33$	$f\sigma_8(0.38)$	$0.4661 \pm 0.0072$
$\Omega_m$	$0.3027 \pm 0.0070$	$r_*$	$144.90 \pm 0.34$	$\sigma_8(0.38)$	$0.6580 \pm 0.0074$
$\Omega_m h^2$	$0.1411 \pm 0.0012$	$100\theta_*$	$1.04150 \pm 0.00046$	$f\sigma_8(0.51)$	$0.4657 \pm 0.0066$
$\Omega_m h^3$	$0.09630 \pm 0.00053$	$D_M(z_*)/\text{Gpc}$	$13.913 \pm 0.034$	$\sigma_8(0.51)$	$0.6161 \pm 0.0068$
$\sigma_8$	$0.8012 \pm 0.0094$	$z_{\text{drag}}$	$1059.96 \pm 0.53$	$f\sigma_8(0.61)$	$0.4615 \pm 0.0062$
$S_8$	$0.805 \pm 0.016$	$r_{\text{drag}}$	$147.55 \pm 0.38$	$\sigma_8(0.61)$	$0.5865^{+0.0062}_{-0.0068}$
$\sigma_8 \Omega_m^{0.5}$	$0.4408 \pm 0.0085$	$k_D$	$0.14044 \pm 0.00052$	$f\sigma_8(2.33)$	$0.2961^{+0.0031}_{-0.0034}$
$\sigma_8 \Omega_m^{0.25}$	$0.5942 \pm 0.0088$	$100\theta_D$	$0.16078 \pm 0.00031$	$\sigma_8(2.33)$	$0.3057^{+0.0032}_{-0.0036}$
$\sigma_8/h^{0.5}$	$0.970 \pm 0.013$	$z_{\text{eq}}$	$3355 \pm 29$	$\chi^2_{\text{small}}$	$396.4 \pm 1.1$
$r_{\text{drag}} h$	$100.74 \pm 0.93$	$k_{\text{eq}}$	$0.010241 \pm 0.000089$	$\chi^2_{6\text{DF}}$	$0.039 \pm 0.054$
$\langle d^2 \rangle^{1/2}$	$2.396 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8223 \pm 0.0053$	$\chi^2_{\text{MGS}}$	$1.92 \pm 0.59$
$z_{\text{re}}$	$7.44^{+0.31}_{-0.86}$	$100\theta_{s,\text{eq}}$	$0.4540 \pm 0.0028$	$\chi^2_{\text{DR12BAO}}$	$3.95 \pm 0.82$
$10^9 A_s$	$2.073^{+0.031}_{-0.038}$	$H(0.15)$	$73.46 \pm 0.47$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.866 \pm 0.021$	$D_M(0.15)$	$635.6 \pm 4.6$	$\chi^2_{\text{BAO}}$	$5.92 \pm 0.97$
$D_{40}$	$1211 \pm 24$	$H(0.38)$	$83.42 \pm 0.36$	$\chi^2_{\text{CMB}}$	$2116 \pm 900$
$D_{220}$	$5705 \pm 59$	$D_M(0.38)$	$1518.1 \pm 9.3$		

$\bar{\chi}^2_{\text{eff}} = 2993.70$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1724.70$ ;  $R - 1 = 0.01568$



**2.20**    **base\_CamSpecHM\_TE\_lowE\_BAO\_post\_lensing\_zre6p5/base\_plikHM\_TE\_lowE\_BAO\_post\_lensing\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02248 \pm 0.00023$	$D_{810}$	$2542 \pm 24$	$H(0.51)$	$90.00 \pm 0.30$
$\Omega_c h^2$	$0.1185 \pm 0.0012$	$D_{1420}$	$821 \pm 12$	$D_M(0.51)$	$1971 \pm 11$
$100\theta_{MC}$	$1.04129 \pm 0.00045$	$D_{2000}$	$232.2 \pm 4.1$	$H(0.61)$	$95.58 \pm 0.26$
$\tau$	$0.0547^{+0.0050}_{-0.0077}$	$n_{s,0.002}$	$0.972 \pm 0.011$	$D_M(0.61)$	$2294 \pm 12$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.015}$	$Y_P$	$0.245435 \pm 0.000091$	$H(2.33)$	$235.69 \pm 0.77$
$n_s$	$0.972 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.246761 \pm 0.000091$	$D_M(2.33)$	$5751 \pm 13$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$10^5 D/H$	$2.567 \pm 0.042$	$f\sigma_8(0.15)$	$0.4509 \pm 0.0063$
$H_0$	$68.11 \pm 0.53$	Age/Gyr	$13.769 \pm 0.030$	$\sigma_8(0.15)$	$0.7463^{+0.0056}_{-0.0063}$
$\Omega_\Lambda$	$0.6947 \pm 0.0069$	$z_*$	$1089.65 \pm 0.33$	$f\sigma_8(0.38)$	$0.4705 \pm 0.0052$
$\Omega_m$	$0.3053 \pm 0.0069$	$r_*$	$144.75 \pm 0.32$	$\sigma_8(0.38)$	$0.6622^{+0.0049}_{-0.0056}$
$\Omega_m h^2$	$0.1416 \pm 0.0012$	$100\theta_*$	$1.04146 \pm 0.00045$	$f\sigma_8(0.51)$	$0.4699 \pm 0.0047$
$\Omega_m h^3$	$0.09643 \pm 0.00051$	$D_M(z_*)/\text{Gpc}$	$13.899 \pm 0.032$	$\sigma_8(0.51)$	$0.6200^{+0.0046}_{-0.0052}$
$\sigma_8$	$0.8070 \pm 0.0065$	$z_{\text{drag}}$	$1060.08 \pm 0.52$	$f\sigma_8(0.61)$	$0.4654 \pm 0.0043$
$S_8$	$0.814 \pm 0.012$	$r_{\text{drag}}$	$147.38 \pm 0.36$	$\sigma_8(0.61)$	$0.5901^{+0.0044}_{-0.0050}$
$\sigma_8 \Omega_m^{0.5}$	$0.4458 \pm 0.0067$	$k_D$	$0.14064 \pm 0.00050$	$f\sigma_8(2.33)$	$0.2978^{+0.0023}_{-0.0026}$
$\sigma_8 \Omega_m^{0.25}$	$0.5998 \pm 0.0064$	$100\theta_D$	$0.16072 \pm 0.00031$	$\sigma_8(2.33)$	$0.3073^{+0.0025}_{-0.0028}$
$\sigma_8/h^{0.5}$	$0.9778 \pm 0.0092$	$z_{\text{eq}}$	$3368 \pm 28$	$\chi^2_{\text{lensing}}$	$9.9 \pm 1.5$
$r_{\text{drag}} h$	$100.39 \pm 0.90$	$k_{\text{eq}}$	$0.010279 \pm 0.000085$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.5$
$\langle d^2 \rangle^{1/2}$	$2.412 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8201 \pm 0.0051$	$\chi^2_{6\text{DF}}$	$0.035 \pm 0.048$
$z_{\text{re}}$	$7.66^{+0.54}_{-0.77}$	$100\theta_{s,\text{eq}}$	$0.4529 \pm 0.0026$	$\chi^2_{\text{MGS}}$	$1.71 \pm 0.55$
$10^9 A_s$	$2.094^{+0.024}_{-0.031}$	$H(0.15)$	$73.33 \pm 0.46$	$\chi^2_{\text{DR12BAO}}$	$4.08 \pm 0.98$
$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.015$	$D_M(0.15)$	$637.0 \pm 4.5$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$D_{40}$	$1215 \pm 24$	$H(0.38)$	$83.34 \pm 0.36$	$\chi^2_{\text{CMB}}$	$2127 \pm 900$
$D_{220}$	$5725 \pm 56$	$D_M(0.38)$	$1520.6 \pm 9.2$	$\chi^2_{\text{BAO}}$	$5.82 \pm 0.85$

$\bar{\chi}^2_{\text{eff}} = 3002.87$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1722.35$ ;  $R - 1 = 0.01685$



## 2.21 base\_CamSpecHM\_EE\_lowE\_BAO/base\_plikHM\_EE\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02351 \pm 0.00065$	$D_{810}$	$2592 \pm 36$	$H(0.51)$	$90.48 \pm 0.59$
$\Omega_c h^2$	$0.1177 \pm 0.0014$	$D_{1420}$	$841 \pm 15$	$D_M(0.51)$	$1957 \pm 18$
$100\theta_{MC}$	$1.03966 \pm 0.00083$	$D_{2000}$	$239.6 \pm 5.4$	$H(0.61)$	$96.04 \pm 0.55$
$\tau$	$0.0514 \pm 0.0082$	$n_{s,0.002}$	$0.9727 \pm 0.0099$	$D_M(0.61)$	$2279 \pm 20$
$\ln(10^{10} A_s)$	$3.054 \pm 0.022$	$Y_P$	$0.24585^{+0.00027}_{-0.00023}$	$H(2.33)$	$236.06 \pm 0.99$
$n_s$	$0.9727 \pm 0.0099$	$Y_P^{\text{BBN}}$	$0.24718^{+0.00027}_{-0.00023}$	$D_M(2.33)$	$5725 \pm 29$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$10^5 D/H$	$2.39 \pm 0.11$	$f\sigma_8(0.15)$	$0.4460 \pm 0.0097$
$H_0$	$68.70 \pm 0.84$	Age/Gyr	$13.710 \pm 0.068$	$\sigma_8(0.15)$	$0.7437 \pm 0.0090$
$\Omega_\Lambda$	$0.6993 \pm 0.0090$	$z_*$	$1088.38 \pm 0.78$	$f\sigma_8(0.38)$	$0.4666 \pm 0.0083$
$\Omega_m$	$0.3007 \pm 0.0090$	$r_*$	$144.16 \pm 0.52$	$\sigma_8(0.38)$	$0.6604 \pm 0.0077$
$\Omega_m h^2$	$0.1418 \pm 0.0014$	$100\theta_*$	$1.03973 \pm 0.00084$	$f\sigma_8(0.51)$	$0.4665 \pm 0.0075$
$\Omega_m h^3$	$0.0974 \pm 0.0012$	$D_M(z_*)/\text{Gpc}$	$13.865 \pm 0.051$	$\sigma_8(0.51)$	$0.6185 \pm 0.0071$
$\sigma_8$	$0.804 \pm 0.010$	$z_{\text{drag}}$	$1062.3 \pm 1.4$	$f\sigma_8(0.61)$	$0.4624 \pm 0.0070$
$S_8$	$0.805 \pm 0.019$	$r_{\text{drag}}$	$146.45 \pm 0.69$	$\sigma_8(0.61)$	$0.5889 \pm 0.0067$
$\sigma_8 \Omega_m^{0.5}$	$0.441 \pm 0.010$	$k_D$	$0.1424 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0034$
$\sigma_8 \Omega_m^{0.25}$	$0.595 \pm 0.010$	$100\theta_D$	$0.15918 \pm 0.00081$	$\sigma_8(2.33)$	$0.3071 \pm 0.0035$
$\sigma_8/h^{0.5}$	$0.970 \pm 0.015$	$z_{\text{eq}}$	$3374 \pm 33$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.5$
$r_{\text{drag}} h$	$100.6 \pm 1.1$	$k_{\text{eq}}$	$0.01030 \pm 0.00010$	$\chi^2_{6\text{DF}}$	$0.054 \pm 0.076$
$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.037$	$100\theta_{\text{eq}}$	$0.8206 \pm 0.0060$	$\chi^2_{\text{MGS}}$	$1.83 \pm 0.70$
$z_{\text{re}}$	$7.10^{+0.85}_{-0.74}$	$100\theta_{s,\text{eq}}$	$0.4523 \pm 0.0031$	$\chi^2_{\text{DR12BAO}}$	$4.5 \pm 1.3$
$10^9 A_s$	$2.121 \pm 0.046$	$H(0.15)$	$73.89 \pm 0.77$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.913 \pm 0.027$	$D_M(0.15)$	$631.9 \pm 7.2$	$\chi^2_{\text{BAO}}$	$6.4 \pm 1.3$
$D_{40}$	$1245 \pm 33$	$H(0.38)$	$83.85 \pm 0.65$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$
$D_{220}$	$5941 \pm 140$	$D_M(0.38)$	$1510 \pm 15$		

Best-fit  $\chi^2_{\text{eff}} = 2297.82$ ;  $\Delta\chi^2_{\text{eff}} = 1157.65$ ;  $\bar{\chi}^2_{\text{eff}} = 2304.89$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1157.53$ ;  $R - 1 = 0.00669$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.68 ( $\Delta$  -0.21) DR12BAO: 3.85 ( $\Delta$  0.25) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.59 ( $\Delta$  -0.03) CamSpec like\_10.7HM\_1400\_unified: 1886.67



## 2.22 base\_CamSpecHM\_EE\_lowE\_BAO\_post\_lensing/base\_plikHM\_EE\_lowE\_BAO\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02334 \pm 0.00055$	$D_{810}$	$2578 \pm 26$	$H(0.51)$	$90.41 \pm 0.56$
$\Omega_c h^2$	$0.1173 \pm 0.0014$	$D_{1420}$	$835 \pm 12$	$D_M(0.51)$	$1958 \pm 18$
$100\theta_{MC}$	$1.03969 \pm 0.00081$	$D_{2000}$	$237.5 \pm 4.3$	$H(0.61)$	$95.95 \pm 0.52$
$\tau$	$0.0497 \pm 0.0079$	$n_{s,0.002}$	$0.9717 \pm 0.0099$	$D_M(0.61)$	$2280 \pm 19$
$\ln(10^{10} A_s)$	$3.045 \pm 0.015$	$Y_P$	$0.24579^{+0.00025}_{-0.00020}$	$H(2.33)$	$235.63 \pm 0.81$
$n_s$	$0.9717 \pm 0.0099$	$Y_P^{\text{BBN}}$	$0.24712^{+0.00025}_{-0.00020}$	$D_M(2.33)$	$5731 \pm 27$
$y_{\text{cal}}$	$0.9999 \pm 0.0024$	$10^5 D/H$	$2.418 \pm 0.093$	$f\sigma_8(0.15)$	$0.4426 \pm 0.0085$
$H_0$	$68.71 \pm 0.82$	Age/Gyr	$13.725 \pm 0.063$	$\sigma_8(0.15)$	$0.7395 \pm 0.0070$
$\Omega_\Lambda$	$0.7006 \pm 0.0087$	$z_*$	$1088.53 \pm 0.70$	$f\sigma_8(0.38)$	$0.4633 \pm 0.0071$
$\Omega_m$	$0.2994 \pm 0.0087$	$r_*$	$144.39 \pm 0.39$	$\sigma_8(0.38)$	$0.6569 \pm 0.0060$
$\Omega_m h^2$	$0.1413 \pm 0.0012$	$100\theta_*$	$1.03978 \pm 0.00082$	$f\sigma_8(0.51)$	$0.4634 \pm 0.0063$
$\Omega_m h^3$	$0.0971 \pm 0.0010$	$D_M(z_*)/\text{Gpc}$	$13.887 \pm 0.041$	$\sigma_8(0.51)$	$0.6153 \pm 0.0055$
$\sigma_8$	$0.7990 \pm 0.0079$	$z_{\text{drag}}$	$1061.9 \pm 1.2$	$f\sigma_8(0.61)$	$0.4594 \pm 0.0057$
$S_8$	$0.798 \pm 0.017$	$r_{\text{drag}}$	$146.74 \pm 0.53$	$\sigma_8(0.61)$	$0.5858 \pm 0.0052$
$\sigma_8 \Omega_m^{0.5}$	$0.4372 \pm 0.0091$	$k_D$	$0.14193 \pm 0.00090$	$f\sigma_8(2.33)$	$0.2958 \pm 0.0027$
$\sigma_8 \Omega_m^{0.25}$	$0.5910 \pm 0.0086$	$100\theta_D$	$0.15940 \pm 0.00068$	$\sigma_8(2.33)$	$0.3056 \pm 0.0028$
$\sigma_8/h^{0.5}$	$0.964 \pm 0.013$	$z_{\text{eq}}$	$3361 \pm 28$	$\chi^2_{\text{lensing}}$	$9.2 \pm 1.3$
$r_{\text{drag}} h$	$100.8 \pm 1.1$	$k_{\text{eq}}$	$0.010257 \pm 0.000087$	$\chi^2_{\text{small}}$	$396.6 \pm 1.4$
$\langle d^2 \rangle^{1/2}$	$2.403 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8226 \pm 0.0054$	$\chi^2_{6\text{DF}}$	$0.054 \pm 0.075$
$z_{\text{re}}$	$6.95^{+0.85}_{-0.72}$	$100\theta_{s,\text{eq}}$	$0.4535 \pm 0.0027$	$\chi^2_{\text{MGS}}$	$1.96 \pm 0.69$
$10^9 A_s$	$2.101 \pm 0.033$	$H(0.15)$	$73.88 \pm 0.74$	$\chi^2_{\text{DR12BAO}}$	$4.3 \pm 1.1$
$10^9 A_s e^{-2\tau}$	$1.902 \pm 0.018$	$D_M(0.15)$	$631.9 \pm 7.0$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$D_{40}$	$1240 \pm 29$	$H(0.38)$	$83.80 \pm 0.62$	$\chi^2_{\text{CMB}}$	$1723 \pm 600$
$D_{220}$	$5906 \pm 110$	$D_M(0.38)$	$1510 \pm 15$	$\chi^2_{\text{BAO}}$	$6.3 \pm 1.2$

$\bar{\chi}^2_{\text{eff}} = 2314.19$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.51$ ;  $R - 1 = 0.00959$



## 2.23 base\_CamSpecHM\_EE\_lowE\_BAO\_post\_zre6p5/base\_plikHM\_EE\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02348 \pm 0.00065$	$D_{810}$	$2591 \pm 36$	$H(0.51)$	$90.47 \pm 0.59$
$\Omega_c h^2$	$0.1177 \pm 0.0014$	$D_{1420}$	$841 \pm 15$	$D_M(0.51)$	$1958 \pm 18$
$100\theta_{MC}$	$1.03966 \pm 0.00083$	$D_{2000}$	$239.5 \pm 5.4$	$H(0.61)$	$96.02 \pm 0.55$
$\tau$	$0.0546^{+0.0038}_{-0.0076}$	$n_{s,0.002}$	$0.9729 \pm 0.0099$	$D_M(0.61)$	$2279 \pm 20$
$\ln(10^{10} A_s)$	$3.060 \pm 0.019$	$Y_P$	$0.24584^{+0.00027}_{-0.00023}$	$H(2.33)$	$236.03 \pm 0.99$
$n_s$	$0.9729 \pm 0.0099$	$Y_P^{\text{BBN}}$	$0.24717^{+0.00028}_{-0.00023}$	$D_M(2.33)$	$5726 \pm 29$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$10^5 D/H$	$2.39 \pm 0.11$	$f\sigma_8(0.15)$	$0.4475 \pm 0.0094$
$H_0$	$68.68 \pm 0.84$	Age/Gyr	$13.713 \pm 0.068$	$\sigma_8(0.15)$	$0.7460 \pm 0.0080$
$\Omega_\Lambda$	$0.6992 \pm 0.0090$	$z_*$	$1088.41 \pm 0.79$	$f\sigma_8(0.38)$	$0.4681 \pm 0.0079$
$\Omega_m$	$0.3008 \pm 0.0090$	$r_*$	$144.18 \pm 0.52$	$\sigma_8(0.38)$	$0.6625 \pm 0.0068$
$\Omega_m h^2$	$0.1418 \pm 0.0014$	$100\theta_*$	$1.03973 \pm 0.00084$	$f\sigma_8(0.51)$	$0.4680 \pm 0.0071$
$\Omega_m h^3$	$0.0974 \pm 0.0012$	$D_M(z_*)/\text{Gpc}$	$13.867 \pm 0.051$	$\sigma_8(0.51)$	$0.6204 \pm 0.0063$
$\sigma_8$	$0.8061 \pm 0.0091$	$z_{\text{drag}}$	$1062.3 \pm 1.4$	$f\sigma_8(0.61)$	$0.4639 \pm 0.0065$
$S_8$	$0.807 \pm 0.018$	$r_{\text{drag}}$	$146.48 \pm 0.69$	$\sigma_8(0.61)$	$0.5907 \pm 0.0059$
$\sigma_8 \Omega_m^{0.5}$	$0.4421 \pm 0.0099$	$k_D$	$0.1423 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2983 \pm 0.0030$
$\sigma_8 \Omega_m^{0.25}$	$0.5970 \pm 0.0096$	$100\theta_D$	$0.15921 \pm 0.00081$	$\sigma_8(2.33)$	$0.3080 \pm 0.0031$
$\sigma_8/h^{0.5}$	$0.973 \pm 0.014$	$z_{\text{eq}}$	$3373 \pm 33$	$\chi^2_{\text{simall}}$	$396.5 \pm 1.3$
$r_{\text{drag}} h$	$100.6 \pm 1.1$	$k_{\text{eq}}$	$0.01030 \pm 0.00010$	$\chi^2_{6\text{DF}}$	$0.054 \pm 0.075$
$\langle d^2 \rangle^{1/2}$	$2.422 \pm 0.035$	$100\theta_{\text{eq}}$	$0.8206 \pm 0.0059$	$\chi^2_{\text{MGS}}$	$1.83 \pm 0.69$
$z_{\text{re}}$	$7.42^{+0.32}_{-0.83}$	$100\theta_{s,\text{eq}}$	$0.4524 \pm 0.0031$	$\chi^2_{\text{DR12BAO}}$	$4.5 \pm 1.3$
$10^9 A_s$	$2.133 \pm 0.041$	$H(0.15)$	$73.87 \pm 0.76$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.912 \pm 0.027$	$D_M(0.15)$	$632.0 \pm 7.1$	$\chi^2_{\text{BAO}}$	$6.4 \pm 1.3$
$D_{40}$	$1245 \pm 33$	$H(0.38)$	$83.83 \pm 0.65$	$\chi^2_{\text{CMB}}$	$1713 \pm 600$
$D_{220}$	$5935 \pm 140$	$D_M(0.38)$	$1510 \pm 15$		

$\bar{\chi}^2_{\text{eff}} = 2304.51$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1157.44$ ;  $R - 1 = 0.01190$



## 2.24 base\_CamSpecHM\_EE\_lowE\_BAO\_post\_lensing\_zre6p5/base\_plikHM\_EE\_lowE\_BAO\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02328 \pm 0.00055$	$D_{810}$	$2574 \pm 25$	$H(0.51)$	$90.38 \pm 0.55$
$\Omega_c h^2$	$0.1172 \pm 0.0014$	$D_{1420}$	$834 \pm 11$	$D_M(0.51)$	$1958 \pm 18$
$100\theta_{MC}$	$1.03970 \pm 0.00081$	$D_{2000}$	$237.0 \pm 4.2$	$H(0.61)$	$95.92 \pm 0.51$
$\tau$	$0.0533^{+0.0034}_{-0.0067}$	$n_{s,0.002}$	$0.9721 \pm 0.0099$	$D_M(0.61)$	$2280 \pm 19$
$\ln(10^{10} A_s)$	$3.050 \pm 0.013$	$Y_P$	$0.24576^{+0.00024}_{-0.00021}$	$H(2.33)$	$235.52 \pm 0.80$
$n_s$	$0.9721 \pm 0.0099$	$Y_P^{\text{BBN}}$	$0.24709^{+0.00024}_{-0.00021}$	$D_M(2.33)$	$5734 \pm 27$
$y_{\text{cal}}$	$0.9998 \pm 0.0024$	$10^5 D/H$	$2.428 \pm 0.093$	$f\sigma_8(0.15)$	$0.4438 \pm 0.0083$
$H_0$	$68.69 \pm 0.82$	Age/Gyr	$13.730 \pm 0.062$	$\sigma_8(0.15)$	$0.7417 \pm 0.0061$
$\Omega_\Lambda$	$0.7007 \pm 0.0087$	$z_*$	$1088.60 \pm 0.70$	$f\sigma_8(0.38)$	$0.4646 \pm 0.0068$
$\Omega_m$	$0.2993 \pm 0.0087$	$r_*$	$144.46 \pm 0.38$	$\sigma_8(0.38)$	$0.6588 \pm 0.0051$
$\Omega_m h^2$	$0.1411 \pm 0.0012$	$100\theta_*$	$1.03980 \pm 0.00081$	$f\sigma_8(0.51)$	$0.4647 \pm 0.0059$
$\Omega_m h^3$	$0.0969 \pm 0.0010$	$D_M(z_*)/\text{Gpc}$	$13.893 \pm 0.040$	$\sigma_8(0.51)$	$0.6171^{+0.0044}_{-0.0049}$
$\sigma_8$	$0.8013 \pm 0.0070$	$z_{\text{drag}}$	$1061.8 \pm 1.2$	$f\sigma_8(0.61)$	$0.4607 \pm 0.0053$
$S_8$	$0.800 \pm 0.016$	$r_{\text{drag}}$	$146.83 \pm 0.51$	$\sigma_8(0.61)$	$0.5875^{+0.0041}_{-0.0046}$
$\sigma_8 \Omega_m^{0.5}$	$0.4383 \pm 0.0089$	$k_D$	$0.14179 \pm 0.00088$	$f\sigma_8(2.33)$	$0.2967^{+0.0021}_{-0.0024}$
$\sigma_8 \Omega_m^{0.25}$	$0.5926 \pm 0.0082$	$100\theta_D$	$0.15948 \pm 0.00068$	$\sigma_8(2.33)$	$0.3065^{+0.0022}_{-0.0025}$
$\sigma_8/h^{0.5}$	$0.967 \pm 0.012$	$z_{\text{eq}}$	$3357 \pm 28$	$\chi^2_{\text{lensing}}$	$9.3 \pm 1.3$
$r_{\text{drag}} h$	$100.9 \pm 1.1$	$k_{\text{eq}}$	$0.010247 \pm 0.000085$	$\chi^2_{\text{simall}}$	$396.24 \pm 0.98$
$\langle d^2 \rangle^{1/2}$	$2.408 \pm 0.029$	$100\theta_{\text{eq}}$	$0.8230 \pm 0.0054$	$\chi^2_{6\text{DF}}$	$0.054 \pm 0.074$
$z_{\text{re}}$	$7.33^{+0.22}_{-0.83}$	$100\theta_{s,\text{eq}}$	$0.4537 \pm 0.0027$	$\chi^2_{\text{MGS}}$	$1.98 \pm 0.68$
$10^9 A_s$	$2.113^{+0.025}_{-0.028}$	$H(0.15)$	$73.86 \pm 0.74$	$\chi^2_{\text{DR12BAO}}$	$4.3 \pm 1.0$
$10^9 A_s e^{-2\tau}$	$1.899 \pm 0.017$	$D_M(0.15)$	$632.1 \pm 6.9$	$\chi^2_{\text{prior}}$	$5.9 \pm 5.2$
$D_{40}$	$1238 \pm 29$	$H(0.38)$	$83.77 \pm 0.62$	$\chi^2_{\text{CMB}}$	$1722 \pm 600$
$D_{220}$	$5892 \pm 110$	$D_M(0.38)$	$1510 \pm 15$	$\chi^2_{\text{BAO}}$	$6.3 \pm 1.2$

$$\bar{\chi}^2_{\text{eff}} = 2313.75; \Delta \bar{\chi}^2_{\text{eff}} = 1158.36; R - 1 = 0.00861$$



## 2.25 base\_CamSpecHM\_TE\_lowE\_lensing/base\_plikHM\_TE\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00025$	$D_{220}$	$5725 \pm 57$	$H(0.38)$	$83.29 \pm 0.53$
$\Omega_c h^2$	$0.1187 \pm 0.0019$	$D_{810}$	$2542 \pm 26$	$D_M(0.38)$	$1522 \pm 14$
$100\theta_{MC}$	$1.04125 \pm 0.00049$	$D_{1420}$	$821 \pm 13$	$H(0.51)$	$89.96 \pm 0.43$
$\tau$	$0.0530 \pm 0.0078$	$D_{2000}$	$232.1 \pm 4.6$	$D_M(0.51)$	$1973 \pm 17$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$n_{s,0.002}$	$0.971 \pm 0.012$	$H(0.61)$	$95.55 \pm 0.35$
$n_s$	$0.971 \pm 0.012$	$Y_P$	$0.24543 \pm 0.00010$	$D_M(0.61)$	$2296 \pm 18$
$y_{cal}$	$1.0003 \pm 0.0025$	$Y_P^{BBN}$	$0.24676 \pm 0.00010$	$H(2.33)$	$235.8 \pm 1.1$
$H_0$	$68.02 \pm 0.84$	$10^5 D/H$	$2.569 \pm 0.046$	$D_M(2.33)$	$5752 \pm 17$
$\Omega_\Lambda$	$0.693 \pm 0.011$	Age/Gyr	$13.772 \pm 0.037$	$f\sigma_8(0.15)$	$0.4513 \pm 0.0090$
$\Omega_m$	$0.307 \pm 0.011$	$z_*$	$1089.68 \pm 0.41$	$\sigma_8(0.15)$	$0.7454 \pm 0.0064$
$\Omega_m h^2$	$0.1418 \pm 0.0018$	$r_*$	$144.70 \pm 0.44$	$f\sigma_8(0.38)$	$0.4706 \pm 0.0070$
$\Omega_m h^3$	$0.09643 \pm 0.00052$	$100\theta_*$	$1.04142 \pm 0.00049$	$\sigma_8(0.38)$	$0.6613 \pm 0.0057$
$\sigma_8$	$0.8062 \pm 0.0071$	$D_M(z_*)/\text{Gpc}$	$13.895 \pm 0.041$	$f\sigma_8(0.51)$	$0.4698 \pm 0.0059$
$S_8$	$0.815 \pm 0.018$	$z_{\text{drag}}$	$1060.07 \pm 0.54$	$\sigma_8(0.51)$	$0.6191 \pm 0.0054$
$\sigma_8 \Omega_m^{0.5}$	$0.4464 \pm 0.0098$	$r_{\text{drag}}$	$147.34 \pm 0.45$	$f\sigma_8(0.61)$	$0.4652 \pm 0.0053$
$\sigma_8 \Omega_m^{0.25}$	$0.5999 \pm 0.0084$	$k_D$	$0.14068 \pm 0.00054$	$\sigma_8(0.61)$	$0.5893 \pm 0.0053$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.011$	$100\theta_D$	$0.16072 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0028$
$r_{\text{drag}} h$	$100.2 \pm 1.4$	$z_{\text{eq}}$	$3373 \pm 42$	$\sigma_8(2.33)$	$0.3067 \pm 0.0032$
$\langle d^2 \rangle^{1/2}$	$2.412 \pm 0.037$	$k_{\text{eq}}$	$0.01029 \pm 0.00013$	$\chi_{\text{lensing}}^2$	$10.0 \pm 1.6$
$z_{\text{re}}$	$7.48^{+0.81}_{-0.71}$	$100\theta_{\text{eq}}$	$0.8192 \pm 0.0080$	$\chi_{\text{small}}^2$	$396.8 \pm 1.4$
$10^9 A_s$	$2.088 \pm 0.033$	$100\theta_{s,\text{eq}}$	$0.4524 \pm 0.0041$	$\chi_{\text{prior}}^2$	$9.2 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.015$	$H(0.15)$	$73.25 \pm 0.72$	$\chi_{\text{CMB}}^2$	$2128 \pm 900$
$D_{40}$	$1216 \pm 27$	$D_M(0.15)$	$637.8 \pm 7.1$		

Best-fit  $\chi_{\text{eff}}^2 = 2991.07$ ;  $\Delta\chi_{\text{eff}}^2 = 1730.83$ ;  $\bar{\chi}_{\text{eff}}^2 = 2998.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 1722.75$ ;  $R - 1 = 0.00781$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.95 ( $\Delta$  -0.59) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.77 ( $\Delta$  -0.09) CamSpec like\_10.7HM\_1400\_unified: 2576.31



## 2.26 base\_CamSpecHM\_TE\_lowE\_lensing\_post\_zre6p5/base\_plikHM\_TE\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00025$	$D_{220}$	$5723 \pm 57$	$H(0.38)$	$83.32 \pm 0.53$
$\Omega_c h^2$	$0.1186 \pm 0.0018$	$D_{810}$	$2541 \pm 26$	$D_M(0.38)$	$1521 \pm 14$
$100\theta_{MC}$	$1.04126 \pm 0.00049$	$D_{1420}$	$821 \pm 13$	$H(0.51)$	$89.98 \pm 0.43$
$\tau$	$0.0546^{+0.0049}_{-0.0080}$	$D_{2000}$	$232.2 \pm 4.6$	$D_M(0.51)$	$1972 \pm 17$
$\ln(10^{10} A_s)$	$3.041^{+0.012}_{-0.015}$	$n_{s,0.002}$	$0.972 \pm 0.012$	$H(0.61)$	$95.56 \pm 0.35$
$n_s$	$0.972 \pm 0.012$	$Y_P$	$0.24543 \pm 0.00010$	$D_M(0.61)$	$2295 \pm 18$
$y_{cal}$	$1.0003 \pm 0.0025$	$Y_P^{BBN}$	$0.24676 \pm 0.00010$	$H(2.33)$	$235.7 \pm 1.1$
$H_0$	$68.07 \pm 0.83$	$10^5 D/H$	$2.568 \pm 0.046$	$D_M(2.33)$	$5751 \pm 17$
$\Omega_\Lambda$	$0.694 \pm 0.011$	Age/Gyr	$13.771 \pm 0.037$	$f\sigma_8(0.15)$	$0.4513 \pm 0.0090$
$\Omega_m$	$0.306 \pm 0.011$	$z_*$	$1089.67 \pm 0.41$	$\sigma_8(0.15)$	$0.7463 \pm 0.0060$
$\Omega_m h^2$	$0.1417 \pm 0.0017$	$r_*$	$144.73 \pm 0.43$	$f\sigma_8(0.38)$	$0.4708 \pm 0.0069$
$\Omega_m h^3$	$0.09642 \pm 0.00052$	$100\theta_*$	$1.04143 \pm 0.00049$	$\sigma_8(0.38)$	$0.6622^{+0.0049}_{-0.0056}$
$\sigma_8$	$0.8070 \pm 0.0067$	$D_M(z_*)/\text{Gpc}$	$13.897 \pm 0.041$	$f\sigma_8(0.51)$	$0.4701 \pm 0.0059$
$S_8$	$0.815 \pm 0.018$	$z_{\text{drag}}$	$1060.07 \pm 0.54$	$\sigma_8(0.51)$	$0.6199^{+0.0047}_{-0.0053}$
$\sigma_8 \Omega_m^{0.5}$	$0.4464 \pm 0.0098$	$r_{\text{drag}}$	$147.36 \pm 0.45$	$f\sigma_8(0.61)$	$0.4656 \pm 0.0052$
$\sigma_8 \Omega_m^{0.25}$	$0.6002 \pm 0.0084$	$k_D$	$0.14066 \pm 0.00054$	$\sigma_8(0.61)$	$0.5900^{+0.0045}_{-0.0052}$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.011$	$100\theta_D$	$0.16072 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2977^{+0.0024}_{-0.0028}$
$r_{\text{drag}} h$	$100.3 \pm 1.4$	$z_{\text{eq}}$	$3370 \pm 42$	$\sigma_8(2.33)$	$0.3072^{+0.0027}_{-0.0031}$
$\langle d^2 \rangle^{1/2}$	$2.413 \pm 0.037$	$k_{\text{eq}}$	$0.01029 \pm 0.00013$	$\chi^2_{\text{lensing}}$	$9.99 \pm 1.6$
$z_{\text{re}}$	$7.65^{+0.54}_{-0.77}$	$100\theta_{\text{eq}}$	$0.8197 \pm 0.0079$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.4$
$10^9 A_s$	$2.094^{+0.026}_{-0.032}$	$100\theta_{s,\text{eq}}$	$0.4527 \pm 0.0041$	$\chi^2_{\text{prior}}$	$9.3 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.015$	$H(0.15)$	$73.30 \pm 0.72$	$\chi^2_{\text{CMB}}$	$2127 \pm 900$
$D_{40}$	$1215 \pm 26$	$D_M(0.15)$	$637.4 \pm 7.0$		

$$\bar{\chi}^2_{\text{eff}} = 2997.86; \Delta \bar{\chi}^2_{\text{eff}} = 1722.71; R - 1 = 0.00847$$



## 2.27 base\_CamSpecHM\_EE\_lowE\_lensing/base\_plikHM\_EE\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.0238 \pm 0.0010$	$D_{220}$	$5975 \pm 160$	$H(0.38)$	$84.5^{+1.4}_{-1.5}$
$\Omega_c h^2$	$0.1158 \pm 0.0031$	$D_{810}$	$2591 \pm 35$	$D_M(0.38)$	$1494 \pm 34$
$100\theta_{MC}$	$1.03976 \pm 0.00086$	$D_{1420}$	$842 \pm 17$	$H(0.51)$	$91.0^{+1.2}_{-1.4}$
$\tau$	$0.0507^{+0.0091}_{-0.0080}$	$D_{2000}$	$240.1 \pm 6.6$	$D_M(0.51)$	$1939 \pm 41$
$\ln(10^{10} A_s)$	$3.049 \pm 0.019$	$n_{s,0.002}$	$0.976 \pm 0.013$	$H(0.61)$	$96.5^{+1.0}_{-1.2}$
$n_s$	$0.976 \pm 0.013$	$Y_P$	$0.24596^{+0.00034}_{-0.00045}$	$D_M(0.61)$	$2259 \pm 45$
$y_{cal}$	$0.9999 \pm 0.0025$	$Y_P^{BBN}$	$0.24729^{+0.00034}_{-0.00045}$	$H(2.33)$	$235.2 \pm 1.2$
$H_0$	$69.7 \pm 2.0$	$10^5 D/H$	$2.35 \pm 0.16$	$D_M(2.33)$	$5706 \pm 54$
$\Omega_\Lambda$	$0.710^{+0.022}_{-0.020}$	Age/Gyr	$13.67 \pm 0.12$	$f\sigma_8(0.15)$	$0.434 \pm 0.018$
$\Omega_m$	$0.290^{+0.020}_{-0.022}$	$z_*$	$1087.9 \pm 1.3$	$\sigma_8(0.15)$	$0.7363^{+0.0087}_{-0.0077}$
$\Omega_m h^2$	$0.1403 \pm 0.0023$	$r_*$	$144.41 \pm 0.41$	$f\sigma_8(0.38)$	$0.456 \pm 0.014$
$\Omega_m h^3$	$0.0977^{+0.0015}_{-0.0017}$	$100\theta_*$	$1.03980 \pm 0.00084$	$\sigma_8(0.38)$	$0.6551 \pm 0.0063$
$\sigma_8$	$0.794^{+0.011}_{-0.0097}$	$D_M(z_*)/\text{Gpc}$	$13.888 \pm 0.042$	$f\sigma_8(0.51)$	$0.457 \pm 0.012$
$S_8$	$0.781 \pm 0.036$	$z_{\text{drag}}$	$1062.9 \pm 2.0$	$\sigma_8(0.51)$	$0.6141 \pm 0.0057$
$\sigma_8 \Omega_m^{0.5}$	$0.428 \pm 0.020$	$r_{\text{drag}}$	$146.62 \pm 0.57$	$f\sigma_8(0.61)$	$0.454^{+0.011}_{-0.0097}$
$\sigma_8 \Omega_m^{0.25}$	$0.583 \pm 0.017$	$k_D$	$0.1423 \pm 0.0011$	$\sigma_8(0.61)$	$0.5849 \pm 0.0054$
$\sigma_8/h^{0.5}$	$0.952 \pm 0.024$	$100\theta_D$	$0.1589 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2958 \pm 0.0028$
$r_{\text{drag}} h$	$102.1 \pm 2.8$	$z_{\text{eq}}$	$3337 \pm 54$	$\sigma_8(2.33)$	$0.3061 \pm 0.0034$
$\langle d^2 \rangle^{1/2}$	$2.382 \pm 0.048$	$k_{\text{eq}}$	$0.01019 \pm 0.00017$	$\chi^2_{\text{lensing}}$	$9.3 \pm 1.3$
$z_{\text{re}}$	$6.93^{+0.89}_{-0.69}$	$100\theta_{\text{eq}}$	$0.828 \pm 0.012$	$\chi^2_{\text{small}}$	$396.7 \pm 1.5$
$10^9 A_s$	$2.110 \pm 0.040$	$100\theta_{s,\text{eq}}$	$0.4561 \pm 0.0058$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.906 \pm 0.019$	$H(0.15)$	$74.7 \pm 1.8$	$\chi^2_{\text{CMB}}$	$1723 \pm 600$
$D_{40}$	$1240 \pm 29$	$D_M(0.15)$	$624 \pm 16$		

Best-fit  $\chi^2_{\text{eff}} = 2301.54$ ;  $\Delta\chi^2_{\text{eff}} = 1158.85$ ;  $\bar{\chi}^2_{\text{eff}} = 2308.71$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.96$ ;  $R - 1 = 0.00642$   
 $\chi^2_{\text{eff}}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp.p\_teb\_consext8: 8.34 ( $\Delta$  0.18) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.63 ( $\Delta$  0.04) CamSpec like\_10.7HM\_1400\_unified: 1887.54



## 2.28 base\_CamSpecHM\_EE\_lowE\_lensing\_post\_zre6p5/base\_plikHM\_EE\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02382^{+0.00095}_{-0.0011}$	$D_{220}$	$5971 \pm 160$	$H(0.38)$	$84.6^{+1.4}_{-1.5}$
$\Omega_c h^2$	$0.1155 \pm 0.0030$	$D_{810}$	$2589 \pm 34$	$D_M(0.38)$	$1492 \pm 34$
$100\theta_{MC}$	$1.03978 \pm 0.00086$	$D_{1420}$	$842 \pm 17$	$H(0.51)$	$91.1^{+1.2}_{-1.4}$
$\tau$	$0.0547^{+0.0043}_{-0.0075}$	$D_{2000}$	$240.1 \pm 6.6$	$D_M(0.51)$	$1936 \pm 41$
$\ln(10^{10} A_s)$	$3.056^{+0.015}_{-0.017}$	$n_{s,0.002}$	$0.977 \pm 0.013$	$H(0.61)$	$96.5^{+1.0}_{-1.2}$
$n_s$	$0.977 \pm 0.013$	$Y_P$	$0.24597^{+0.00034}_{-0.00045}$	$D_M(0.61)$	$2256 \pm 45$
$y_{cal}$	$0.9999 \pm 0.0025$	$Y_P^{BBN}$	$0.24730^{+0.00034}_{-0.00045}$	$H(2.33)$	$235.0 \pm 1.2$
$H_0$	$69.8 \pm 2.0$	$10^5 D/H$	$2.34 \pm 0.16$	$D_M(2.33)$	$5705^{+57}_{-52}$
$\Omega_\Lambda$	$0.712^{+0.022}_{-0.019}$	Age/Gyr	$13.67 \pm 0.12$	$f\sigma_8(0.15)$	$0.433 \pm 0.018$
$\Omega_m$	$0.288^{+0.019}_{-0.022}$	$z_*$	$1087.9 \pm 1.3$	$\sigma_8(0.15)$	$0.7381^{+0.0081}_{-0.0072}$
$\Omega_m h^2$	$0.1400 \pm 0.0022$	$r_*$	$144.49 \pm 0.40$	$f\sigma_8(0.38)$	$0.456 \pm 0.014$
$\Omega_m h^3$	$0.0977^{+0.0015}_{-0.0017}$	$100\theta_*$	$1.03982 \pm 0.00083$	$\sigma_8(0.38)$	$0.6569 \pm 0.0056$
$\sigma_8$	$0.796^{+0.011}_{-0.0093}$	$D_M(z_*)/\text{Gpc}$	$13.895 \pm 0.041$	$f\sigma_8(0.51)$	$0.458^{+0.013}_{-0.011}$
$S_8$	$0.780 \pm 0.036$	$z_{\text{drag}}$	$1062.9 \pm 2.0$	$\sigma_8(0.51)$	$0.6158 \pm 0.0049$
$\sigma_8 \Omega_m^{0.5}$	$0.427 \pm 0.020$	$r_{\text{drag}}$	$146.70 \pm 0.56$	$f\sigma_8(0.61)$	$0.455^{+0.011}_{-0.0096}$
$\sigma_8 \Omega_m^{0.25}$	$0.583 \pm 0.017$	$k_D$	$0.1423 \pm 0.0011$	$\sigma_8(0.61)$	$0.5867 \pm 0.0046$
$\sigma_8/h^{0.5}$	$0.953 \pm 0.024$	$100\theta_D$	$0.1589 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2968^{+0.0022}_{-0.0025}$
$r_{\text{drag}} h$	$102.4 \pm 2.7$	$z_{\text{eq}}$	$3330 \pm 52$	$\sigma_8(2.33)$	$0.3072 \pm 0.0029$
$\langle d^2 \rangle^{1/2}$	$2.385 \pm 0.048$	$k_{\text{eq}}$	$0.01016 \pm 0.00016$	$\chi^2_{\text{lensing}}$	$9.3 \pm 1.3$
$z_{\text{re}}$	$7.33^{+0.24}_{-0.81}$	$100\theta_{\text{eq}}$	$0.830 \pm 0.012$	$\chi^2_{\text{small}}$	$396.3 \pm 1.0$
$10^9 A_s$	$2.124^{+0.031}_{-0.036}$	$100\theta_{s,\text{eq}}$	$0.4569 \pm 0.0057$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.904 \pm 0.018$	$H(0.15)$	$74.9 \pm 1.8$	$\chi^2_{\text{CMB}}$	$1723 \pm 600$
$D_{40}$	$1238 \pm 28$	$D_M(0.15)$	$623 \pm 16$		

$\bar{\chi}^2_{\text{eff}} = 2308.23$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.83$ ;  $R - 1 = 0.00344$



## 2.29 base\_CamSpecHM\_TE\_lowE\_lensing\_BAO\_CookeDH/base\_plikHM\_TE\_lowE\_lensing\_BAO\_CookeDH

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00021$	$D_{810}$	$2540 \pm 24$	$H(0.51)$	$89.94 \pm 0.28$
$\Omega_c h^2$	$0.1186 \pm 0.0012$	$D_{1420}$	$820 \pm 11$	$D_M(0.51)$	$1973 \pm 10$
$100\theta_{MC}$	$1.04127 \pm 0.00047$	$D_{2000}$	$231.7 \pm 4.1$	$H(0.61)$	$95.53 \pm 0.25$
$\tau$	$0.0535 \pm 0.0074$	$n_{s,0.002}$	$0.971 \pm 0.011$	$D_M(0.61)$	$2296 \pm 11$
$\ln(10^{10} A_s)$	$3.039 \pm 0.015$	$Y_P$	$0.245415 \pm 0.000082$	$H(2.33)$	$235.71 \pm 0.77$
$n_s$	$0.971 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.246742 \pm 0.000083$	$D_M(2.33)$	$5753 \pm 12$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$10^5 D/H$	$2.576 \pm 0.039$	$f\sigma_8(0.15)$	$0.4510 \pm 0.0063$
$H_0$	$68.03 \pm 0.52$	Age/Gyr	$13.775 \pm 0.028$	$\sigma_8(0.15)$	$0.7455 \pm 0.0063$
$\Omega_\Lambda$	$0.6938 \pm 0.0068$	$z_*$	$1089.72 \pm 0.30$	$f\sigma_8(0.38)$	$0.4705 \pm 0.0053$
$\Omega_m$	$0.3062 \pm 0.0068$	$r_*$	$144.76 \pm 0.32$	$\sigma_8(0.38)$	$0.6614 \pm 0.0056$
$\Omega_m h^2$	$0.1417 \pm 0.0012$	$100\theta_*$	$1.04145 \pm 0.00047$	$f\sigma_8(0.51)$	$0.4697 \pm 0.0048$
$\Omega_m h^3$	$0.09636 \pm 0.00049$	$D_M(z_*)/\text{Gpc}$	$13.899 \pm 0.032$	$\sigma_8(0.51)$	$0.6192 \pm 0.0053$
$\sigma_8$	$0.8061 \pm 0.0069$	$z_{\text{drag}}$	$1059.97 \pm 0.48$	$f\sigma_8(0.61)$	$0.4652 \pm 0.0045$
$S_8$	$0.814 \pm 0.012$	$r_{\text{drag}}$	$147.40 \pm 0.35$	$\sigma_8(0.61)$	$0.5893 \pm 0.0051$
$\sigma_8 \Omega_m^{0.5}$	$0.4461 \pm 0.0067$	$k_D$	$0.14058 \pm 0.00047$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0026$
$\sigma_8 \Omega_m^{0.25}$	$0.5996 \pm 0.0065$	$100\theta_D$	$0.16078 \pm 0.00028$	$\sigma_8(2.33)$	$0.3068 \pm 0.0028$
$\sigma_8/h^{0.5}$	$0.9774 \pm 0.0094$	$z_{\text{eq}}$	$3370 \pm 28$	$\chi^2_{\text{lensing}}$	$10.0 \pm 1.6$
$r_{\text{drag}} h$	$100.27 \pm 0.89$	$k_{\text{eq}}$	$0.010284 \pm 0.000085$	$\chi^2_{\text{small}}$	$396.8 \pm 1.5$
$\langle d^2 \rangle^{1/2}$	$2.413 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8196 \pm 0.0051$	$\chi^2_{6\text{DF}}$	$0.035 \pm 0.049$
$z_{\text{re}}$	$7.55 \pm 0.75$	$100\theta_{s,\text{eq}}$	$0.4527 \pm 0.0026$	$\chi^2_{\text{MGS}}$	$1.64 \pm 0.53$
$10^9 A_s$	$2.089 \pm 0.031$	$H(0.15)$	$73.25 \pm 0.45$	$\chi^2_{\text{DR12BAO}}$	$4.2 \pm 1.1$
$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.015$	$D_M(0.15)$	$637.7 \pm 4.4$	$\chi^2_{\text{prior}}$	$9.6 \pm 3.3$
$D_{40}$	$1218 \pm 25$	$H(0.38)$	$83.28 \pm 0.34$	$\chi^2_{\text{CMB}}$	$2127 \pm 900$
$D_{220}$	$5725 \pm 56$	$D_M(0.38)$	$1522.2 \pm 8.9$	$\chi^2_{\text{BAO}}$	$5.82 \pm 0.87$

Best-fit  $\chi^2_{\text{eff}} = 2996.49$ ;  $\Delta\chi^2_{\text{eff}} = 1730.51$ ;  $\bar{\chi}^2_{\text{eff}} = 3003.53$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1722.40$ ;  $R - 1 = 0.00799$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.75 ( $\Delta$  0.34) DR12BAO: 3.44 ( $\Delta$  -0.49) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.95 ( $\Delta$  -1.04) small\_100x143\_offlike5\_EE\_Aplanc: 395.71 ( $\Delta$  -0.15) CamSpec like\_10.7HM\_1400\_unified: 2576.42



## 2.30 base\_CamSpecHM\_EE\_lowE\_lensing\_BAO\_CookeDH/base\_plikHM\_EE\_lowE\_lensing\_BAO\_CookeDH

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02272 \pm 0.00037$	$D_{810}$	$2558 \pm 22$	$H(0.51)$	$89.84 \pm 0.40$
$\Omega_c h^2$	$0.1181 \pm 0.0013$	$D_{1420}$	$826.2 \pm 9.9$	$D_M(0.51)$	$1975 \pm 13$
$100\theta_{MC}$	$1.03974 \pm 0.00081$	$D_{2000}$	$234.0 \pm 3.6$	$H(0.61)$	$95.42 \pm 0.36$
$\tau$	$0.0505 \pm 0.0078$	$n_{s,0.002}$	$0.9708 \pm 0.0099$	$D_M(0.61)$	$2299 \pm 15$
$\ln(10^{10} A_s)$	$3.040 \pm 0.015$	$Y_P$	$0.24553^{+0.00014}_{-0.00016}$	$H(2.33)$	$235.54 \pm 0.82$
$n_s$	$0.9708 \pm 0.0099$	$Y_P^{\text{BBN}}$	$0.24686^{+0.00014}_{-0.00016}$	$D_M(2.33)$	$5759 \pm 19$
$y_{\text{cal}}$	$0.99997 \pm 0.0025$	$10^5 D/H$	$2.524 \pm 0.066$	$f\sigma_8(0.15)$	$0.4492 \pm 0.0074$
$H_0$	$67.92 \pm 0.63$	Age/Gyr	$13.790 \pm 0.044$	$\sigma_8(0.15)$	$0.7417 \pm 0.0068$
$\Omega_\Lambda$	$0.6933 \pm 0.0075$	$z_*$	$1089.33 \pm 0.50$	$f\sigma_8(0.38)$	$0.4684 \pm 0.0063$
$\Omega_m$	$0.3067 \pm 0.0075$	$r_*$	$144.66 \pm 0.35$	$\sigma_8(0.38)$	$0.6580 \pm 0.0059$
$\Omega_m h^2$	$0.1415 \pm 0.0012$	$100\theta_*$	$1.03989 \pm 0.00081$	$f\sigma_8(0.51)$	$0.4676 \pm 0.0056$
$\Omega_m h^3$	$0.09608 \pm 0.00076$	$D_M(z_*)/\text{Gpc}$	$13.911 \pm 0.038$	$\sigma_8(0.51)$	$0.6160 \pm 0.0055$
$\sigma_8$	$0.8022 \pm 0.0075$	$z_{\text{drag}}$	$1060.59 \pm 0.82$	$f\sigma_8(0.61)$	$0.4630 \pm 0.0052$
$S_8$	$0.811 \pm 0.014$	$r_{\text{drag}}$	$147.21 \pm 0.43$	$\sigma_8(0.61)$	$0.5863 \pm 0.0052$
$\sigma_8 \Omega_m^{0.5}$	$0.4443 \pm 0.0079$	$k_D$	$0.14099 \pm 0.00066$	$f\sigma_8(2.33)$	$0.2958 \pm 0.0026$
$\sigma_8 \Omega_m^{0.25}$	$0.5970 \pm 0.0077$	$100\theta_D$	$0.16018 \pm 0.00050$	$\sigma_8(2.33)$	$0.3052 \pm 0.0028$
$\sigma_8/h^{0.5}$	$0.973 \pm 0.011$	$z_{\text{eq}}$	$3365 \pm 29$	$\chi^2_{\text{lensing}}$	$9.2 \pm 1.1$
$r_{\text{drag}} h$	$99.99 \pm 0.94$	$k_{\text{eq}}$	$0.010270 \pm 0.000087$	$\chi^2_{\text{small}}$	$396.7 \pm 1.4$
$\langle d^2 \rangle^{1/2}$	$2.411 \pm 0.030$	$100\theta_{\text{eq}}$	$0.8201 \pm 0.0052$	$\chi^2_{6\text{DF}}$	$0.048 \pm 0.066$
$z_{\text{re}}$	$7.17^{+0.83}_{-0.72}$	$100\theta_{s,\text{eq}}$	$0.4526 \pm 0.0027$	$\chi^2_{\text{MGS}}$	$1.46 \pm 0.54$
$10^9 A_s$	$2.091 \pm 0.031$	$H(0.15)$	$73.15 \pm 0.56$	$\chi^2_{\text{DR12BAO}}$	$4.7 \pm 1.5$
$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.016$	$D_M(0.15)$	$638.7 \pm 5.4$	$\chi^2_{\text{prior}}$	$7.6 \pm 5.4$
$D_{40}$	$1227 \pm 28$	$H(0.38)$	$83.17 \pm 0.45$	$\chi^2_{\text{CMB}}$	$1723 \pm 600$
$D_{220}$	$5799 \pm 91$	$D_M(0.38)$	$1524 \pm 11$	$\chi^2_{\text{BAO}}$	$6.2 \pm 1.2$

Best-fit  $\chi^2_{\text{eff}} = 2309.08$ ;  $\Delta\chi^2_{\text{eff}} = 1157.91$ ;  $\bar{\chi}^2_{\text{eff}} = 2316.30$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.03$ ;  $R - 1 = 0.00893$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.41 ( $\Delta$  0.00) DR12BAO: 4.12 ( $\Delta$  0.02) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.37 ( $\Delta$  -0.16) simall\_100x143\_offlike5\_EE\_Aplanck: 395.66 ( $\Delta$  -0.05) CamSpec like\_10.7HM\_1400\_unified: 1888.53



## 2.31 base\_CamSpecHM\_TE\_lowE\_lensing\_CookeDH/base\_plikHM\_TE\_lowE\_lensing\_CookeDH

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02242 \pm 0.00023$	$D_{220}$	$5722 \pm 58$	$H(0.38)$	$83.22 \pm 0.50$
$\Omega_c h^2$	$0.1188 \pm 0.0018$	$D_{810}$	$2539 \pm 26$	$D_M(0.38)$	$1524 \pm 13$
$100\theta_{MC}$	$1.04124 \pm 0.00049$	$D_{1420}$	$819 \pm 13$	$H(0.51)$	$89.90 \pm 0.40$
$\tau$	$0.0530 \pm 0.0078$	$D_{2000}$	$231.5 \pm 4.4$	$D_M(0.51)$	$1975 \pm 16$
$\ln(10^{10} A_s)$	$3.038 \pm 0.016$	$n_{s,0.002}$	$0.970 \pm 0.012$	$H(0.61)$	$95.49 \pm 0.33$
$n_s$	$0.970 \pm 0.012$	$Y_P$	$0.245410 \pm 0.000090$	$D_M(0.61)$	$2298 \pm 17$
$y_{cal}$	$1.0003 \pm 0.0025$	$Y_P^{BBN}$	$0.246737 \pm 0.000090$	$H(2.33)$	$235.8 \pm 1.1$
$H_0$	$67.93 \pm 0.80$	$10^5 D/H$	$2.578 \pm 0.042$	$D_M(2.33)$	$5755 \pm 15$
$\Omega_\Lambda$	$0.692 \pm 0.011$	Age/Gyr	$13.778 \pm 0.034$	$f\sigma_8(0.15)$	$0.4520 \pm 0.0087$
$\Omega_m$	$0.308 \pm 0.011$	$z_*$	$1089.76 \pm 0.37$	$\sigma_8(0.15)$	$0.7454 \pm 0.0063$
$\Omega_m h^2$	$0.1419 \pm 0.0017$	$r_*$	$144.71 \pm 0.44$	$f\sigma_8(0.38)$	$0.4711 \pm 0.0067$
$\Omega_m h^3$	$0.09635 \pm 0.00049$	$100\theta_*$	$1.04142 \pm 0.00048$	$\sigma_8(0.38)$	$0.6612 \pm 0.0056$
$\sigma_8$	$0.8063 \pm 0.0069$	$D_M(z_*)/\text{Gpc}$	$13.896 \pm 0.041$	$f\sigma_8(0.51)$	$0.4702 \pm 0.0057$
$S_8$	$0.816 \pm 0.017$	$z_{\text{drag}}$	$1059.95 \pm 0.49$	$\sigma_8(0.51)$	$0.6190 \pm 0.0054$
$\sigma_8 \Omega_m^{0.5}$	$0.4471 \pm 0.0094$	$r_{\text{drag}}$	$147.36 \pm 0.45$	$f\sigma_8(0.61)$	$0.4655 \pm 0.0051$
$\sigma_8 \Omega_m^{0.25}$	$0.6004 \pm 0.0081$	$k_D$	$0.14062 \pm 0.00053$	$\sigma_8(0.61)$	$0.5891 \pm 0.0052$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.011$	$100\theta_D$	$0.16079 \pm 0.00029$	$f\sigma_8(2.33)$	$0.2972 \pm 0.0028$
$r_{\text{drag}} h$	$100.1 \pm 1.4$	$z_{\text{eq}}$	$3374 \pm 42$	$\sigma_8(2.33)$	$0.3066 \pm 0.0031$
$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.037$	$k_{\text{eq}}$	$0.01030 \pm 0.00013$	$\chi_{\text{lensing}}^2$	$10.0 \pm 1.5$
$z_{\text{re}}$	$7.50 \pm 0.79$	$100\theta_{\text{eq}}$	$0.8188 \pm 0.0078$	$\chi_{\text{small}}^2$	$396.8 \pm 1.5$
$10^9 A_s$	$2.087 \pm 0.032$	$100\theta_{s,\text{eq}}$	$0.4522 \pm 0.0040$	$\chi_{\text{prior}}^2$	$9.6 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.015$	$H(0.15)$	$73.17 \pm 0.68$	$\chi_{\text{CMB}}^2$	$2127 \pm 900$
$D_{40}$	$1219 \pm 27$	$D_M(0.15)$	$638.6 \pm 6.7$		

Best-fit  $\chi_{\text{eff}}^2 = 2991.29$ ;  $\Delta\chi_{\text{eff}}^2 = 1730.84$ ;  $\bar{\chi}_{\text{eff}}^2 = 2998.52$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 1722.97$ ;  $R - 1 = 0.00490$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.01 ( $\Delta$  -0.60) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.72 ( $\Delta$  -0.13) CamSpec like\_10.7HM\_1400\_unified: 2576.36



### 2.32 base\_CamSpecHM\_EE\_lowE\_lensing\_CookeDH/base\_plikHM\_EE\_lowE\_lensing\_CookeDH

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02253 \pm 0.00043$	$D_{220}$	$5777 \pm 96$	$H(0.38)$	$82.75 \pm 0.69$
$\Omega_c h^2$	$0.1193 \pm 0.0020$	$D_{810}$	$2552 \pm 24$	$D_M(0.38)$	$1536 \pm 18$
$100\theta_{MC}$	$1.03955 \pm 0.00082$	$D_{1420}$	$822 \pm 11$	$H(0.51)$	$89.50 \pm 0.58$
$\tau$	$0.0483 \pm 0.0082$	$D_{2000}$	$232.5 \pm 4.1$	$D_M(0.51)$	$1989 \pm 22$
$\ln(10^{10} A_s)$	$3.036 \pm 0.016$	$n_{s,0.002}$	$0.967 \pm 0.011$	$H(0.61)$	$95.14 \pm 0.50$
$n_s$	$0.967 \pm 0.011$	$Y_P$	$0.24546 \pm 0.00018$	$D_M(0.61)$	$2314 \pm 23$
$y_{cal}$	$0.9999 \pm 0.0025$	$Y_P^{BBN}$	$0.24678 \pm 0.00018$	$H(2.33)$	$236.2 \pm 1.1$
$H_0$	$67.3 \pm 1.0$	$10^5 D/H$	$2.558^{+0.074}_{-0.083}$	$D_M(2.33)$	$5773 \pm 25$
$\Omega_\Lambda$	$0.685 \pm 0.013$	Age/Gyr	$13.819 \pm 0.057$	$f\sigma_8(0.15)$	$0.456 \pm 0.011$
$\Omega_m$	$0.315 \pm 0.013$	$z_*$	$1089.67 \pm 0.66$	$\sigma_8(0.15)$	$0.7426 \pm 0.0068$
$\Omega_m h^2$	$0.1425 \pm 0.0018$	$r_*$	$144.48 \pm 0.41$	$f\sigma_8(0.38)$	$0.4730 \pm 0.0085$
$\Omega_m h^3$	$0.09586 \pm 0.00079$	$100\theta_*$	$1.03972 \pm 0.00082$	$\sigma_8(0.38)$	$0.6579 \pm 0.0058$
$\sigma_8$	$0.8041 \pm 0.0079$	$D_M(z_*)/\text{Gpc}$	$13.896 \pm 0.042$	$f\sigma_8(0.51)$	$0.4711 \pm 0.0072$
$S_8$	$0.824 \pm 0.022$	$z_{\text{drag}}$	$1060.25 \pm 0.92$	$\sigma_8(0.51)$	$0.6155 \pm 0.0054$
$\sigma_8 \Omega_m^{0.5}$	$0.451 \pm 0.012$	$r_{\text{drag}}$	$147.09 \pm 0.44$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0064$
$\sigma_8 \Omega_m^{0.25}$	$0.602 \pm 0.010$	$k_D$	$0.14098 \pm 0.00065$	$\sigma_8(0.61)$	$0.5856 \pm 0.0052$
$\sigma_8/h^{0.5}$	$0.980 \pm 0.014$	$100\theta_D$	$0.16036 \pm 0.00055$	$f\sigma_8(2.33)$	$0.2951 \pm 0.0027$
$r_{\text{drag}} h$	$98.9 \pm 1.6$	$z_{\text{eq}}$	$3390 \pm 43$	$\sigma_8(2.33)$	$0.3041 \pm 0.0030$
$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.036$	$k_{\text{eq}}$	$0.01035 \pm 0.00013$	$\chi^2_{\text{lensing}}$	$9.6 \pm 1.4$
$z_{\text{re}}$	$6.98^{+0.89}_{-0.74}$	$100\theta_{\text{eq}}$	$0.8149 \pm 0.0084$	$\chi^2_{\text{small}}$	$396.8 \pm 1.5$
$10^9 A_s$	$2.082 \pm 0.033$	$100\theta_{s,\text{eq}}$	$0.4501 \pm 0.0042$	$\chi^2_{\text{prior}}$	$7.2 \pm 5.4$
$10^9 A_s e^{-2\tau}$	$1.890 \pm 0.016$	$H(0.15)$	$72.58 \pm 0.90$	$\chi^2_{\text{CMB}}$	$1724 \pm 600$
$D_{40}$	$1232 \pm 29$	$D_M(0.15)$	$644.3 \pm 8.9$		

Best-fit  $\chi^2_{\text{eff}} = 2303.11$ ;  $\Delta\chi^2_{\text{eff}} = 1157.94$ ;  $\bar{\chi}^2_{\text{eff}} = 2310.16$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1157.90$ ;  $R - 1 = 0.00957$   
 $\chi^2_{\text{eff}}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp.p\_teb\_consext8: 8.77 ( $\Delta$  0.10) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.72 ( $\Delta$  0.04) CamSpec like\_10.7HM\_1400\_unified: 1888.23



### 2.33 base\_CamSpecHM\_TT\_lowl/base\_plikHM\_TT\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00027$	$\langle d^2 \rangle^{1/2}$	$2.540 \pm 0.061$	$D_M(0.15)$	$636 \pm 10$
$\Omega_c h^2$	$0.1179 \pm 0.0026$	$z_{\text{re}}$	$12.5^{+3.0}_{-2.1}$	$H(0.38)$	$83.37 \pm 0.76$
$100\theta_{MC}$	$1.04117 \pm 0.00052$	$10^9 A_s$	$2.34 \pm 0.15$	$D_M(0.38)$	$1519 \pm 20$
$\tau$	$0.111^{+0.035}_{-0.032}$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.015$	$H(0.51)$	$90.00 \pm 0.60$
$\ln(10^{10} A_s)$	$3.150^{+0.066}_{-0.059}$	$D_{40}$	$1239 \pm 16$	$D_M(0.51)$	$1969 \pm 24$
$n_s$	$0.9723 \pm 0.0080$	$D_{220}$	$5713 \pm 42$	$H(0.61)$	$95.55 \pm 0.49$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{810}$	$2530 \pm 14$	$D_M(0.61)$	$2293 \pm 26$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$815.2 \pm 5.2$	$H(2.33)$	$235.2 \pm 1.5$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.5 \pm 2.1$	$D_M(2.33)$	$5754 \pm 22$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$n_{s,0.002}$	$0.9723 \pm 0.0080$	$f\sigma_8(0.15)$	$0.473 \pm 0.013$
$A_{100}^{PS}$	$244 \pm 30$	$Y_P$	$0.24540 \pm 0.00011$	$\sigma_8(0.15)$	$0.786 \pm 0.022$
$A_{143}^{PS}$	$40 \pm 10$	$Y_P^{\text{BBN}}$	$0.24673 \pm 0.00011$	$f\sigma_8(0.38)$	$0.494 \pm 0.013$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.581 \pm 0.050$	$\sigma_8(0.38)$	$0.698 \pm 0.021$
$A^{kSZ}$	$< 4.66$	Age/Gyr	$13.777 \pm 0.047$	$f\sigma_8(0.51)$	$0.494 \pm 0.013$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1089.70 \pm 0.52$	$\sigma_8(0.51)$	$0.654 \pm 0.020$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$r_*$	$144.96 \pm 0.55$	$f\sigma_8(0.61)$	$0.490 \pm 0.012$
$H_0$	$68.2 \pm 1.2$	$100\theta_*$	$1.04135 \pm 0.00051$	$\sigma_8(0.61)$	$0.622 \pm 0.019$
$\Omega_\Lambda$	$0.697^{+0.016}_{-0.015}$	$D_M(z_*)/\text{Gpc}$	$13.920 \pm 0.050$	$f\sigma_8(2.33)$	$0.314 \pm 0.010$
$\Omega_m$	$0.303 \pm 0.016$	$z_{\text{drag}}$	$1059.86 \pm 0.53$	$\sigma_8(2.33)$	$0.324 \pm 0.011$
$\Omega_m h^2$	$0.1409 \pm 0.0024$	$r_{\text{drag}}$	$147.62 \pm 0.53$	$f_{2000}^{143}$	$28 \pm 4$
$\Omega_m h^3$	$0.09613 \pm 0.00048$	$k_D$	$0.14033 \pm 0.00053$	$f_{2000}^{143 \times 217}$	$30.8 \pm 2.6$
$\sigma_8$	$0.850 \pm 0.023$	$100\theta_D$	$0.16083 \pm 0.00029$	$f_{2000}^{217}$	$105.7 \pm 2.4$
$S_8$	$0.854 \pm 0.025$	$z_{\text{eq}}$	$3353 \pm 57$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.468 \pm 0.014$	$k_{\text{eq}}$	$0.01023 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.3 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.631 \pm 0.016$	$100\theta_{\text{eq}}$	$0.823 \pm 0.011$	$\chi_{\text{CMB}}^2$	$3939 \pm 3000$
$\sigma_8/h^{0.5}$	$1.029 \pm 0.026$	$100\theta_{s,\text{eq}}$	$0.4543 \pm 0.0057$		
$r_{\text{drag}} h$	$100.7 \pm 2.1$	$H(0.15)$	$73.4 \pm 1.0$		

Best-fit  $\chi_{\text{eff}}^2 = 7072.29$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.81$ ;  $\bar{\chi}_{\text{eff}}^2 = 7092.24$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.04$ ;  $R - 1 = 0.00797$   
 $\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 24.50 ( $\Delta$  -0.39) CamSpec like\_10.7HM: 7046.38



### 2.34 base\_CamSpecHM\_TTTEEE\_lowl/base\_plikHM\_TTTEEE\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.525^{+0.058}_{-0.051}$	$D_M(0.15)$	$637.7 \pm 6.0$
$\Omega_c h^2$	$0.1184 \pm 0.0016$	$z_{\text{re}}$	$11.7^{+2.5}_{-1.8}$	$H(0.38)$	$83.28 \pm 0.45$
$100\theta_{MC}$	$1.04105 \pm 0.00033$	$10^9 A_s$	$2.29 \pm 0.12$	$D_M(0.38)$	$1522 \pm 12$
$\tau$	$0.0999^{+0.028}_{-0.025}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.012$	$H(0.51)$	$89.94 \pm 0.36$
$\ln(10^{10} A_s)$	$3.130^{+0.054}_{-0.048}$	$D_{40}$	$1237 \pm 14$	$D_M(0.51)$	$1973 \pm 14$
$n_s$	$0.9707 \pm 0.0053$	$D_{220}$	$5723 \pm 39$	$H(0.61)$	$95.52 \pm 0.29$
$y_{\text{cal}}$	$1.0003 \pm 0.0024$	$D_{810}$	$2532 \pm 14$	$D_M(0.61)$	$2296 \pm 15$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$816.1 \pm 4.8$	$H(2.33)$	$235.65 \pm 0.91$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.7 \pm 1.8$	$D_M(2.33)$	$5754 \pm 13$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9707 \pm 0.0053$	$f\sigma_8(0.15)$	$0.471 \pm 0.011$
$A_{100}^{PS}$	$242 \pm 30$	$Y_P$	$0.245432^{+0.000070}_{-0.000063}$	$\sigma_8(0.15)$	$0.780^{+0.020}_{-0.018}$
$A_{143}^{PS}$	$40 \pm 9$	$Y_P^{\text{BBN}}$	$0.246759^{+0.000070}_{-0.000063}$	$f\sigma_8(0.38)$	$0.492 \pm 0.011$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.568 \pm 0.032$	$\sigma_8(0.38)$	$0.692 \pm 0.017$
$A^{kSZ}$	$< 4.39$	Age/Gyr	$13.777 \pm 0.029$	$f\sigma_8(0.51)$	$0.491^{+0.012}_{-0.011}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1089.66 \pm 0.32$	$\sigma_8(0.51)$	$0.648 \pm 0.016$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.76 \pm 0.34$	$f\sigma_8(0.61)$	$0.486^{+0.012}_{-0.010}$
$H_0$	$68.04 \pm 0.71$	$100\theta_*$	$1.04122 \pm 0.00032$	$\sigma_8(0.61)$	$0.616 \pm 0.016$
$\Omega_\Lambda$	$0.6940 \pm 0.0094$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.031$	$f\sigma_8(2.33)$	$0.3110 \pm 0.0082$
$\Omega_m$	$0.3060 \pm 0.0094$	$z_{\text{drag}}$	$1060.06 \pm 0.35$	$\sigma_8(2.33)$	$0.3209 \pm 0.0087$
$\Omega_m h^2$	$0.1416 \pm 0.0014$	$r_{\text{drag}}$	$147.39 \pm 0.33$	$f_{2000}^{143}$	$27 \pm 3$
$\Omega_m h^3$	$0.09630 \pm 0.00033$	$k_D$	$0.14063 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.5 \pm 2.2$
$\sigma_8$	$0.843^{+0.021}_{-0.019}$	$100\theta_D$	$0.16069 \pm 0.00020$	$f_{2000}^{217}$	$105.5 \pm 2.0$
$S_8$	$0.851 \pm 0.020$	$z_{\text{eq}}$	$3367 \pm 35$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.466 \pm 0.011$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.627^{+0.015}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8200 \pm 0.0067$	$\chi_{\text{CMB}}^2$	$6958 \pm 5000$
$\sigma_8/h^{0.5}$	$1.022^{+0.024}_{-0.022}$	$100\theta_{s,\text{eq}}$	$0.4528 \pm 0.0034$		
$r_{\text{drag}} h$	$100.3 \pm 1.2$	$H(0.15)$	$73.26 \pm 0.61$		

Best-fit  $\chi_{\text{eff}}^2 = 11522.05$ ;  $\Delta\chi_{\text{eff}}^2 = 9158.41$ ;  $\bar{\chi}_{\text{eff}}^2 = 11544.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9153.56$ ;  $R - 1 = 0.00836$   
 $\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 23.92 ( $\Delta$  -0.85) CamSpec like\_10.7HM\_1400\_unified: 11496.23



### 2.35 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing/base\_plikHM\_TT\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02214 \pm 0.00020$	$\langle d^2 \rangle^{1/2}$	$2.447 \pm 0.025$	$D_M(0.15)$	$646.1 \pm 6.1$
$\Omega_c h^2$	$0.1202 \pm 0.0016$	$z_{\text{re}}$	$7.53 \pm 0.80$	$H(0.38)$	$82.63 \pm 0.44$
$100\theta_{MC}$	$1.04083 \pm 0.00046$	$10^9 A_s$	$2.090 \pm 0.031$	$D_M(0.38)$	$1539 \pm 12$
$\tau$	$0.0526 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(0.51)$	$89.40 \pm 0.36$
$\ln(10^{10} A_s)$	$3.040 \pm 0.015$	$D_{40}$	$1231 \pm 13$	$D_M(0.51)$	$1993 \pm 14$
$n_s$	$0.9637 \pm 0.0048$	$D_{220}$	$5711 \pm 41$	$H(0.61)$	$95.07 \pm 0.29$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2535 \pm 13$	$D_M(0.61)$	$2318 \pm 15$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.3 \pm 5.1$	$H(2.33)$	$236.48 \pm 0.95$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.5 \pm 1.8$	$D_M(2.33)$	$5775 \pm 14$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.9637 \pm 0.0048$	$f\sigma_8(0.15)$	$0.4612 \pm 0.0081$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.245298^{+0.000096}_{-0.000079}$	$\sigma_8(0.15)$	$0.7483 \pm 0.0056$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.246624^{+0.000097}_{-0.000080}$	$f\sigma_8(0.38)$	$0.4780 \pm 0.0063$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.629 \pm 0.039$	$\sigma_8(0.38)$	$0.6626 \pm 0.0049$
$A^{kSZ}$	$< 5.87$	Age/Gyr	$13.824 \pm 0.032$	$f\sigma_8(0.51)$	$0.4758 \pm 0.0054$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1090.23 \pm 0.34$	$\sigma_8(0.51)$	$0.6198 \pm 0.0046$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.55 \pm 0.36$	$f\sigma_8(0.61)$	$0.4703 \pm 0.0048$
$H_0$	$67.06 \pm 0.70$	$100\theta_*$	$1.04103 \pm 0.00045$	$\sigma_8(0.61)$	$0.5895 \pm 0.0045$
$\Omega_\Lambda$	$0.6818 \pm 0.0097$	$D_M(z_*)/\text{Gpc}$	$13.885 \pm 0.034$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0023$
$\Omega_m$	$0.3182 \pm 0.0097$	$z_{\text{drag}}$	$1059.42 \pm 0.44$	$\sigma_8(2.33)$	$0.3059 \pm 0.0026$
$\Omega_m h^2$	$0.1430 \pm 0.0015$	$r_{\text{drag}}$	$147.29 \pm 0.38$	$f_{2000}^{143}$	$31.1 \pm 3.0$
$\Omega_m h^3$	$0.09590 \pm 0.00045$	$k_D$	$0.14048 \pm 0.00045$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\sigma_8$	$0.8105 \pm 0.0063$	$100\theta_D$	$0.16106 \pm 0.00026$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$S_8$	$0.835 \pm 0.016$	$z_{\text{eq}}$	$3402 \pm 35$	$\chi_{\text{lensing}}^2$	$9.48 \pm 0.87$
$\sigma_8 \Omega_m^{0.5}$	$0.4571 \pm 0.0088$	$k_{\text{eq}}$	$0.01038 \pm 0.00011$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6087 \pm 0.0077$	$100\theta_{\text{eq}}$	$0.8127 \pm 0.0066$	$\chi_{\text{lowl}}^2$	$23.6 \pm 1.0$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.010$	$100\theta_{s,\text{eq}}$	$0.4492 \pm 0.0034$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$98.8 \pm 1.2$	$H(0.15)$	$72.41 \pm 0.60$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7480.67$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.11$ ;  $\bar{\chi}_{\text{eff}}^2 = 7500.24$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.83$ ;  $R - 1 = 0.00500$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.91 ( $\Delta$  0.01) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  0.01) commander\_dx12\_v3.2\_29: 23.42 ( $\Delta$  0.19) CamSpec like\_10.7HM: 7050.18



### 2.36 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00019$	$10^9 A_s$	$2.098^{+0.029}_{-0.032}$	$D_M(0.51)$	$1983 \pm 10$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$H(0.61)$	$95.25 \pm 0.23$
$100\theta_{MC}$	$1.04100 \pm 0.00042$	$D_{40}$	$1227 \pm 12$	$D_M(0.61)$	$2307 \pm 11$
$\tau$	$0.0553 \pm 0.0075$	$D_{220}$	$5719 \pm 40$	$H(2.33)$	$235.85 \pm 0.70$
$\ln(10^{10} A_s)$	$3.043 \pm 0.015$	$D_{810}$	$2536 \pm 13$	$D_M(2.33)$	$5767 \pm 12$
$n_s$	$0.9662 \pm 0.0041$	$D_{1420}$	$815.4 \pm 5.0$	$f\sigma_8(0.15)$	$0.4559 \pm 0.0061$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.7$	$\sigma_8(0.15)$	$0.7476 \pm 0.0057$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9662 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4743 \pm 0.0051$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245329^{+0.000086}_{-0.000073}$	$\sigma_8(0.38)$	$0.6627 \pm 0.0050$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{BBN}$	$0.246655^{+0.000086}_{-0.000074}$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.615 \pm 0.036$	$\sigma_8(0.51)$	$0.6202 \pm 0.0047$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.807 \pm 0.027$	$f\sigma_8(0.61)$	$0.4680 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.04 \pm 0.28$	$\sigma_8(0.61)$	$0.5902 \pm 0.0045$
$A^{kSZ}$	$< 5.67$	$r_*$	$144.77 \pm 0.29$	$f\sigma_8(2.33)$	$0.2976 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04120 \pm 0.00041$	$\sigma_8(2.33)$	$0.3068 \pm 0.0025$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.904 \pm 0.028$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.56 \pm 0.49$	$z_{drag}$	$1059.51 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6888 \pm 0.0066$	$r_{drag}$	$147.49 \pm 0.32$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3112 \pm 0.0066$	$k_D$	$0.14032 \pm 0.00042$	$\chi^2_{lensing}$	$9.33 \pm 0.77$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$100\theta_D$	$0.16102 \pm 0.00025$	$\chi^2_{simall}$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09593 \pm 0.00044$	$z_{eq}$	$3378 \pm 25$	$\chi^2_{lowl}$	$23.14 \pm 0.86$
$\sigma_8$	$0.8090 \pm 0.0063$	$k_{eq}$	$0.010310 \pm 0.000078$	$\chi^2_{6DF}$	$0.059 \pm 0.071$
$S_8$	$0.824 \pm 0.012$	$100\theta_{eq}$	$0.8173 \pm 0.0047$	$\chi^2_{MGS}$	$1.27 \pm 0.46$
$\sigma_8 \Omega_m^{0.5}$	$0.4513 \pm 0.0065$	$100\theta_{s,eq}$	$0.4516 \pm 0.0024$	$\chi^2_{DR12BAO}$	$4.9 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0062$	$H(0.15)$	$72.83 \pm 0.43$	$\chi^2_{prior}$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9844 \pm 0.0090$	$D_M(0.15)$	$641.8 \pm 4.2$	$\chi^2_{CMB}$	$4347 \pm 3000$
$r_{drag} h$	$99.64 \pm 0.84$	$H(0.38)$	$82.93 \pm 0.32$	$\chi^2_{BAO}$	$6.2 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.022$	$D_M(0.38)$	$1530.7 \pm 8.5$		
$z_{re}$	$7.79 \pm 0.75$	$H(0.51)$	$89.64 \pm 0.27$		

$\bar{\chi}^2_{\text{eff}} = 7506.48$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.75$ ;  $R - 1 = 0.00781$



### 2.37 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_Riess18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00020$	$z_{\text{re}}$	$8.04 \pm 0.79$	$D_{\text{M}}(0.38)$	$1522 \pm 12$
$\Omega_c h^2$	$0.1182 \pm 0.0015$	$10^9 A_s$	$2.107^{+0.031}_{-0.035}$	$H(0.51)$	$89.90 \pm 0.35$
$100\theta_{MC}$	$1.04118 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$D_{\text{M}}(0.51)$	$1973 \pm 14$
$\tau$	$0.0583^{+0.0076}_{-0.0085}$	$D_{40}$	$1223 \pm 13$	$H(0.61)$	$95.46 \pm 0.29$
$\ln(10^{10} A_s)$	$3.048 \pm 0.016$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(0.61)$	$2296 \pm 15$
$n_s$	$0.9688 \pm 0.0048$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$235.32 \pm 0.92$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{1420}$	$816.8 \pm 5.0$	$D_{\text{M}}(2.33)$	$5758 \pm 14$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.6 \pm 1.8$	$f\sigma_8(0.15)$	$0.4511 \pm 0.0078$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9688 \pm 0.0048$	$\sigma_8(0.15)$	$0.7472 \pm 0.0058$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.245374^{+0.000087}_{-0.000069}$	$f\sigma_8(0.38)$	$0.4709 \pm 0.0062$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P^{\text{BBN}}$	$0.246701^{+0.000088}_{-0.000069}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0051$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.595^{+0.034}_{-0.040}$	$f\sigma_8(0.51)$	$0.4703 \pm 0.0053$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.786 \pm 0.030$	$\sigma_8(0.51)$	$0.6209 \pm 0.0048$
$A^{kSZ}$	$< 5.45$	$z_*$	$1089.82 \pm 0.32$	$f\sigma_8(0.61)$	$0.4658 \pm 0.0048$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$r_*$	$144.95 \pm 0.36$	$\sigma_8(0.61)$	$0.5910 \pm 0.0046$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04137 \pm 0.00044$	$f\sigma_8(2.33)$	$0.2982^{+0.0023}_{-0.0025}$
$H_0$	$68.06 \pm 0.68$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.919 \pm 0.034$	$\sigma_8(2.33)$	$0.3078 \pm 0.0027$
$\Omega_{\Lambda}$	$0.6952 \pm 0.0090$	$z_{\text{drag}}$	$1059.70 \pm 0.43$	$f_{2000}^{143}$	$30.2 \pm 2.9$
$\Omega_m$	$0.3048 \pm 0.0090$	$r_{\text{drag}}$	$147.63 \pm 0.38$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_m h^2$	$0.1411 \pm 0.0014$	$k_{\text{D}}$	$0.14026 \pm 0.00045$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m h^3$	$0.09604 \pm 0.00043$	$100\theta_{\text{D}}$	$0.16092 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.7 \pm 1.3$
$\sigma_8$	$0.8079 \pm 0.0065$	$z_{\text{eq}}$	$3357 \pm 34$	$\chi_{\text{simall}}^2$	$397.8 \pm 2.5$
$S_8$	$0.814 \pm 0.015$	$k_{\text{eq}}$	$0.01025 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.78 \pm 0.90$
$\sigma_8 \Omega_m^{0.5}$	$0.4460 \pm 0.0084$	$100\theta_{\text{eq}}$	$0.8216 \pm 0.0066$	$\chi_{\text{H073p45}}^2$	$10.7 \pm 2.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6003 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4538 \pm 0.0034$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.979 \pm 0.010$	$H(0.15)$	$73.27 \pm 0.59$	$\chi_{\text{CMB}}^2$	$4349 \pm 3000$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.15)$	$637.5 \pm 5.8$		
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.024$	$H(0.38)$	$83.25 \pm 0.44$		

$\bar{\chi}_{\text{eff}}^2 = 7512.86$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.69$ ;  $R - 1 = 0.03322$



2.38 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Riess18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00019$	$10^9 A_s$	$2.107 \pm 0.032$	$D_M(0.51)$	$1973.2 \pm 9.7$
$\Omega_c h^2$	$0.1182 \pm 0.0011$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.45 \pm 0.23$
$100\theta_{MC}$	$1.04117 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2297 \pm 11$
$\tau$	$0.0581 \pm 0.0075$	$D_{220}$	$5730 \pm 40$	$H(2.33)$	$235.35 \pm 0.69$
$\ln(10^{10} A_s)$	$3.048 \pm 0.015$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9687 \pm 0.0041$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4513 \pm 0.0059$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7473 \pm 0.0058$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4710 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245373^{+0.000082}_{-0.000069}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0051$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246699^{+0.000082}_{-0.000069}$	$f\sigma_8(0.51)$	$0.4704 \pm 0.0045$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.595 \pm 0.035$	$\sigma_8(0.51)$	$0.6208 \pm 0.0048$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.787 \pm 0.026$	$f\sigma_8(0.61)$	$0.4660 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.83 \pm 0.27$	$\sigma_8(0.61)$	$0.5909 \pm 0.0046$
$A^{kSZ}$	$< 5.44$	$r_*$	$144.94 \pm 0.28$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04136 \pm 0.00041$	$\sigma_8(2.33)$	$0.3077 \pm 0.0025$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.918 \pm 0.028$	$f_{2000}^{143}$	$30.1 \pm 3.0$
$H_0$	$68.03 \pm 0.48$	$z_{drag}$	$1059.69 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6949 \pm 0.0062$	$r_{drag}$	$147.62 \pm 0.31$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m$	$0.3051 \pm 0.0062$	$k_D$	$0.14027 \pm 0.00042$	$\chi_{lensing}^2$	$9.5 \pm 1.0$
$\Omega_m h^2$	$0.1412 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi_{small}^2$	$397.7 \pm 2.2$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3358 \pm 25$	$\chi_{lowl}^2$	$22.78 \pm 0.82$
$\sigma_8$	$0.8080 \pm 0.0063$	$k_{eq}$	$0.010249 \pm 0.000076$	$\chi_{H073p45}^2$	$10.7 \pm 1.9$
$S_8$	$0.815 \pm 0.012$	$100\theta_{eq}$	$0.8214 \pm 0.0046$	$\chi_{6DF}^2$	$0.028 \pm 0.040$
$\sigma_8 \Omega_m^{0.5}$	$0.4462 \pm 0.0063$	$100\theta_{s,eq}$	$0.4536 \pm 0.0024$	$\chi_{MGS}^2$	$1.73 \pm 0.50$
$\sigma_8 \Omega_m^{0.25}$	$0.6004 \pm 0.0062$	$H(0.15)$	$73.24 \pm 0.41$	$\chi_{DR12BAO}^2$	$3.93 \pm 0.79$
$\sigma_8/h^{0.5}$	$0.9796 \pm 0.0089$	$D_M(0.15)$	$637.7 \pm 4.0$	$\chi_{prior}^2$	$7.4 \pm 3.5$
$r_{drag} h$	$100.44 \pm 0.82$	$H(0.38)$	$83.24 \pm 0.31$	$\chi_{CMB}^2$	$4348 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.022$	$D_M(0.38)$	$1522.4 \pm 8.2$	$\chi_{BAO}^2$	$5.69 \pm 0.71$
$z_{re}$	$8.03 \pm 0.74$	$H(0.51)$	$89.89 \pm 0.26$		

$\bar{\chi}_{\text{eff}}^2 = 7518.00$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.55$ ;  $R - 1 = 0.02714$



### 2.39 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_Pantheon18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00020$	$z_{\text{re}}$	$7.64 \pm 0.78$	$D_{\text{M}}(0.38)$	$1535 \pm 11$
$\Omega_c h^2$	$0.1198 \pm 0.0014$	$10^9 A_s$	$2.094 \pm 0.031$	$H(0.51)$	$89.51 \pm 0.33$
$100\theta_{MC}$	$1.04089 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.51)$	$1989 \pm 13$
$\tau$	$0.0538 \pm 0.0077$	$D_{40}$	$1229 \pm 12$	$H(0.61)$	$95.15 \pm 0.28$
$\ln(10^{10} A_s)$	$3.041 \pm 0.015$	$D_{220}$	$5715 \pm 41$	$D_{\text{M}}(0.61)$	$2313 \pm 14$
$n_s$	$0.9648 \pm 0.0046$	$D_{810}$	$2535 \pm 13$	$H(2.33)$	$236.20 \pm 0.88$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$814.8 \pm 5.1$	$D_{\text{M}}(2.33)$	$5772 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.7 \pm 1.8$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0075$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9648 \pm 0.0046$	$\sigma_8(0.15)$	$0.7480 \pm 0.0056$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245313^{+0.000092}_{-0.000077}$	$f\sigma_8(0.38)$	$0.4764 \pm 0.0059$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P^{\text{BBN}}$	$0.246639^{+0.000092}_{-0.000077}$	$\sigma_8(0.38)$	$0.6627 \pm 0.0049$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.623 \pm 0.038$	$f\sigma_8(0.51)$	$0.4745 \pm 0.0051$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.817 \pm 0.031$	$\sigma_8(0.51)$	$0.6200 \pm 0.0047$
$A^{kSZ}$	$< 5.77$	$z_*$	$1090.15 \pm 0.32$	$f\sigma_8(0.61)$	$0.4693 \pm 0.0046$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$r_*$	$144.64 \pm 0.34$	$\sigma_8(0.61)$	$0.5898 \pm 0.0045$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04110 \pm 0.00044$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0023$
$H_0$	$67.28 \pm 0.65$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.033$	$\sigma_8(2.33)$	$0.3063 \pm 0.0026$
$\Omega_\Lambda$	$0.6848 \pm 0.0088$	$z_{\text{drag}}$	$1059.47 \pm 0.44$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$\Omega_m$	$0.3152 \pm 0.0088$	$r_{\text{drag}}$	$147.37 \pm 0.36$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_m h^2$	$0.1426 \pm 0.0014$	$k_{\text{D}}$	$0.14042 \pm 0.00044$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m h^3$	$0.09591 \pm 0.00044$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.40 \pm 0.80$
$\sigma_8$	$0.8098 \pm 0.0063$	$z_{\text{eq}}$	$3392 \pm 33$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$S_8$	$0.830 \pm 0.015$	$k_{\text{eq}}$	$0.01035 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$23.39 \pm 0.97$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0082$	$100\theta_{\text{eq}}$	$0.8147 \pm 0.0061$	$\chi_{\text{JLA}}^2$	$1035.42 \pm 0.62$
$\sigma_8 \Omega_m^{0.25}$	$0.6068 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4502 \pm 0.0031$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.010$	$H(0.15)$	$72.59 \pm 0.56$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$r_{\text{drag}} h$	$99.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$644.2 \pm 5.6$		
$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.024$	$H(0.38)$	$82.76 \pm 0.41$		

Best-fit  $\chi_{\text{eff}}^2 = 8516.03$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.15$ ;  $\bar{\chi}_{\text{eff}}^2 = 8535.63$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.83$ ;  $R - 1 = 0.00582$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.88 ( $\Delta$  0.04) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.05 ( $\Delta$  0.18) commander\_dx12\_v3\_2\_29: 23.24 ( $\Delta$  0.01) CamSpec like\_10.7HM: 7050.35 SN - JLA Pantheon18: 1035.29 ( $\Delta$  0.03)



2.40 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$10^9 A_s$	$2.107 \pm 0.032$	$D_M(0.51)$	$1972.4 \pm 9.6$
$\Omega_c h^2$	$0.1181 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.47 \pm 0.23$
$100\theta_{MC}$	$1.04117 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2296 \pm 10$
$\tau$	$0.0582 \pm 0.0076$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$235.30 \pm 0.67$
$\ln(10^{10} A_s)$	$3.048 \pm 0.015$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9688 \pm 0.0040$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4508 \pm 0.0059$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7471 \pm 0.0058$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9688 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4707 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245376^{+0.000081}_{-0.000071}$	$\sigma_8(0.38)$	$0.6630 \pm 0.0051$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246702^{+0.000081}_{-0.000071}$	$f\sigma_8(0.51)$	$0.4701 \pm 0.0045$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.594 \pm 0.035$	$\sigma_8(0.51)$	$0.6208 \pm 0.0048$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.786 \pm 0.026$	$f\sigma_8(0.61)$	$0.4657 \pm 0.0042$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1089.81 \pm 0.27$	$\sigma_8(0.61)$	$0.5909 \pm 0.0045$
$A^{kSZ}$	$< 5.43$	$r_*$	$144.95 \pm 0.28$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04136 \pm 0.00041$	$\sigma_8(2.33)$	$0.3078 \pm 0.0025$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.920 \pm 0.028$	$f_{2000}^{143}$	$30.1 \pm 2.9$
$H_0$	$68.07 \pm 0.47$	$z_{drag}$	$1059.70 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6955 \pm 0.0061$	$r_{drag}$	$147.64 \pm 0.31$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m$	$0.3045 \pm 0.0061$	$k_D$	$0.14025 \pm 0.00042$	$\chi_{lensing}^2$	$9.6 \pm 1.1$
$\Omega_m h^2$	$0.1411 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi_{small}^2$	$397.7 \pm 2.2$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3356 \pm 24$	$\chi_{lowl}^2$	$22.76 \pm 0.80$
$\sigma_8$	$0.8077 \pm 0.0063$	$k_{eq}$	$0.010243 \pm 0.000074$	$\chi_{H073p45}^2$	$10.6 \pm 1.8$
$S_8$	$0.814 \pm 0.011$	$100\theta_{eq}$	$0.8217 \pm 0.0045$	$\chi_{JLA}^2$	$706.62 \pm 0.12$
$\sigma_8 \Omega_m^{0.5}$	$0.4457 \pm 0.0063$	$100\theta_{s,eq}$	$0.4538 \pm 0.0023$	$\chi_{6DF}^2$	$0.027 \pm 0.039$
$\sigma_8 \Omega_m^{0.25}$	$0.6000 \pm 0.0062$	$H(0.15)$	$73.28 \pm 0.41$	$\chi_{MGS}^2$	$1.77 \pm 0.50$
$\sigma_8/h^{0.5}$	$0.9790 \pm 0.0090$	$D_M(0.15)$	$637.4 \pm 4.0$	$\chi_{DR12BAO}^2$	$3.88 \pm 0.74$
$r_{drag} h$	$100.51 \pm 0.81$	$H(0.38)$	$83.26 \pm 0.31$	$\chi_{prior}^2$	$7.5 \pm 3.6$
$\langle d^2 \rangle^{1/2}$	$2.423 \pm 0.022$	$D_M(0.38)$	$1521.8 \pm 8.1$	$\chi_{CMB}^2$	$4349 \pm 3000$
$z_{re}$	$8.04 \pm 0.74$	$H(0.51)$	$89.90 \pm 0.26$	$\chi_{BAO}^2$	$5.68 \pm 0.71$
$\bar{\chi}_{eff}^2 = 8224.73$ ; $\Delta\bar{\chi}_{eff}^2 = 6291.68$ ; $R - 1 = 0.08459$					



## 2.41 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00019$	$10^9 A_s$	$2.099^{+0.029}_{-0.033}$	$D_M(0.51)$	$1981.5 \pm 9.7$
$\Omega_c h^2$	$0.1190 \pm 0.0011$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$H(0.61)$	$95.28 \pm 0.23$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2306 \pm 10$
$\tau$	$0.0557 \pm 0.0075$	$D_{220}$	$5720 \pm 40$	$H(2.33)$	$235.76 \pm 0.68$
$\ln(10^{10} A_s)$	$3.044 \pm 0.015$	$D_{810}$	$2536 \pm 13$	$D_M(2.33)$	$5766 \pm 11$
$n_s$	$0.9666 \pm 0.0041$	$D_{1420}$	$815.5 \pm 5.0$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0059$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.7$	$\sigma_8(0.15)$	$0.7475 \pm 0.0057$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9666 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4738 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245334^{+0.000085}_{-0.000073}$	$\sigma_8(0.38)$	$0.6628 \pm 0.0050$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{BBN}$	$0.246660^{+0.000085}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4725 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.613 \pm 0.036$	$\sigma_8(0.51)$	$0.6203 \pm 0.0047$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.805 \pm 0.026$	$f\sigma_8(0.61)$	$0.4676 \pm 0.0041$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.01 \pm 0.28$	$\sigma_8(0.61)$	$0.5903 \pm 0.0045$
$A^{kSZ}$	$< 5.64$	$r_*$	$144.80 \pm 0.28$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04121 \pm 0.00041$	$\sigma_8(2.33)$	$0.3069^{+0.0023}_{-0.0026}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.907 \pm 0.028$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.63 \pm 0.47$	$z_{drag}$	$1059.53 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.6898 \pm 0.0063$	$r_{drag}$	$147.52 \pm 0.31$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m$	$0.3102 \pm 0.0063$	$k_D$	$0.14030 \pm 0.00042$	$\chi_{lensing}^2$	$9.34 \pm 0.79$
$\Omega_m h^2$	$0.1419 \pm 0.0010$	$100\theta_D$	$0.16101 \pm 0.00025$	$\chi_{small}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09593 \pm 0.00044$	$z_{eq}$	$3374 \pm 25$	$\chi_{lowl}^2$	$23.08 \pm 0.85$
$\sigma_8$	$0.8088 \pm 0.0063$	$k_{eq}$	$0.010299 \pm 0.000075$	$\chi_{JLA}^2$	$1035.07 \pm 0.31$
$S_8$	$0.822 \pm 0.011$	$100\theta_{eq}$	$0.8180 \pm 0.0045$	$\chi_{6DF}^2$	$0.049 \pm 0.061$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0063$	$100\theta_{s,eq}$	$0.4519 \pm 0.0023$	$\chi_{MGS}^2$	$1.34 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6036 \pm 0.0061$	$H(0.15)$	$72.89 \pm 0.41$	$\chi_{DR12BAO}^2$	$4.6 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0088$	$D_M(0.15)$	$641.2 \pm 4.0$	$\chi_{prior}^2$	$7.4 \pm 3.6$
$r_{drag} h$	$99.77 \pm 0.81$	$H(0.38)$	$82.97 \pm 0.31$	$\chi_{CMB}^2$	$4347 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$D_M(0.38)$	$1529.5 \pm 8.2$	$\chi_{BAO}^2$	$6.0 \pm 1.1$
$z_{re}$	$7.82 \pm 0.75$	$H(0.51)$	$89.67 \pm 0.26$		

Best-fit  $\chi_{\text{eff}}^2 = 8521.87$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.16$ ;  $\bar{\chi}_{\text{eff}}^2 = 8541.50$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.72$ ;  $R - 1 = 0.00920$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 ( $\Delta$  0.01) MGS: 1.28 ( $\Delta$  -0.06) DR12BAO: 4.18 ( $\Delta$  0.15) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.02 ( $\Delta$  0.14) small\_100x143\_offlike5\_EE\_Aplanck. 396.23 ( $\Delta$  -0.14) commander\_dx12\_v3.2\_29: 22.86 ( $\Delta$  0.04) CamSpec like\_10.7HM: 7051.17 SN - JLA Pantheon18: 1034.99 ( $\Delta$  0.04)



**2.42**    **base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_Riess18/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$10^9 A_s$	$2.107 \pm 0.032$	$D_M(0.51)$	$1972.5 \pm 9.4$
$\Omega_c h^2$	$0.1181 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.46 \pm 0.22$
$100\theta_{MC}$	$1.04117 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2296 \pm 10$
$\tau$	$0.0583 \pm 0.0075$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$235.30 \pm 0.67$
$\ln(10^{10} A_s)$	$3.048 \pm 0.015$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9688 \pm 0.0040$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4510 \pm 0.0058$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7472 \pm 0.0058$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9688 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4708 \pm 0.0049$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245375^{+0.000081}_{-0.000068}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0051$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246702^{+0.000082}_{-0.000068}$	$f\sigma_8(0.51)$	$0.4702 \pm 0.0045$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.594 \pm 0.035$	$\sigma_8(0.51)$	$0.6209 \pm 0.0048$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.786 \pm 0.026$	$f\sigma_8(0.61)$	$0.4658 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.81 \pm 0.27$	$\sigma_8(0.61)$	$0.5910 \pm 0.0046$
$A^{kSZ}$	$< 5.41$	$r_*$	$144.95 \pm 0.28$	$f\sigma_8(2.33)$	$0.2983 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04137 \pm 0.00040$	$\sigma_8(2.33)$	$0.3078 \pm 0.0025$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.919 \pm 0.027$	$f_{2000}^{143}$	$30.1 \pm 3.0$
$H_0$	$68.07 \pm 0.46$	$z_{drag}$	$1059.70 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6954 \pm 0.0060$	$r_{drag}$	$147.64 \pm 0.31$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m$	$0.3046 \pm 0.0060$	$k_D$	$0.14026 \pm 0.00042$	$\chi^2_{lensing}$	$9.5 \pm 1.1$
$\Omega_m h^2$	$0.1411 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi^2_{small}$	$397.7 \pm 2.3$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3356 \pm 24$	$\chi^2_{lowl}$	$22.76 \pm 0.81$
$\sigma_8$	$0.8079 \pm 0.0063$	$k_{eq}$	$0.010244 \pm 0.000073$	$\chi^2_{H073p45}$	$10.6 \pm 1.8$
$S_8$	$0.814 \pm 0.011$	$100\theta_{eq}$	$0.8217 \pm 0.0044$	$\chi^2_{JLA}$	$1034.87 \pm 0.17$
$\sigma_8 \Omega_m^{0.5}$	$0.4459 \pm 0.0061$	$100\theta_{s,eq}$	$0.4538 \pm 0.0023$	$\chi^2_{6DF}$	$0.026 \pm 0.037$
$\sigma_8 \Omega_m^{0.25}$	$0.6002 \pm 0.0061$	$H(0.15)$	$73.27 \pm 0.40$	$\chi^2_{MGS}$	$1.77 \pm 0.49$
$\sigma_8/h^{0.5}$	$0.9792 \pm 0.0088$	$D_M(0.15)$	$637.4 \pm 3.9$	$\chi^2_{DR12BAO}$	$3.87 \pm 0.71$
$r_{drag} h$	$100.50 \pm 0.79$	$H(0.38)$	$83.26 \pm 0.31$	$\chi^2_{prior}$	$7.4 \pm 3.5$
$\langle d^2 \rangle^{1/2}$	$2.423 \pm 0.021$	$D_M(0.38)$	$1521.9 \pm 7.9$	$\chi^2_{CMB}$	$4348 \pm 3000$
$z_{re}$	$8.05 \pm 0.74$	$H(0.51)$	$89.90 \pm 0.26$	$\chi^2_{BAO}$	$5.66 \pm 0.66$

Best-fit  $\chi^2_{\text{eff}} = 8533.26$ ;  $\Delta\chi^2_{\text{eff}} = 6292.25$ ;  $\bar{\chi}^2_{\text{eff}} = 8552.81$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.55$ ;  $R - 1 = 0.02978$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.68 ( $\Delta$  -0.07) DR12BAO: 3.49 ( $\Delta$  0.05) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.17 ( $\Delta$  0.17) small\_100x143\_offlike5\_EE\_Aplanck: 396.83 ( $\Delta$  -0.06) commander\_dx12\_v3.2\_29: 22.60 ( $\Delta$  -0.00) CamSpec like\_10.7HM: 7051.98 Hubble - H073p45: 10.58 ( $\Delta$  0.26) SN - JLA Pantheon18: 1034.81 ( $\Delta$  0.02)



## 2.43 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02215 \pm 0.00020$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.025$	$D_M(0.15)$	$645.6 \pm 5.9$
$\Omega_c h^2$	$0.1201 \pm 0.0015$	$z_{\text{re}}$	$7.69^{+0.54}_{-0.80}$	$H(0.38)$	$82.66 \pm 0.43$
$100\theta_{MC}$	$1.04084 \pm 0.00045$	$10^9 A_s$	$2.095^{+0.022}_{-0.032}$	$D_M(0.38)$	$1538 \pm 12$
$\tau$	$0.0540^{+0.0048}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(0.51)$	$89.43 \pm 0.35$
$\ln(10^{10} A_s)$	$3.042^{+0.011}_{-0.015}$	$D_{40}$	$1230 \pm 13$	$D_M(0.51)$	$1992 \pm 14$
$n_s$	$0.9640 \pm 0.0048$	$D_{220}$	$5711 \pm 41$	$H(0.61)$	$95.09 \pm 0.29$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2534 \pm 13$	$D_M(0.61)$	$2317 \pm 15$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.3 \pm 5.1$	$H(2.33)$	$236.41 \pm 0.93$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$D_M(2.33)$	$5774 \pm 14$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$n_{s,0.002}$	$0.9640 \pm 0.0048$	$f\sigma_8(0.15)$	$0.4611 \pm 0.0081$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.245302^{+0.000095}_{-0.000079}$	$\sigma_8(0.15)$	$0.7490^{+0.0049}_{-0.0055}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.246628^{+0.000096}_{-0.000079}$	$f\sigma_8(0.38)$	$0.4781 \pm 0.0063$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.627 \pm 0.039$	$\sigma_8(0.38)$	$0.6633^{+0.0040}_{-0.0048}$
$A^{kSZ}$	$< 5.86$	Age/Gyr	$13.822 \pm 0.032$	$f\sigma_8(0.51)$	$0.4760 \pm 0.0053$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1090.21 \pm 0.34$	$\sigma_8(0.51)$	$0.6205^{+0.0036}_{-0.0046}$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$144.57 \pm 0.36$	$f\sigma_8(0.61)$	$0.4705 \pm 0.0047$
$H_0$	$67.11 \pm 0.68$	$100\theta_*$	$1.04105 \pm 0.00045$	$\sigma_8(0.61)$	$0.5903^{+0.0034}_{-0.0044}$
$\Omega_\Lambda$	$0.6826 \pm 0.0094$	$D_M(z_*)/\text{Gpc}$	$13.887 \pm 0.034$	$f\sigma_8(2.33)$	$0.2974^{+0.0017}_{-0.0024}$
$\Omega_m$	$0.3174 \pm 0.0094$	$z_{\text{drag}}$	$1059.44 \pm 0.44$	$\sigma_8(2.33)$	$0.3063^{+0.0019}_{-0.0026}$
$\Omega_m h^2$	$0.1429 \pm 0.0014$	$r_{\text{drag}}$	$147.31 \pm 0.37$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$\Omega_m h^3$	$0.09590 \pm 0.00045$	$k_D$	$0.14047 \pm 0.00044$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\sigma_8$	$0.8112 \pm 0.0060$	$100\theta_D$	$0.16105 \pm 0.00026$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$S_8$	$0.834 \pm 0.016$	$z_{\text{eq}}$	$3400 \pm 34$	$\chi^2_{\text{lensing}}$	$9.46 \pm 0.87$
$\sigma_8 \Omega_m^{0.5}$	$0.4570 \pm 0.0088$	$k_{\text{eq}}$	$0.01038 \pm 0.00011$	$\chi^2_{\text{simall}}$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6088 \pm 0.0076$	$100\theta_{\text{eq}}$	$0.8132 \pm 0.0064$	$\chi^2_{\text{lowl}}$	$23.6 \pm 1.0$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.010$	$100\theta_{s,\text{eq}}$	$0.4495 \pm 0.0033$	$\chi^2_{\text{prior}}$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$98.9 \pm 1.2$	$H(0.15)$	$72.45 \pm 0.59$	$\chi^2_{\text{CMB}}$	$4347 \pm 3000$

$$\bar{\chi}^2_{\text{eff}} = 7500.01; \Delta\bar{\chi}^2_{\text{eff}} = 6291.85; R - 1 = 0.00502$$



2.44 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00019$	$10^9 A_s$	$2.101^{+0.024}_{-0.033}$	$D_M(0.51)$	$1983 \pm 10$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$H(0.61)$	$95.25 \pm 0.23$
$100\theta_{MC}$	$1.04100 \pm 0.00042$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2307 \pm 11$
$\tau$	$0.0560^{+0.0057}_{-0.0078}$	$D_{220}$	$5719 \pm 40$	$H(2.33)$	$235.83 \pm 0.70$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2535 \pm 13$	$D_M(2.33)$	$5767 \pm 12$
$n_s$	$0.9663 \pm 0.0041$	$D_{1420}$	$815.3 \pm 5.0$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0061$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.7$	$\sigma_8(0.15)$	$0.7481^{+0.0050}_{-0.0057}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9663 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4745 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245330^{+0.000085}_{-0.000073}$	$\sigma_8(0.38)$	$0.6632^{+0.0042}_{-0.0051}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{BBN}$	$0.246657^{+0.000086}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.615 \pm 0.036$	$\sigma_8(0.51)$	$0.6206^{+0.0039}_{-0.0048}$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.807 \pm 0.027$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0041$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.04 \pm 0.28$	$\sigma_8(0.61)$	$0.5906^{+0.0037}_{-0.0046}$
$A^{kSZ}$	$< 5.65$	$r_*$	$144.78 \pm 0.29$	$f\sigma_8(2.33)$	$0.2978^{+0.0019}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04120 \pm 0.00042$	$\sigma_8(2.33)$	$0.3070^{+0.0020}_{-0.0026}$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.905 \pm 0.028$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.57 \pm 0.49$	$z_{\text{drag}}$	$1059.52 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.6890 \pm 0.0065$	$r_{\text{drag}}$	$147.50 \pm 0.32$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m$	$0.3110 \pm 0.0065$	$k_D$	$0.14032 \pm 0.00042$	$\chi_{\text{lensing}}^2$	$9.29 \pm 0.72$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$100\theta_D$	$0.16101 \pm 0.00025$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09593 \pm 0.00044$	$z_{\text{eq}}$	$3377 \pm 25$	$\chi_{\text{lowl}}^2$	$23.14 \pm 0.87$
$\sigma_8$	$0.8095 \pm 0.0060$	$k_{\text{eq}}$	$0.010308 \pm 0.000077$	$\chi_{6\text{DF}}^2$	$0.057 \pm 0.069$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8174 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.29 \pm 0.46$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0065$	$100\theta_{s,\text{eq}}$	$0.4517 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0061$	$H(0.15)$	$72.84 \pm 0.42$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9848 \pm 0.0088$	$D_M(0.15)$	$641.7 \pm 4.2$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$r_{\text{drag}} h$	$99.67 \pm 0.83$	$H(0.38)$	$82.94 \pm 0.32$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.021$	$D_M(0.38)$	$1530.4 \pm 8.5$		
$z_{\text{re}}$	$7.86^{+0.62}_{-0.76}$	$H(0.51)$	$89.64 \pm 0.27$		

$$\bar{\chi}_{\text{eff}}^2 = 7506.32; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.75; R - 1 = 0.00854$$



**2.45 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_Riess18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_Riess18\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$z_{\text{re}}$	$8.09^{+0.69}_{-0.82}$	$D_{\text{M}}(0.38)$	$1522 \pm 11$
$\Omega_c h^2$	$0.1181 \pm 0.0015$	$10^9 A_s$	$2.109^{+0.028}_{-0.035}$	$H(0.51)$	$89.91 \pm 0.35$
$100\theta_{MC}$	$1.04118 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$D_{\text{M}}(0.51)$	$1972 \pm 14$
$\tau$	$0.0588^{+0.0067}_{-0.0086}$	$D_{40}$	$1223 \pm 13$	$H(0.61)$	$95.47 \pm 0.29$
$\ln(10^{10} A_s)$	$3.049^{+0.013}_{-0.016}$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(0.61)$	$2296 \pm 15$
$n_s$	$0.9689 \pm 0.0048$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$235.30 \pm 0.91$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{1420}$	$816.8 \pm 5.0$	$D_{\text{M}}(2.33)$	$5757 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.6 \pm 1.8$	$f\sigma_8(0.15)$	$0.4511 \pm 0.0078$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9689 \pm 0.0048$	$\sigma_8(0.15)$	$0.7475 \pm 0.0056$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.245375^{+0.000087}_{-0.000069}$	$f\sigma_8(0.38)$	$0.4709 \pm 0.0062$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P^{\text{BBN}}$	$0.246702^{+0.000087}_{-0.000069}$	$\sigma_8(0.38)$	$0.6633^{+0.0046}_{-0.0052}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.594^{+0.034}_{-0.040}$	$f\sigma_8(0.51)$	$0.4703 \pm 0.0053$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.786 \pm 0.030$	$\sigma_8(0.51)$	$0.6211^{+0.0043}_{-0.0050}$
$A^{kSZ}$	$< 5.45$	$z_*$	$1089.81 \pm 0.32$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0048$
$c_{100}$	$0.9986 \pm 0.0014$	$r_*$	$144.95 \pm 0.36$	$\sigma_8(0.61)$	$0.5912^{+0.0040}_{-0.0049}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04137 \pm 0.00044$	$f\sigma_8(2.33)$	$0.2984^{+0.0021}_{-0.0026}$
$H_0$	$68.08 \pm 0.68$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.920 \pm 0.034$	$\sigma_8(2.33)$	$0.3079^{+0.0023}_{-0.0028}$
$\Omega_{\Lambda}$	$0.6954 \pm 0.0089$	$z_{\text{drag}}$	$1059.70 \pm 0.42$	$f_{2000}^{143}$	$30.1 \pm 2.9$
$\Omega_m$	$0.3046 \pm 0.0089$	$r_{\text{drag}}$	$147.64 \pm 0.38$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_m h^2$	$0.1411 \pm 0.0014$	$k_{\text{D}}$	$0.14025 \pm 0.00045$	$f_{2000}^{217}$	$107.2 \pm 2.0$
$\Omega_m h^3$	$0.09604 \pm 0.00043$	$100\theta_{\text{D}}$	$0.16092 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.7 \pm 1.2$
$\sigma_8$	$0.8081 \pm 0.0063$	$z_{\text{eq}}$	$3356 \pm 34$	$\chi_{\text{simall}}^2$	$397.8 \pm 2.5$
$S_8$	$0.814 \pm 0.015$	$k_{\text{eq}}$	$0.01024 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.77 \pm 0.90$
$\sigma_8 \Omega_m^{0.5}$	$0.4460 \pm 0.0084$	$100\theta_{\text{eq}}$	$0.8218 \pm 0.0065$	$\chi_{\text{H073p45}}^2$	$10.6 \pm 2.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6003 \pm 0.0075$	$100\theta_{\text{s,eq}}$	$0.4538 \pm 0.0034$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.979 \pm 0.010$	$H(0.15)$	$73.28 \pm 0.58$	$\chi_{\text{CMB}}^2$	$4349 \pm 3000$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.15)$	$637.4 \pm 5.7$		
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.024$	$H(0.38)$	$83.27 \pm 0.43$		

$\bar{\chi}_{\text{eff}}^2 = 7512.76$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6291.70$ ;  $R - 1 = 0.03489$



## 2.46 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Riess18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00019$	$10^9 A_s$	$2.108^{+0.028}_{-0.033}$	$D_M(0.51)$	$1973.0 \pm 9.6$
$\Omega_c h^2$	$0.1182 \pm 0.0011$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.45 \pm 0.23$
$100\theta_{MC}$	$1.04117 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2297 \pm 10$
$\tau$	$0.0585^{+0.0066}_{-0.0078}$	$D_{220}$	$5730 \pm 40$	$H(2.33)$	$235.34 \pm 0.68$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.016}$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9687 \pm 0.0041$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4514 \pm 0.0059$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7475 \pm 0.0056$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4711 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245374^{+0.000082}_{-0.000069}$	$\sigma_8(0.38)$	$0.6633^{+0.0046}_{-0.0053}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246700^{+0.000082}_{-0.000069}$	$f\sigma_8(0.51)$	$0.4705 \pm 0.0045$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.595 \pm 0.035$	$\sigma_8(0.51)$	$0.6211^{+0.0043}_{-0.0050}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.787 \pm 0.026$	$f\sigma_8(0.61)$	$0.4661 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.82 \pm 0.27$	$\sigma_8(0.61)$	$0.5911^{+0.0041}_{-0.0047}$
$A^{kSZ}$	$< 5.40$	$r_*$	$144.94 \pm 0.28$	$f\sigma_8(2.33)$	$0.2983^{+0.0021}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04136 \pm 0.00041$	$\sigma_8(2.33)$	$0.3079^{+0.0022}_{-0.0026}$
$c_{217}$	$0.9997^{+0.0019}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.918 \pm 0.028$	$f_{2000}^{143}$	$30.1 \pm 3.0$
$H_0$	$68.04 \pm 0.48$	$z_{drag}$	$1059.69 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6951 \pm 0.0062$	$r_{drag}$	$147.63 \pm 0.31$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m$	$0.3049 \pm 0.0062$	$k_D$	$0.14026 \pm 0.00042$	$\chi_{lensing}^2$	$9.5 \pm 1.0$
$\Omega_m h^2$	$0.1411 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi_{simall}^2$	$397.7 \pm 2.3$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3358 \pm 25$	$\chi_{lowl}^2$	$22.78 \pm 0.82$
$\sigma_8$	$0.8082 \pm 0.0062$	$k_{eq}$	$0.010248 \pm 0.000075$	$\chi_{H073p45}^2$	$10.7 \pm 1.9$
$S_8$	$0.815 \pm 0.012$	$100\theta_{eq}$	$0.8214 \pm 0.0046$	$\chi_{6DF}^2$	$0.028 \pm 0.039$
$\sigma_8 \Omega_m^{0.5}$	$0.4463 \pm 0.0063$	$100\theta_{s,eq}$	$0.4537 \pm 0.0024$	$\chi_{MGS}^2$	$1.74 \pm 0.50$
$\sigma_8 \Omega_m^{0.25}$	$0.6006 \pm 0.0061$	$H(0.15)$	$73.25 \pm 0.41$	$\chi_{DR12BAO}^2$	$3.92 \pm 0.77$
$\sigma_8/h^{0.5}$	$0.9798 \pm 0.0088$	$D_M(0.15)$	$637.6 \pm 4.0$	$\chi_{prior}^2$	$7.4 \pm 3.5$
$r_{drag} h$	$100.45 \pm 0.81$	$H(0.38)$	$83.24 \pm 0.31$	$\chi_{CMB}^2$	$4348 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.425 \pm 0.021$	$D_M(0.38)$	$1522.3 \pm 8.2$	$\chi_{BAO}^2$	$5.69 \pm 0.70$
$z_{re}$	$8.07 \pm 0.69$	$H(0.51)$	$89.89 \pm 0.26$		

$$\bar{\chi}_{\text{eff}}^2 = 7517.92; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.57; R - 1 = 0.02825$$



**2.47 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_Pantheon18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_Pantheon18\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00020$	$z_{\text{re}}$	$7.76^{+0.58}_{-0.79}$	$D_{\text{M}}(0.38)$	$1535 \pm 11$
$\Omega_c h^2$	$0.1197 \pm 0.0014$	$10^9 A_s$	$2.098^{+0.023}_{-0.032}$	$H(0.51)$	$89.52 \pm 0.33$
$100\theta_{MC}$	$1.04090 \pm 0.00044$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.51)$	$1988 \pm 13$
$\tau$	$0.0549^{+0.0052}_{-0.0082}$	$D_{40}$	$1229 \pm 12$	$H(0.61)$	$95.16 \pm 0.27$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.015}$	$D_{220}$	$5715 \pm 40$	$D_{\text{M}}(0.61)$	$2313 \pm 14$
$n_s$	$0.9650 \pm 0.0046$	$D_{810}$	$2535 \pm 13$	$H(2.33)$	$236.16 \pm 0.87$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.8 \pm 5.1$	$D_{\text{M}}(2.33)$	$5771 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.8 \pm 1.8$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0075$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9650 \pm 0.0046$	$\sigma_8(0.15)$	$0.7486^{+0.0049}_{-0.0056}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245315^{+0.000091}_{-0.000077}$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0059$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P^{\text{BBN}}$	$0.246642^{+0.000092}_{-0.000077}$	$\sigma_8(0.38)$	$0.6632^{+0.0041}_{-0.0050}$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.621 \pm 0.038$	$f\sigma_8(0.51)$	$0.4747 \pm 0.0051$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.815 \pm 0.030$	$\sigma_8(0.51)$	$0.6205^{+0.0037}_{-0.0047}$
$A^{kSZ}$	$< 5.76$	$z_*$	$1090.13 \pm 0.32$	$f\sigma_8(0.61)$	$0.4695 \pm 0.0046$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$r_*$	$144.66 \pm 0.34$	$\sigma_8(0.61)$	$0.5904^{+0.0035}_{-0.0045}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04111 \pm 0.00044$	$f\sigma_8(2.33)$	$0.2976^{+0.0018}_{-0.0024}$
$H_0$	$67.31 \pm 0.64$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.895 \pm 0.032$	$\sigma_8(2.33)$	$0.3066^{+0.0019}_{-0.0026}$
$\Omega_\Lambda$	$0.6854 \pm 0.0087$	$z_{\text{drag}}$	$1059.48 \pm 0.44$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$\Omega_m$	$0.3146 \pm 0.0087$	$r_{\text{drag}}$	$147.39 \pm 0.36$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_m h^2$	$0.1425 \pm 0.0013$	$k_{\text{D}}$	$0.14041 \pm 0.00044$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m h^3$	$0.09591 \pm 0.00045$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.37 \pm 0.78$
$\sigma_8$	$0.8104 \pm 0.0060$	$z_{\text{eq}}$	$3390 \pm 32$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$S_8$	$0.830 \pm 0.015$	$k_{\text{eq}}$	$0.010346 \pm 0.000098$	$\chi_{\text{lowl}}^2$	$23.38 \pm 0.97$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0082$	$100\theta_{\text{eq}}$	$0.8150 \pm 0.0060$	$\chi_{\text{JLA}}^2$	$1035.38 \pm 0.58$
$\sigma_8 \Omega_m^{0.25}$	$0.6070 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0031$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.010$	$H(0.15)$	$72.62 \pm 0.55$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$r_{\text{drag}} h$	$99.2 \pm 1.1$	$D_{\text{M}}(0.15)$	$643.9 \pm 5.5$		
$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.024$	$H(0.38)$	$82.78 \pm 0.41$		

$\bar{\chi}_{\text{eff}}^2 = 8535.44$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.83$ ;  $R - 1 = 0.00636$



2.48 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$10^9 A_s$	$2.108^{+0.028}_{-0.033}$	$D_M(0.51)$	$1972.3 \pm 9.6$
$\Omega_c h^2$	$0.1181 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.47 \pm 0.23$
$100\theta_{MC}$	$1.04118 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2296 \pm 10$
$\tau$	$0.0586^{+0.0066}_{-0.0078}$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$235.29 \pm 0.67$
$\ln(10^{10} A_s)$	$3.048^{+0.014}_{-0.015}$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9689 \pm 0.0040$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4509 \pm 0.0059$
$y_{cal}$	$1.0009 \pm 0.0026$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7473 \pm 0.0056$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9689 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4708 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245376^{+0.000081}_{-0.000071}$	$\sigma_8(0.38)$	$0.6632^{+0.0046}_{-0.0052}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246702^{+0.000081}_{-0.000071}$	$f\sigma_8(0.51)$	$0.4702 \pm 0.0045$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.594 \pm 0.035$	$\sigma_8(0.51)$	$0.6210^{+0.0043}_{-0.0049}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.786 \pm 0.026$	$f\sigma_8(0.61)$	$0.4658 \pm 0.0042$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1089.81 \pm 0.27$	$\sigma_8(0.61)$	$0.5911^{+0.0041}_{-0.0047}$
$A^{kSZ}$	$< 5.39$	$r_*$	$144.96 \pm 0.28$	$f\sigma_8(2.33)$	$0.2983^{+0.0021}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04137 \pm 0.00041$	$\sigma_8(2.33)$	$0.3079^{+0.0022}_{-0.0025}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.920 \pm 0.027$	$f_{2000}^{143}$	$30.1 \pm 2.9$
$H_0$	$68.08 \pm 0.47$	$z_{drag}$	$1059.70 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6956 \pm 0.0061$	$r_{drag}$	$147.65 \pm 0.31$	$f_{2000}^{217}$	$107.3 \pm 2.0$
$\Omega_m$	$0.3044 \pm 0.0061$	$k_D$	$0.14025 \pm 0.00042$	$\chi_{lensing}^2$	$9.5 \pm 1.0$
$\Omega_m h^2$	$0.1411 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi_{simall}^2$	$397.7 \pm 2.3$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3356 \pm 24$	$\chi_{lowl}^2$	$22.76 \pm 0.81$
$\sigma_8$	$0.8080 \pm 0.0062$	$k_{eq}$	$0.010242 \pm 0.000074$	$\chi_{H073p45}^2$	$10.5 \pm 1.8$
$S_8$	$0.814 \pm 0.011$	$100\theta_{eq}$	$0.8218 \pm 0.0045$	$\chi_{JLA}^2$	$706.61 \pm 0.12$
$\sigma_8 \Omega_m^{0.5}$	$0.4458 \pm 0.0063$	$100\theta_{s,eq}$	$0.4539 \pm 0.0023$	$\chi_{6DF}^2$	$0.027 \pm 0.039$
$\sigma_8 \Omega_m^{0.25}$	$0.6001 \pm 0.0061$	$H(0.15)$	$73.28 \pm 0.41$	$\chi_{MGS}^2$	$1.78 \pm 0.50$
$\sigma_8/h^{0.5}$	$0.9793 \pm 0.0089$	$D_M(0.15)$	$637.3 \pm 4.0$	$\chi_{DR12BAO}^2$	$3.87 \pm 0.72$
$r_{drag} h$	$100.52 \pm 0.80$	$H(0.38)$	$83.27 \pm 0.31$	$\chi_{prior}^2$	$7.5 \pm 3.6$
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.021$	$D_M(0.38)$	$1521.6 \pm 8.1$	$\chi_{CMB}^2$	$4348 \pm 3000$
$z_{re}$	$8.08 \pm 0.69$	$H(0.51)$	$89.91 \pm 0.26$	$\chi_{BAO}^2$	$5.68 \pm 0.70$

$$\bar{\chi}_{\text{eff}}^2 = 8224.63; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.68; R - 1 = 0.08788$$



2.49 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00019$	$10^9 A_s$	$2.101^{+0.025}_{-0.033}$	$D_M(0.51)$	$1981.2 \pm 9.6$
$\Omega_c h^2$	$0.1190 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$H(0.61)$	$95.28 \pm 0.23$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2306 \pm 10$
$\tau$	$0.0564^{+0.0058}_{-0.0078}$	$D_{220}$	$5720 \pm 40$	$H(2.33)$	$235.74 \pm 0.68$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2536 \pm 13$	$D_M(2.33)$	$5766 \pm 11$
$n_s$	$0.9667 \pm 0.0041$	$D_{1420}$	$815.5 \pm 5.0$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0059$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.7$	$\sigma_8(0.15)$	$0.7479^{+0.0050}_{-0.0057}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9667 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0049$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245335^{+0.000084}_{-0.000072}$	$\sigma_8(0.38)$	$0.6631^{+0.0043}_{-0.0051}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246661^{+0.000085}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0044$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.613 \pm 0.036$	$\sigma_8(0.51)$	$0.6207^{+0.0040}_{-0.0049}$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.804 \pm 0.026$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0041$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.01 \pm 0.27$	$\sigma_8(0.61)$	$0.5906^{+0.0038}_{-0.0047}$
$A^{kSZ}$	$< 5.62$	$r_*$	$144.81 \pm 0.28$	$f\sigma_8(2.33)$	$0.2978^{+0.0019}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04122 \pm 0.00041$	$\sigma_8(2.33)$	$0.3071^{+0.0020}_{-0.0026}$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.908 \pm 0.028$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$H_0$	$67.64 \pm 0.47$	$z_{\text{drag}}$	$1059.53 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.6899 \pm 0.0062$	$r_{\text{drag}}$	$147.53 \pm 0.31$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m$	$0.3101 \pm 0.0062$	$k_D$	$0.14030 \pm 0.00042$	$\chi^2_{\text{lensing}}$	$9.30 \pm 0.75$
$\Omega_m h^2$	$0.1418 \pm 0.0010$	$100\theta_D$	$0.16101 \pm 0.00025$	$\chi^2_{\text{simall}}$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09593 \pm 0.00044$	$z_{\text{eq}}$	$3374 \pm 24$	$\chi^2_{\text{lowl}}$	$23.08 \pm 0.85$
$\sigma_8$	$0.8092 \pm 0.0060$	$k_{\text{eq}}$	$0.010297 \pm 0.000075$	$\chi^2_{\text{JLA}}$	$1035.06 \pm 0.30$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8181 \pm 0.0045$	$\chi^2_{6\text{DF}}$	$0.047 \pm 0.059$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0063$	$100\theta_{s,\text{eq}}$	$0.4520 \pm 0.0023$	$\chi^2_{\text{MGS}}$	$1.35 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6038 \pm 0.0060$	$H(0.15)$	$72.90 \pm 0.41$	$\chi^2_{\text{DR12BAO}}$	$4.6 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.9840 \pm 0.0087$	$D_M(0.15)$	$641.1 \pm 4.0$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.6$
$r_{\text{drag}} h$	$99.79 \pm 0.80$	$H(0.38)$	$82.98 \pm 0.31$	$\chi^2_{\text{CMB}}$	$4347 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$D_M(0.38)$	$1529.2 \pm 8.1$	$\chi^2_{\text{BAO}}$	$6.0 \pm 1.0$
$z_{\text{re}}$	$7.89^{+0.63}_{-0.76}$	$H(0.51)$	$89.68 \pm 0.26$		

$\bar{\chi}^2_{\text{eff}} = 8541.35$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.73$ ;  $R - 1 = 0.00983$



2.50 base\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_Riess18\_zre6p5/base\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_BAO\_Pa

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$10^9 A_s$	$2.109^{+0.028}_{-0.033}$	$D_M(0.51)$	$1972.4 \pm 9.3$
$\Omega_c h^2$	$0.1181 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$H(0.61)$	$95.47 \pm 0.22$
$100\theta_{MC}$	$1.04118 \pm 0.00041$	$D_{40}$	$1223 \pm 12$	$D_M(0.61)$	$2296 \pm 10$
$\tau$	$0.0587^{+0.0066}_{-0.0078}$	$D_{220}$	$5730 \pm 40$	$H(2.33)$	$235.30 \pm 0.66$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.016}$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5758 \pm 11$
$n_s$	$0.9689 \pm 0.0040$	$D_{1420}$	$816.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4510 \pm 0.0058$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.7474 \pm 0.0056$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9689 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4709 \pm 0.0049$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245376^{+0.000081}_{-0.000068}$	$\sigma_8(0.38)$	$0.6633^{+0.0046}_{-0.0053}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{BBN}$	$0.246702^{+0.000081}_{-0.000068}$	$f\sigma_8(0.51)$	$0.4703 \pm 0.0044$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.594 \pm 0.035$	$\sigma_8(0.51)$	$0.6211^{+0.0043}_{-0.0050}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.786 \pm 0.026$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0041$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.81 \pm 0.27$	$\sigma_8(0.61)$	$0.5912^{+0.0041}_{-0.0047}$
$A^{kSZ}$	$< 5.39$	$r_*$	$144.95 \pm 0.28$	$f\sigma_8(2.33)$	$0.2984^{+0.0021}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04137 \pm 0.00040$	$\sigma_8(2.33)$	$0.3079^{+0.0022}_{-0.0026}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.920 \pm 0.027$	$f_{2000}^{143}$	$30.1 \pm 3.0$
$H_0$	$68.08 \pm 0.46$	$z_{drag}$	$1059.70 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.1$
$\Omega_\Lambda$	$0.6955 \pm 0.0060$	$r_{drag}$	$147.64 \pm 0.31$	$f_{2000}^{217}$	$107.2 \pm 2.0$
$\Omega_m$	$0.3045 \pm 0.0060$	$k_D$	$0.14025 \pm 0.00041$	$\chi_{lensing}^2$	$9.5 \pm 1.0$
$\Omega_m h^2$	$0.1411 \pm 0.0010$	$100\theta_D$	$0.16092 \pm 0.00025$	$\chi_{simall}^2$	$397.7 \pm 2.3$
$\Omega_m h^3$	$0.09604 \pm 0.00044$	$z_{eq}$	$3356 \pm 24$	$\chi_{lowl}^2$	$22.75 \pm 0.81$
$\sigma_8$	$0.8081 \pm 0.0062$	$k_{eq}$	$0.010243 \pm 0.000073$	$\chi_{H073p45}^2$	$10.6 \pm 1.8$
$S_8$	$0.814 \pm 0.011$	$100\theta_{eq}$	$0.8218 \pm 0.0044$	$\chi_{JLA}^2$	$1034.87 \pm 0.17$
$\sigma_8 \Omega_m^{0.5}$	$0.4459 \pm 0.0062$	$100\theta_{s,eq}$	$0.4538 \pm 0.0023$	$\chi_{6DF}^2$	$0.026 \pm 0.037$
$\sigma_8 \Omega_m^{0.25}$	$0.6003 \pm 0.0060$	$H(0.15)$	$73.28 \pm 0.40$	$\chi_{MGS}^2$	$1.77 \pm 0.49$
$\sigma_8/h^{0.5}$	$0.9794 \pm 0.0087$	$D_M(0.15)$	$637.4 \pm 3.9$	$\chi_{DR12BAO}^2$	$3.86 \pm 0.69$
$r_{drag} h$	$100.51 \pm 0.78$	$H(0.38)$	$83.26 \pm 0.30$	$\chi_{prior}^2$	$7.4 \pm 3.5$
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.021$	$D_M(0.38)$	$1521.7 \pm 7.9$	$\chi_{CMB}^2$	$4348 \pm 3000$
$z_{re}$	$8.09 \pm 0.69$	$H(0.51)$	$89.90 \pm 0.26$	$\chi_{BAO}^2$	$5.66 \pm 0.66$

$$\bar{\chi}_{\text{eff}}^2 = 8552.73; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.56; R - 1 = 0.03088$$



## 2.51 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.022$	$D_M(0.15)$	$643.3 \pm 4.6$
$\Omega_c h^2$	$0.1198 \pm 0.0012$	$z_{\text{re}}$	$7.64 \pm 0.74$	$H(0.38)$	$82.86 \pm 0.34$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$10^9 A_s$	$2.096 \pm 0.030$	$D_M(0.38)$	$1533.4 \pm 9.3$
$\tau$	$0.0540 \pm 0.0074$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(0.51)$	$89.61 \pm 0.27$
$\ln(10^{10} A_s)$	$3.043 \pm 0.014$	$D_{40}$	$1230 \pm 12$	$D_M(0.51)$	$1986 \pm 11$
$n_s$	$0.9652 \pm 0.0042$	$D_{220}$	$5728 \pm 40$	$H(0.61)$	$95.26 \pm 0.22$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2537 \pm 13$	$D_M(0.61)$	$2310 \pm 12$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 4.9$	$H(2.33)$	$236.42 \pm 0.73$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.6$	$D_M(2.33)$	$5765 \pm 11$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9652 \pm 0.0042$	$f\sigma_8(0.15)$	$0.4588 \pm 0.0066$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P$	$0.245379^{+0.000066}_{-0.000056}$	$\sigma_8(0.15)$	$0.7483 \pm 0.0055$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246705^{+0.000066}_{-0.000056}$	$f\sigma_8(0.38)$	$0.4764 \pm 0.0053$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.593 \pm 0.029$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$A^{kSZ}$	$< 5.34$	Age/Gyr	$13.801 \pm 0.024$	$f\sigma_8(0.51)$	$0.4746 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$z_*$	$1089.95 \pm 0.26$	$\sigma_8(0.51)$	$0.6203 \pm 0.0045$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$r_*$	$144.50 \pm 0.28$	$f\sigma_8(0.61)$	$0.4694 \pm 0.0043$
$H_0$	$67.37 \pm 0.54$	$100\theta_*$	$1.04108 \pm 0.00031$	$\sigma_8(0.61)$	$0.5901 \pm 0.0043$
$\Omega_\Lambda$	$0.6853 \pm 0.0074$	$D_M(z_*)/\text{Gpc}$	$13.880 \pm 0.026$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0022$
$\Omega_m$	$0.3147 \pm 0.0074$	$z_{\text{drag}}$	$1059.84 \pm 0.33$	$\sigma_8(2.33)$	$0.3065 \pm 0.0024$
$\Omega_m h^2$	$0.1428 \pm 0.0011$	$r_{\text{drag}}$	$147.18 \pm 0.29$	$f_{2000}^{143}$	$29.7 \pm 2.8$
$\Omega_m h^3$	$0.09622 \pm 0.00033$	$k_D$	$0.14075 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\sigma_8$	$0.8101 \pm 0.0061$	$100\theta_D$	$0.16081 \pm 0.00019$	$f_{2000}^{217}$	$107.0 \pm 1.8$
$S_8$	$0.830 \pm 0.013$	$z_{\text{eq}}$	$3397 \pm 27$	$\chi_{\text{lensing}}^2$	$9.27 \pm 0.69$
$\sigma_8 \Omega_m^{0.5}$	$0.4545 \pm 0.0071$	$k_{\text{eq}}$	$0.010370 \pm 0.000083$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6068 \pm 0.0065$	$100\theta_{\text{eq}}$	$0.8141 \pm 0.0051$	$\chi_{\text{lowl}}^2$	$23.38 \pm 0.89$
$\sigma_8/h^{0.5}$	$0.9870 \pm 0.0092$	$100\theta_{s,\text{eq}}$	$0.4498 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$99.16 \pm 0.93$	$H(0.15)$	$72.69 \pm 0.46$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11929.66$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.02$ ;  $\bar{\chi}_{\text{eff}}^2 = 11951.44$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.75$ ;  $R - 1 = 0.00801$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 8.83 ( $\Delta$  -0.04) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  -0.18) commander\_dx12\_v3\_2\_29: 23.22 ( $\Delta$  -0.03) CamSpec like\_10.7HM\_1400\_unified: 11499.65



## 2.52 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s$	$2.101 \pm 0.030$	$D_M(0.51)$	$1980.1 \pm 8.5$
$\Omega_c h^2$	$0.11920 \pm 0.00094$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.36 \pm 0.19$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$D_M(0.61)$	$2304.2 \pm 9.2$
$\tau$	$0.0557^{+0.0067}_{-0.0075}$	$D_{220}$	$5733 \pm 40$	$H(2.33)$	$236.05 \pm 0.59$
$\ln(10^{10} A_s)$	$3.045 \pm 0.014$	$D_{810}$	$2538 \pm 14$	$D_M(2.33)$	$5760.6 \pm 9.1$
$n_s$	$0.9668 \pm 0.0038$	$D_{1420}$	$817.1 \pm 4.8$	$f\sigma_8(0.15)$	$0.4557 \pm 0.0055$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.7479 \pm 0.0055$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9668 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245397^{+0.000061}_{-0.000051}$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246723^{+0.000062}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0043$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.584^{+0.025}_{-0.029}$	$\sigma_8(0.51)$	$0.6205 \pm 0.0045$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.791 \pm 0.021$	$f\sigma_8(0.61)$	$0.4680 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.84 \pm 0.22$	$\sigma_8(0.61)$	$0.5905 \pm 0.0043$
$A^{kSZ}$	$< 5.28$	$r_*$	$144.63 \pm 0.23$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3070 \pm 0.0023$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.891 \pm 0.023$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$67.66 \pm 0.42$	$z_{drag}$	$1059.90^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6893 \pm 0.0056$	$r_{drag}$	$147.29 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.3107 \pm 0.0056$	$k_D$	$0.14066 \pm 0.00032$	$\chi_{lensing}^2$	$9.20 \pm 0.68$
$\Omega_m h^2$	$0.14222 \pm 0.00090$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi_{simall}^2$	$397.1 \pm 1.8$
$\Omega_m h^3$	$0.09623 \pm 0.00032$	$z_{eq}$	$3383 \pm 22$	$\chi_{lowl}^2$	$23.11 \pm 0.81$
$\sigma_8$	$0.8093 \pm 0.0061$	$k_{eq}$	$0.010326 \pm 0.000066$	$\chi_{6DF}^2$	$0.050 \pm 0.058$
$S_8$	$0.824 \pm 0.011$	$100\theta_{eq}$	$0.8168 \pm 0.0040$	$\chi_{MGS}^2$	$1.28 \pm 0.40$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0059$	$100\theta_{s,eq}$	$0.4512 \pm 0.0021$	$\chi_{DR12BAO}^2$	$4.7 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6042 \pm 0.0058$	$H(0.15)$	$72.94 \pm 0.36$	$\chi_{prior}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9838 \pm 0.0085$	$D_M(0.15)$	$640.8 \pm 3.6$	$\chi_{CMB}^2$	$7366 \pm 5000$
$r_{drag} h$	$99.67 \pm 0.72$	$H(0.38)$	$83.04 \pm 0.27$	$\chi_{BAO}^2$	$6.1 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$D_M(0.38)$	$1528.4 \pm 7.2$		
$z_{re}$	$7.79 \pm 0.72$	$H(0.51)$	$89.75 \pm 0.22$		

$\bar{\chi}_{\text{eff}}^2 = 11957.40$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.56$ ;  $R - 1 = 0.01372$



### 2.53 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Riess18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02244 \pm 0.00015$	$z_{\text{re}}$	$7.93 \pm 0.74$	$D_{\text{M}}(0.38)$	$1523.6 \pm 8.7$
$\Omega_c h^2$	$0.1186 \pm 0.0011$	$10^9 A_s$	$2.106 \pm 0.031$	$H(0.51)$	$89.89 \pm 0.26$
$100\theta_{MC}$	$1.04107 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$D_{\text{M}}(0.51)$	$1974 \pm 10$
$\tau$	$0.0573^{+0.0070}_{-0.0080}$	$D_{40}$	$1225 \pm 12$	$H(0.61)$	$95.48 \pm 0.22$
$\ln(10^{10} A_s)$	$3.047 \pm 0.015$	$D_{220}$	$5739 \pm 39$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$n_s$	$0.9682 \pm 0.0041$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$235.75 \pm 0.69$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{1420}$	$817.9 \pm 4.8$	$D_{\text{M}}(2.33)$	$5755 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.2 \pm 1.6$	$f\sigma_8(0.15)$	$0.4530 \pm 0.0062$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9682 \pm 0.0041$	$\sigma_8(0.15)$	$0.7476 \pm 0.0055$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245421^{+0.000060}_{-0.000052}$	$f\sigma_8(0.38)$	$0.4723 \pm 0.0051$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246747^{+0.000060}_{-0.000053}$	$\sigma_8(0.38)$	$0.6632 \pm 0.0049$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.573 \pm 0.027$	$f\sigma_8(0.51)$	$0.4714 \pm 0.0046$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.780 \pm 0.023$	$\sigma_8(0.51)$	$0.6208 \pm 0.0046$
$A^{kSZ}$	$< 5.18$	$z_*$	$1089.71 \pm 0.24$	$f\sigma_8(0.61)$	$0.4668 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.73 \pm 0.27$	$\sigma_8(0.61)$	$0.5909 \pm 0.0044$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04125 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0023$
$H_0$	$67.94 \pm 0.51$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.025$	$\sigma_8(2.33)$	$0.3075 \pm 0.0024$
$\Omega_\Lambda$	$0.6929 \pm 0.0068$	$z_{\text{drag}}$	$1060.00 \pm 0.32$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m$	$0.3071 \pm 0.0068$	$r_{\text{drag}}$	$147.38 \pm 0.28$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.1417 \pm 0.0011$	$k_{\text{D}}$	$0.14062 \pm 0.00034$	$f_{2000}^{217}$	$106.6 \pm 1.9$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16073 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.31 \pm 0.84$
$\sigma_8$	$0.8086 \pm 0.0061$	$z_{\text{eq}}$	$3371 \pm 26$	$\chi_{\text{simall}}^2$	$397.5 \pm 2.1$
$S_8$	$0.818 \pm 0.012$	$k_{\text{eq}}$	$0.010290 \pm 0.000079$	$\chi_{\text{lowl}}^2$	$22.91 \pm 0.82$
$\sigma_8 \Omega_m^{0.5}$	$0.4480 \pm 0.0067$	$100\theta_{\text{eq}}$	$0.8192 \pm 0.0049$	$\chi_{\text{H073p45}}^2$	$11.1 \pm 2.0$
$\sigma_8 \Omega_m^{0.25}$	$0.6019 \pm 0.0063$	$100\theta_{\text{s,eq}}$	$0.4524 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.9810 \pm 0.0090$	$H(0.15)$	$73.18 \pm 0.44$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$100.13 \pm 0.89$	$D_{\text{M}}(0.15)$	$638.4 \pm 4.3$		
$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.022$	$H(0.38)$	$83.22 \pm 0.32$		

$$\bar{\chi}_{\text{eff}}^2 = 11963.63; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.66; R - 1 = 0.02452$$



2.54 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Riess18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00014$	$10^9 A_s$	$2.106 \pm 0.031$	$D_M(0.51)$	$1973.2 \pm 8.1$
$\Omega_c h^2$	$0.11850 \pm 0.00090$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.50 \pm 0.18$
$100\theta_{MC}$	$1.04109 \pm 0.00029$	$D_{40}$	$1225 \pm 12$	$D_M(0.61)$	$2296.7 \pm 8.8$
$\tau$	$0.0576 \pm 0.0073$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.66 \pm 0.57$
$\ln(10^{10} A_s)$	$3.047 \pm 0.015$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5754.5 \pm 8.8$
$n_s$	$0.9685 \pm 0.0038$	$D_{1420}$	$818.0 \pm 4.7$	$f\sigma_8(0.15)$	$0.4523 \pm 0.0054$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7475 \pm 0.0055$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9685 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4717 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245424^{+0.000057}_{-0.000049}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0049$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246751^{+0.000057}_{-0.000050}$	$f\sigma_8(0.51)$	$0.4710 \pm 0.0042$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.572 \pm 0.026$	$\sigma_8(0.51)$	$0.6208 \pm 0.0046$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.778 \pm 0.020$	$f\sigma_8(0.61)$	$0.4664 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.69 \pm 0.21$	$\sigma_8(0.61)$	$0.5909 \pm 0.0044$
$A^{kSZ}$	$< 5.15$	$r_*$	$144.76 \pm 0.23$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(2.33)$	$0.3076 \pm 0.0024$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.902 \pm 0.022$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$H_0$	$68.01 \pm 0.40$	$z_{drag}$	$1060.01 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6938 \pm 0.0053$	$r_{drag}$	$147.40 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3062 \pm 0.0053$	$k_D$	$0.14060 \pm 0.00032$	$\chi^2_{lensing}$	$9.30 \pm 0.84$
$\Omega_m h^2$	$0.14159 \pm 0.00087$	$100\theta_D$	$0.16072 \pm 0.00018$	$\chi^2_{simall}$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$z_{eq}$	$3368 \pm 21$	$\chi^2_{lowl}$	$22.85 \pm 0.78$
$\sigma_8$	$0.8083 \pm 0.0061$	$k_{eq}$	$0.010280 \pm 0.000064$	$\chi^2_{H073p45}$	$10.8 \pm 1.6$
$S_8$	$0.817 \pm 0.010$	$100\theta_{eq}$	$0.8198 \pm 0.0039$	$\chi^2_{6DF}$	$0.023 \pm 0.032$
$\sigma_8 \Omega_m^{0.5}$	$0.4473 \pm 0.0057$	$100\theta_{s,eq}$	$0.4527 \pm 0.0020$	$\chi^2_{MGS}$	$1.61 \pm 0.42$
$\sigma_8 \Omega_m^{0.25}$	$0.6013 \pm 0.0057$	$H(0.15)$	$73.23 \pm 0.35$	$\chi^2_{DR12BAO}$	$3.99 \pm 0.77$
$\sigma_8/h^{0.5}$	$0.9802 \pm 0.0084$	$D_M(0.15)$	$637.9 \pm 3.4$	$\chi^2_{prior}$	$9.7 \pm 4.4$
$r_{drag} h$	$100.25 \pm 0.70$	$H(0.38)$	$83.26 \pm 0.26$	$\chi^2_{CMB}$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.021$	$D_M(0.38)$	$1522.6 \pm 6.9$	$\chi^2_{BAO}$	$5.61 \pm 0.56$
$z_{re}$	$7.95 \pm 0.72$	$H(0.51)$	$89.92 \pm 0.21$		

$$\bar{\chi}^2_{\text{eff}} = 11968.81; \Delta\bar{\chi}^2_{\text{eff}} = 9150.57; R - 1 = 0.02105$$



**2.55 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Pantheon18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Pantheon18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00015$	$z_{\text{re}}$	$7.70 \pm 0.74$	$D_{\text{M}}(0.38)$	$1531.5 \pm 8.8$
$\Omega_c h^2$	$0.1196 \pm 0.0011$	$10^9 A_s$	$2.098 \pm 0.030$	$H(0.51)$	$89.66 \pm 0.26$
$100\theta_{MC}$	$1.04092 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$D_{\text{M}}(0.51)$	$1984 \pm 10$
$\tau$	$0.0546 \pm 0.0074$	$D_{40}$	$1229 \pm 12$	$H(0.61)$	$95.30 \pm 0.21$
$\ln(10^{10} A_s)$	$3.043 \pm 0.014$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(0.61)$	$2308 \pm 11$
$n_s$	$0.9658 \pm 0.0041$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$236.27 \pm 0.69$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5763 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.15)$	$0.4576 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9658 \pm 0.0041$	$\sigma_8(0.15)$	$0.7481 \pm 0.0055$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245386^{+0.000064}_{-0.000054}$	$f\sigma_8(0.38)$	$0.4755 \pm 0.0051$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246713^{+0.000065}_{-0.000055}$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$A_{143}^{PS}$	$43 \pm 9$	$10^5 D/H$	$2.589^{+0.027}_{-0.030}$	$f\sigma_8(0.51)$	$0.4739 \pm 0.0046$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.797 \pm 0.023$	$\sigma_8(0.51)$	$0.6204 \pm 0.0045$
$A^{kSZ}$	$< 5.32$	$z_*$	$1089.91 \pm 0.25$	$f\sigma_8(0.61)$	$0.4688 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.55 \pm 0.27$	$\sigma_8(0.61)$	$0.5902 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04111 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0022$
$H_0$	$67.49 \pm 0.51$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.884 \pm 0.025$	$\sigma_8(2.33)$	$0.3067 \pm 0.0024$
$\Omega_\Lambda$	$0.6868 \pm 0.0069$	$z_{\text{drag}}$	$1059.86 \pm 0.33$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$\Omega_m$	$0.3132 \pm 0.0069$	$r_{\text{drag}}$	$147.22 \pm 0.28$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\Omega_m h^2$	$0.1426 \pm 0.0011$	$k_{\text{D}}$	$0.14072 \pm 0.00033$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m h^3$	$0.09622 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.24 \pm 0.68$
$\sigma_8$	$0.8098 \pm 0.0061$	$z_{\text{eq}}$	$3392 \pm 26$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$S_8$	$0.827 \pm 0.012$	$k_{\text{eq}}$	$0.010353 \pm 0.000079$	$\chi_{\text{lowl}}^2$	$23.27 \pm 0.87$
$\sigma_8 \Omega_m^{0.5}$	$0.4531 \pm 0.0068$	$100\theta_{\text{eq}}$	$0.8151 \pm 0.0048$	$\chi_{\text{JLA}}^2$	$1035.24 \pm 0.43$
$\sigma_8 \Omega_m^{0.25}$	$0.6058 \pm 0.0063$	$100\theta_{\text{s,eq}}$	$0.4503 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9858 \pm 0.0090$	$H(0.15)$	$72.79 \pm 0.44$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.35 \pm 0.88$	$D_{\text{M}}(0.15)$	$642.3 \pm 4.4$		
$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.022$	$H(0.38)$	$82.93 \pm 0.32$		

Best-fit  $\chi_{\text{eff}}^2 = 12964.78$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.94$ ;  $\bar{\chi}_{\text{eff}}^2 = 12986.66$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.70$ ;  $R - 1 = 0.01285$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.86 ( $\Delta$  0.09) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.07 ( $\Delta$  -0.09) commander\_dx12\_v3\_2\_29: 23.03 ( $\Delta$  -0.15) CamSpec like\_10.7HM\_1400\_unified: 11499.55 SN - JLA Pantheon18: 1035.10 ( $\Delta$  -0.08)



2.56 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_JLA

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00014$	$10^9 A_s$	$2.107 \pm 0.031$	$D_M(0.51)$	$1972.8 \pm 8.0$
$\Omega_c h^2$	$0.11845 \pm 0.00090$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.51 \pm 0.18$
$100\theta_{MC}$	$1.04110 \pm 0.00029$	$D_{40}$	$1224 \pm 12$	$D_M(0.61)$	$2296.3 \pm 8.7$
$\tau$	$0.0578^{+0.0069}_{-0.0078}$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.64 \pm 0.57$
$\ln(10^{10} A_s)$	$3.048 \pm 0.015$	$D_{810}$	$2539 \pm 13$	$D_M(2.33)$	$5754.2 \pm 8.8$
$n_s$	$0.9687 \pm 0.0038$	$D_{1420}$	$818.1 \pm 4.7$	$f\sigma_8(0.15)$	$0.4521 \pm 0.0053$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7475 \pm 0.0056$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4716 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245425^{+0.000057}_{-0.000051}$	$\sigma_8(0.38)$	$0.6632 \pm 0.0049$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{BBN}$	$0.246751^{+0.000057}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4709 \pm 0.0042$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.571 \pm 0.026$	$\sigma_8(0.51)$	$0.6209 \pm 0.0046$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.777 \pm 0.020$	$f\sigma_8(0.61)$	$0.4664 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.68 \pm 0.21$	$\sigma_8(0.61)$	$0.5910 \pm 0.0044$
$A^{kSZ}$	$< 5.12$	$r_*$	$144.77 \pm 0.23$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(2.33)$	$0.3077 \pm 0.0024$
$c_{217}$	$0.9996^{+0.0019}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.022$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$H_0$	$68.03 \pm 0.40$	$z_{drag}$	$1060.01^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6941 \pm 0.0053$	$r_{drag}$	$147.41 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3059 \pm 0.0053$	$k_D$	$0.14059^{+0.00034}_{-0.00031}$	$\chi^2_{lensing}$	$9.31 \pm 0.84$
$\Omega_m h^2$	$0.14155 \pm 0.00087$	$100\theta_D$	$0.16072 \pm 0.00019$	$\chi^2_{simall}$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00033$	$z_{eq}$	$3367 \pm 21$	$\chi^2_{lowl}$	$22.82 \pm 0.78$
$\sigma_8$	$0.8083 \pm 0.0061$	$k_{eq}$	$0.010277 \pm 0.000063$	$\chi^2_{H073p45}$	$10.7 \pm 1.6$
$S_8$	$0.816 \pm 0.010$	$100\theta_{eq}$	$0.8200 \pm 0.0039$	$\chi^2_{JLA}$	$706.63 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4471 \pm 0.0056$	$100\theta_{s,eq}$	$0.4528 \pm 0.0020$	$\chi^2_{6DF}$	$0.022 \pm 0.031$
$\sigma_8 \Omega_m^{0.25}$	$0.6012 \pm 0.0057$	$H(0.15)$	$73.25 \pm 0.34$	$\chi^2_{MGS}$	$1.63 \pm 0.42$
$\sigma_8/h^{0.5}$	$0.9801 \pm 0.0084$	$D_M(0.15)$	$637.7 \pm 3.4$	$\chi^2_{DR12BAO}$	$3.95 \pm 0.73$
$r_{drag} h$	$100.28 \pm 0.69$	$H(0.38)$	$83.27 \pm 0.26$	$\chi^2_{prior}$	$9.6 \pm 4.4$
$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.021$	$D_M(0.38)$	$1522.2 \pm 6.8$	$\chi^2_{CMB}$	$7368 \pm 5000$
$z_{re}$	$7.97 \pm 0.72$	$H(0.51)$	$89.93 \pm 0.21$	$\chi^2_{BAO}$	$5.60 \pm 0.54$

$$\bar{\chi}^2_{\text{eff}} = 12675.57; \Delta\bar{\chi}^2_{\text{eff}} = 9150.70; R - 1 = 0.05190$$



2.57 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Panth

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00014$	$10^9 A_s$	$2.102 \pm 0.030$	$D_M(0.51)$	$1979.0 \pm 8.2$
$\Omega_c h^2$	$0.11908 \pm 0.00091$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.38 \pm 0.18$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$D_M(0.61)$	$2303.1 \pm 8.9$
$\tau$	$0.0560^{+0.0067}_{-0.0075}$	$D_{220}$	$5734 \pm 40$	$H(2.33)$	$235.98 \pm 0.57$
$\ln(10^{10} A_s)$	$3.045 \pm 0.014$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5759.8 \pm 8.9$
$n_s$	$0.9670 \pm 0.0038$	$D_{1420}$	$817.2 \pm 4.8$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0054$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.6$	$\sigma_8(0.15)$	$0.7478 \pm 0.0055$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9670 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4738 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245400^{+0.000061}_{-0.000050}$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246727^{+0.000061}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0042$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.583^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.6206 \pm 0.0045$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.790 \pm 0.020$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.82 \pm 0.22$	$\sigma_8(0.61)$	$0.5905 \pm 0.0043$
$A^{kSZ}$	$< 5.26$	$r_*$	$144.66 \pm 0.23$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04118 \pm 0.00029$	$\sigma_8(2.33)$	$0.3071 \pm 0.0023$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.893 \pm 0.022$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$67.72 \pm 0.41$	$z_{drag}$	$1059.91 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_\Lambda$	$0.6900 \pm 0.0054$	$r_{drag}$	$147.32 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.3100 \pm 0.0054$	$k_D$	$0.14064 \pm 0.00032$	$\chi_{lensing}^2$	$9.21 \pm 0.70$
$\Omega_m h^2$	$0.14212 \pm 0.00088$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi_{small}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09623 \pm 0.00032$	$z_{eq}$	$3381 \pm 21$	$\chi_{lowl}^2$	$23.07 \pm 0.80$
$\sigma_8$	$0.8091 \pm 0.0061$	$k_{eq}$	$0.010318 \pm 0.000064$	$\chi_{JLA}^2$	$1035.04 \pm 0.26$
$S_8$	$0.822 \pm 0.010$	$100\theta_{eq}$	$0.8173 \pm 0.0039$	$\chi_{6DF}^2$	$0.043 \pm 0.052$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0057$	$100\theta_{s,eq}$	$0.4514 \pm 0.0020$	$\chi_{MGS}^2$	$1.33 \pm 0.39$
$\sigma_8 \Omega_m^{0.25}$	$0.6037 \pm 0.0057$	$H(0.15)$	$72.98 \pm 0.35$	$\chi_{DR12BAO}^2$	$4.6 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.9832 \pm 0.0084$	$D_M(0.15)$	$640.3 \pm 3.5$	$\chi_{prior}^2$	$9.7 \pm 4.4$
$r_{drag} h$	$99.76 \pm 0.70$	$H(0.38)$	$83.07 \pm 0.26$	$\chi_{CMB}^2$	$7366 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$D_M(0.38)$	$1527.5 \pm 7.0$	$\chi_{BAO}^2$	$5.94 \pm 0.90$
$z_{re}$	$7.81 \pm 0.71$	$H(0.51)$	$89.77 \pm 0.22$		

Best-fit  $\chi_{\text{eff}}^2 = 12970.49$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.81$ ;  $\bar{\chi}_{\text{eff}}^2 = 12992.39$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.54$ ;  $R - 1 = 0.01438$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 ( $\Delta$  0.00) MGS: 1.28 ( $\Delta$  0.00) DR12BAO: 4.23 ( $\Delta$  -0.01) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.97 ( $\Delta$  0.25) small\_100x143\_offlike5\_EE\_Aplanck.  
396.05 ( $\Delta$  -0.47) commander\_dx12\_v3.2\_29: 22.77 ( $\Delta$  -0.11) CamSpec like\_10.7HM\_1400\_unified: 11500.17 SN - JLA Pantheon18: 1034.98 ( $\Delta$  0.01)



2.58 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_Riess18/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BA

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00014$	$10^9 A_s$	$2.107 \pm 0.031$	$D_M(0.51)$	$1972.6 \pm 7.9$
$\Omega_c h^2$	$0.11843 \pm 0.00088$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.51 \pm 0.18$
$100\theta_{MC}$	$1.04110 \pm 0.00029$	$D_{40}$	$1224 \pm 12$	$D_M(0.61)$	$2296.1 \pm 8.5$
$\tau$	$0.0578 \pm 0.0073$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.63 \pm 0.56$
$\ln(10^{10} A_s)$	$3.048 \pm 0.015$	$D_{810}$	$2539 \pm 13$	$D_M(2.33)$	$5754.0 \pm 8.7$
$n_s$	$0.9687 \pm 0.0037$	$D_{1420}$	$818.1 \pm 4.7$	$f\sigma_8(0.15)$	$0.4519 \pm 0.0053$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7474 \pm 0.0055$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0037$	$f\sigma_8(0.38)$	$0.4715 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245426^{+0.000056}_{-0.000049}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0049$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246753^{+0.000056}_{-0.000049}$	$f\sigma_8(0.51)$	$0.4708 \pm 0.0042$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.571 \pm 0.026$	$\sigma_8(0.51)$	$0.6209 \pm 0.0046$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.777 \pm 0.020$	$f\sigma_8(0.61)$	$0.4663 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.68 \pm 0.21$	$\sigma_8(0.61)$	$0.5909 \pm 0.0044$
$A^{kSZ}$	$< 5.15$	$r_*$	$144.77 \pm 0.23$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(2.33)$	$0.3077 \pm 0.0024$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.904 \pm 0.022$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$H_0$	$68.04 \pm 0.39$	$z_{drag}$	$1060.02 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6942 \pm 0.0052$	$r_{drag}$	$147.41 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3058 \pm 0.0052$	$k_D$	$0.14059 \pm 0.00032$	$\chi_{lensing}^2$	$9.31 \pm 0.86$
$\Omega_m h^2$	$0.14153 \pm 0.00085$	$100\theta_D$	$0.16072 \pm 0.00018$	$\chi_{simall}^2$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$z_{eq}$	$3367 \pm 20$	$\chi_{lowl}^2$	$22.83 \pm 0.77$
$\sigma_8$	$0.8082 \pm 0.0061$	$k_{eq}$	$0.010276 \pm 0.000062$	$\chi_{H073p45}^2$	$10.7 \pm 1.5$
$S_8$	$0.816 \pm 0.010$	$100\theta_{eq}$	$0.8201 \pm 0.0038$	$\chi_{JLA}^2$	$1034.88 \pm 0.17$
$\sigma_8 \Omega_m^{0.5}$	$0.4469 \pm 0.0055$	$100\theta_{s,eq}$	$0.4529 \pm 0.0020$	$\chi_{6DF}^2$	$0.021 \pm 0.029$
$\sigma_8 \Omega_m^{0.25}$	$0.6010 \pm 0.0056$	$H(0.15)$	$73.26 \pm 0.34$	$\chi_{MGS}^2$	$1.64 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9798 \pm 0.0083$	$D_M(0.15)$	$637.6 \pm 3.3$	$\chi_{DR12BAO}^2$	$3.92 \pm 0.70$
$r_{drag} h$	$100.30 \pm 0.68$	$H(0.38)$	$83.27 \pm 0.25$	$\chi_{prior}^2$	$9.7 \pm 4.4$
$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.020$	$D_M(0.38)$	$1522.0 \pm 6.7$	$\chi_{CMB}^2$	$7368 \pm 5000$
$z_{re}$	$7.97 \pm 0.72$	$H(0.51)$	$89.94 \pm 0.21$	$\chi_{BAO}^2$	$5.58 \pm 0.51$

$\bar{\chi}_{\text{eff}}^2 = 13003.64$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.54$ ;  $R - 1 = 0.02217$



2.59 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.022$	$D_M(0.15)$	$643.1 \pm 4.6$
$\Omega_c h^2$	$0.1198 \pm 0.0012$	$z_{\text{re}}$	$7.74^{+0.56}_{-0.77}$	$H(0.38)$	$82.88 \pm 0.33$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s$	$2.100^{+0.023}_{-0.031}$	$D_M(0.38)$	$1532.9 \pm 9.1$
$\tau$	$0.0549^{+0.0051}_{-0.0079}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(0.51)$	$89.62 \pm 0.27$
$\ln(10^{10} A_s)$	$3.044^{+0.011}_{-0.015}$	$D_{40}$	$1229 \pm 12$	$D_M(0.51)$	$1985 \pm 11$
$n_s$	$0.9654 \pm 0.0042$	$D_{220}$	$5728 \pm 40$	$H(0.61)$	$95.27 \pm 0.22$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2537 \pm 13$	$D_M(0.61)$	$2310 \pm 12$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 4.9$	$H(2.33)$	$236.38 \pm 0.72$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.6$	$D_M(2.33)$	$5765 \pm 10$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9654 \pm 0.0042$	$f\sigma_8(0.15)$	$0.4588 \pm 0.0066$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.245381^{+0.000066}_{-0.000056}$	$\sigma_8(0.15)$	$0.7488^{+0.0048}_{-0.0055}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246707^{+0.000066}_{-0.000056}$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0053$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.592^{+0.027}_{-0.030}$	$\sigma_8(0.38)$	$0.6635^{+0.0040}_{-0.0048}$
$A^{kSZ}$	$< 5.32$	Age/Gyr	$13.800 \pm 0.024$	$f\sigma_8(0.51)$	$0.4748 \pm 0.0046$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1089.94 \pm 0.26$	$\sigma_8(0.51)$	$0.6208^{+0.0037}_{-0.0046}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$r_*$	$144.51 \pm 0.28$	$f\sigma_8(0.61)$	$0.4696 \pm 0.0042$
$H_0$	$67.40 \pm 0.53$	$100\theta_*$	$1.04108 \pm 0.00031$	$\sigma_8(0.61)$	$0.5906^{+0.0035}_{-0.0044}$
$\Omega_\Lambda$	$0.6856 \pm 0.0073$	$D_M(z_*)/\text{Gpc}$	$13.881 \pm 0.026$	$f\sigma_8(2.33)$	$0.2977^{+0.0018}_{-0.0023}$
$\Omega_m$	$0.3144 \pm 0.0073$	$z_{\text{drag}}$	$1059.85 \pm 0.33$	$\sigma_8(2.33)$	$0.3068^{+0.0019}_{-0.0025}$
$\Omega_m h^2$	$0.1428 \pm 0.0011$	$r_{\text{drag}}$	$147.19 \pm 0.28$	$f_{2000}^{143}$	$29.7 \pm 2.8$
$\Omega_m h^3$	$0.09622 \pm 0.00033$	$k_D$	$0.14074 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\sigma_8$	$0.8107 \pm 0.0058$	$100\theta_D$	$0.16081 \pm 0.00019$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$S_8$	$0.830 \pm 0.013$	$z_{\text{eq}}$	$3396 \pm 27$	$\chi_{\text{lensing}}^2$	$9.24 \pm 0.66$
$\sigma_8 \Omega_m^{0.5}$	$0.4545 \pm 0.0071$	$k_{\text{eq}}$	$0.010366 \pm 0.000082$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6070 \pm 0.0065$	$100\theta_{\text{eq}}$	$0.8143 \pm 0.0050$	$\chi_{\text{lowl}}^2$	$23.37 \pm 0.89$
$\sigma_8/h^{0.5}$	$0.9875 \pm 0.0091$	$100\theta_{s,\text{eq}}$	$0.4499 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$99.20 \pm 0.92$	$H(0.15)$	$72.71 \pm 0.46$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11951.25$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.75$ ;  $R - 1 = 0.00847$



**2.60**    **base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s$	$2.103^{+0.025}_{-0.032}$	$D_M(0.51)$	$1979.9 \pm 8.4$
$\Omega_c h^2$	$0.11918 \pm 0.00093$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.37 \pm 0.19$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$D_M(0.61)$	$2304.0 \pm 9.1$
$\tau$	$0.0562^{+0.0056}_{-0.0077}$	$D_{220}$	$5732 \pm 40$	$H(2.33)$	$236.03 \pm 0.58$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$D_{810}$	$2538 \pm 14$	$D_M(2.33)$	$5760.5 \pm 9.1$
$n_s$	$0.9668 \pm 0.0038$	$D_{1420}$	$817.1 \pm 4.8$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0055$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.7482^{+0.0048}_{-0.0056}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9668 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4744 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245398^{+0.000061}_{-0.000051}$	$\sigma_8(0.38)$	$0.6633^{+0.0042}_{-0.0050}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246724^{+0.000061}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0042$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.584^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.6208^{+0.0039}_{-0.0047}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.791 \pm 0.021$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.84 \pm 0.22$	$\sigma_8(0.61)$	$0.5908^{+0.0037}_{-0.0045}$
$A^{kSZ}$	$< 5.26$	$r_*$	$144.64 \pm 0.23$	$f\sigma_8(2.33)$	$0.2979^{+0.0019}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04117 \pm 0.00029$	$\sigma_8(2.33)$	$0.3072^{+0.0020}_{-0.0024}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.892 \pm 0.022$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$67.67 \pm 0.42$	$z_{drag}$	$1059.90 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_\Lambda$	$0.6894 \pm 0.0056$	$r_{drag}$	$147.30 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.3106 \pm 0.0056$	$k_D$	$0.14066 \pm 0.00032$	$\chi_{lensing}^2$	$9.17 \pm 0.63$
$\Omega_m h^2$	$0.14220 \pm 0.00089$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi_{simall}^2$	$397.1 \pm 1.9$
$\Omega_m h^3$	$0.09623 \pm 0.00032$	$z_{eq}$	$3383 \pm 21$	$\chi_{lowl}^2$	$23.12 \pm 0.81$
$\sigma_8$	$0.8096^{+0.0054}_{-0.0061}$	$k_{eq}$	$0.010325 \pm 0.000065$	$\chi_{6DF}^2$	$0.048 \pm 0.057$
$S_8$	$0.824 \pm 0.011$	$100\theta_{eq}$	$0.8169 \pm 0.0040$	$\chi_{MGS}^2$	$1.29 \pm 0.39$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0058$	$100\theta_{s,eq}$	$0.4512 \pm 0.0021$	$\chi_{DR12BAO}^2$	$4.7 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6044 \pm 0.0057$	$H(0.15)$	$72.95 \pm 0.36$	$\chi_{prior}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9842 \pm 0.0083$	$D_M(0.15)$	$640.7 \pm 3.5$	$\chi_{CMB}^2$	$7366 \pm 5000$
$r_{drag} h$	$99.68 \pm 0.71$	$H(0.38)$	$83.04 \pm 0.27$	$\chi_{BAO}^2$	$6.04 \pm 0.99$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.020$	$D_M(0.38)$	$1528.3 \pm 7.1$		
$z_{re}$	$7.85^{+0.59}_{-0.75}$	$H(0.51)$	$89.75 \pm 0.22$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.26; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.54; R - 1 = 0.01434$$



2.61 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Riess18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02244 \pm 0.00015$	$z_{\text{re}}$	$7.98^{+0.64}_{-0.78}$	$D_{\text{M}}(0.38)$	$1523.4 \pm 8.6$
$\Omega_c h^2$	$0.1186 \pm 0.0011$	$10^9 A_s$	$2.108^{+0.027}_{-0.033}$	$H(0.51)$	$89.90 \pm 0.26$
$100\theta_{MC}$	$1.04107 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.51)$	$1974 \pm 10$
$\tau$	$0.0578^{+0.0061}_{-0.0081}$	$D_{40}$	$1225 \pm 12$	$H(0.61)$	$95.48 \pm 0.21$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.015}$	$D_{220}$	$5739 \pm 39$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$n_s$	$0.9683 \pm 0.0041$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$235.73 \pm 0.69$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{1420}$	$817.9 \pm 4.8$	$D_{\text{M}}(2.33)$	$5755 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.2 \pm 1.6$	$f\sigma_8(0.15)$	$0.4530 \pm 0.0062$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9683 \pm 0.0041$	$\sigma_8(0.15)$	$0.7479^{+0.0050}_{-0.0056}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245421^{+0.000059}_{-0.000052}$	$f\sigma_8(0.38)$	$0.4724 \pm 0.0051$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246748^{+0.000060}_{-0.000052}$	$\sigma_8(0.38)$	$0.6634^{+0.0043}_{-0.0050}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.573 \pm 0.027$	$f\sigma_8(0.51)$	$0.4715 \pm 0.0045$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.780 \pm 0.023$	$\sigma_8(0.51)$	$0.6211^{+0.0040}_{-0.0047}$
$A^{kSZ}$	$< 5.17$	$z_*$	$1089.71 \pm 0.24$	$f\sigma_8(0.61)$	$0.4669 \pm 0.0041$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.74 \pm 0.27$	$\sigma_8(0.61)$	$0.5911^{+0.0039}_{-0.0045}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04125 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2982^{+0.0020}_{-0.0023}$
$H_0$	$67.95 \pm 0.51$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.025$	$\sigma_8(2.33)$	$0.3077^{+0.0021}_{-0.0025}$
$\Omega_\Lambda$	$0.6931 \pm 0.0067$	$z_{\text{drag}}$	$1060.00 \pm 0.32$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m$	$0.3069 \pm 0.0067$	$r_{\text{drag}}$	$147.38 \pm 0.28$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.1417 \pm 0.0011$	$k_{\text{D}}$	$0.14062 \pm 0.00033$	$f_{2000}^{217}$	$106.6 \pm 1.9$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16073 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.28 \pm 0.78$
$\sigma_8$	$0.8089 \pm 0.0059$	$z_{\text{eq}}$	$3371 \pm 26$	$\chi_{\text{small}}^2$	$397.5 \pm 2.1$
$S_8$	$0.818 \pm 0.012$	$k_{\text{eq}}$	$0.010288 \pm 0.000078$	$\chi_{\text{lowl}}^2$	$22.91 \pm 0.82$
$\sigma_8 \Omega_m^{0.5}$	$0.4481 \pm 0.0066$	$100\theta_{\text{eq}}$	$0.8193 \pm 0.0049$	$\chi_{\text{H073p45}}^2$	$11.1 \pm 2.0$
$\sigma_8 \Omega_m^{0.25}$	$0.6020 \pm 0.0062$	$100\theta_{\text{s,eq}}$	$0.4525 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.9812 \pm 0.0088$	$H(0.15)$	$73.19 \pm 0.44$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$100.15 \pm 0.88$	$D_{\text{M}}(0.15)$	$638.3 \pm 4.3$		
$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.021$	$H(0.38)$	$83.22 \pm 0.32$		

$\bar{\chi}_{\text{eff}}^2 = 11963.51$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.65$ ;  $R - 1 = 0.02593$



## 2.62 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Riess18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00014$	$10^9 A_s$	$2.108^{+0.027}_{-0.032}$	$D_M(0.51)$	$1973.1 \pm 8.1$
$\Omega_c h^2$	$0.11849 \pm 0.00090$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.50 \pm 0.18$
$100\theta_{MC}$	$1.04109 \pm 0.00030$	$D_{40}$	$1225 \pm 12$	$D_M(0.61)$	$2296.6 \pm 8.7$
$\tau$	$0.0580^{+0.0061}_{-0.0078}$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.66 \pm 0.57$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5754.4 \pm 8.8$
$n_s$	$0.9686 \pm 0.0038$	$D_{1420}$	$818.0 \pm 4.7$	$f\sigma_8(0.15)$	$0.4524 \pm 0.0053$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7477^{+0.0050}_{-0.0057}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9686 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4719 \pm 0.0045$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245424^{+0.000057}_{-0.000049}$	$\sigma_8(0.38)$	$0.6634^{+0.0044}_{-0.0050}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246751^{+0.000057}_{-0.000050}$	$f\sigma_8(0.51)$	$0.4711 \pm 0.0041$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.571 \pm 0.026$	$\sigma_8(0.51)$	$0.6210^{+0.0041}_{-0.0047}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.778 \pm 0.020$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.69 \pm 0.21$	$\sigma_8(0.61)$	$0.5911^{+0.0039}_{-0.0045}$
$A^{kSZ}$	$< 5.15$	$r_*$	$144.76 \pm 0.23$	$f\sigma_8(2.33)$	$0.2983^{+0.0020}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(2.33)$	$0.3077^{+0.0021}_{-0.0025}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.022$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$H_0$	$68.01 \pm 0.40$	$z_{drag}$	$1060.01 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6939 \pm 0.0053$	$r_{drag}$	$147.40 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3061 \pm 0.0053$	$k_D$	$0.14060 \pm 0.00032$	$\chi_{lensing}^2$	$9.26 \pm 0.77$
$\Omega_m h^2$	$0.14158 \pm 0.00087$	$100\theta_D$	$0.16072 \pm 0.00018$	$\chi_{simall}^2$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$z_{eq}$	$3368 \pm 21$	$\chi_{lowl}^2$	$22.85 \pm 0.78$
$\sigma_8$	$0.8086^{+0.0056}_{-0.0062}$	$k_{eq}$	$0.010279 \pm 0.000063$	$\chi_{H073p45}^2$	$10.8 \pm 1.6$
$S_8$	$0.817 \pm 0.010$	$100\theta_{eq}$	$0.8198 \pm 0.0039$	$\chi_{6DF}^2$	$0.022 \pm 0.032$
$\sigma_8 \Omega_m^{0.5}$	$0.4474 \pm 0.0056$	$100\theta_{s,eq}$	$0.4527 \pm 0.0020$	$\chi_{MGS}^2$	$1.61 \pm 0.41$
$\sigma_8 \Omega_m^{0.25}$	$0.6014 \pm 0.0056$	$H(0.15)$	$73.24 \pm 0.35$	$\chi_{DR12BAO}^2$	$3.98 \pm 0.75$
$\sigma_8/h^{0.5}$	$0.9805 \pm 0.0082$	$D_M(0.15)$	$637.8 \pm 3.4$	$\chi_{prior}^2$	$9.7 \pm 4.5$
$r_{drag} h$	$100.25 \pm 0.69$	$H(0.38)$	$83.26 \pm 0.26$	$\chi_{CMB}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.020$	$D_M(0.38)$	$1522.5 \pm 6.8$	$\chi_{BAO}^2$	$5.61 \pm 0.55$
$z_{re}$	$7.99^{+0.64}_{-0.75}$	$H(0.51)$	$89.92 \pm 0.21$		

$\bar{\chi}_{eff}^2 = 11968.71$ ;  $\Delta\bar{\chi}_{eff}^2 = 9150.56$ ;  $R - 1 = 0.02252$



2.63 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Pantheon18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.78^{+0.57}_{-0.76}$	$D_{\text{M}}(0.38)$	$1531.1 \pm 8.6$
$\Omega_c h^2$	$0.1195 \pm 0.0011$	$10^9 A_s$	$2.101^{+0.024}_{-0.032}$	$H(0.51)$	$89.67 \pm 0.26$
$100\theta_{MC}$	$1.04093 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.51)$	$1983 \pm 10$
$\tau$	$0.0555^{+0.0053}_{-0.0078}$	$D_{40}$	$1229 \pm 12$	$H(0.61)$	$95.31 \pm 0.21$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(0.61)$	$2308 \pm 11$
$n_s$	$0.9660 \pm 0.0041$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$236.25 \pm 0.68$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5763 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.15)$	$0.4577 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9660 \pm 0.0041$	$\sigma_8(0.15)$	$0.7486^{+0.0048}_{-0.0055}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245388^{+0.000064}_{-0.000054}$	$f\sigma_8(0.38)$	$0.4757 \pm 0.0051$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246714^{+0.000064}_{-0.000054}$	$\sigma_8(0.38)$	$0.6634^{+0.0040}_{-0.0049}$
$A_{143}^{PS}$	$43 \pm 9$	$10^5 D/H$	$2.589^{+0.026}_{-0.030}$	$f\sigma_8(0.51)$	$0.4741 \pm 0.0045$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.797 \pm 0.023$	$\sigma_8(0.51)$	$0.6208^{+0.0037}_{-0.0046}$
$A^{kSZ}$	$< 5.31$	$z_*$	$1089.90 \pm 0.25$	$f\sigma_8(0.61)$	$0.4690 \pm 0.0041$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.56 \pm 0.26$	$\sigma_8(0.61)$	$0.5907^{+0.0035}_{-0.0044}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04111 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2978^{+0.0018}_{-0.0023}$
$H_0$	$67.51 \pm 0.50$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.025$	$\sigma_8(2.33)$	$0.3069^{+0.0019}_{-0.0025}$
$\Omega_{\Lambda}$	$0.6871 \pm 0.0068$	$z_{\text{drag}}$	$1059.87 \pm 0.33$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$\Omega_m$	$0.3129 \pm 0.0068$	$r_{\text{drag}}$	$147.23 \pm 0.28$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_m h^2$	$0.1425 \pm 0.0011$	$k_{\text{D}}$	$0.14071 \pm 0.00033$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m h^3$	$0.09622 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.64$
$\sigma_8$	$0.8102 \pm 0.0058$	$z_{\text{eq}}$	$3391 \pm 25$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$S_8$	$0.827 \pm 0.012$	$k_{\text{eq}}$	$0.010350 \pm 0.000078$	$\chi_{\text{lowl}}^2$	$23.27 \pm 0.87$
$\sigma_8 \Omega_m^{0.5}$	$0.4532 \pm 0.0067$	$100\theta_{\text{eq}}$	$0.8153 \pm 0.0048$	$\chi_{\text{JLA}}^2$	$1035.22 \pm 0.41$
$\sigma_8 \Omega_m^{0.25}$	$0.6060 \pm 0.0063$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9862 \pm 0.0088$	$H(0.15)$	$72.80 \pm 0.43$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.39 \pm 0.87$	$D_{\text{M}}(0.15)$	$642.1 \pm 4.3$		
$\langle d^2 \rangle^{1/2}$	$2.440 \pm 0.021$	$H(0.38)$	$82.94 \pm 0.32$		

$\bar{\chi}_{\text{eff}}^2 = 12986.49$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.67$ ;  $R - 1 = 0.01335$



2.64 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_JLA\_Riess18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00014$	$10^9 A_s$	$2.108^{+0.027}_{-0.032}$	$D_M(0.51)$	$1972.7 \pm 8.0$
$\Omega_c h^2$	$0.11845 \pm 0.00089$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.51 \pm 0.18$
$100\theta_{MC}$	$1.04110 \pm 0.00029$	$D_{40}$	$1224 \pm 12$	$D_M(0.61)$	$2296.2 \pm 8.7$
$\tau$	$0.0581^{+0.0062}_{-0.0078}$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.63 \pm 0.57$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5754.1 \pm 8.8$
$n_s$	$0.9687 \pm 0.0038$	$D_{1420}$	$818.1 \pm 4.7$	$f\sigma_8(0.15)$	$0.4522 \pm 0.0053$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7477^{+0.0051}_{-0.0057}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4718 \pm 0.0045$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245425 \pm 0.000055$	$\sigma_8(0.38)$	$0.6634^{+0.0044}_{-0.0051}$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{BBN}$	$0.246752 \pm 0.000055$	$f\sigma_8(0.51)$	$0.4710 \pm 0.0041$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.571 \pm 0.026$	$\sigma_8(0.51)$	$0.6211^{+0.0041}_{-0.0047}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.777 \pm 0.020$	$f\sigma_8(0.61)$	$0.4665 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.68 \pm 0.21$	$\sigma_8(0.61)$	$0.5912^{+0.0039}_{-0.0045}$
$A^{kSZ}$	$< 5.11$	$r_*$	$144.77 \pm 0.23$	$f\sigma_8(2.33)$	$0.2983^{+0.0020}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04128 \pm 0.00029$	$\sigma_8(2.33)$	$0.3078^{+0.0021}_{-0.0024}$
$c_{217}$	$0.9996^{+0.0019}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.022$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$H_0$	$68.03 \pm 0.40$	$z_{drag}$	$1060.01 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6941 \pm 0.0052$	$r_{drag}$	$147.41 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3059 \pm 0.0052$	$k_D$	$0.14059^{+0.00034}_{-0.00031}$	$\chi_{lensing}^2$	$9.27 \pm 0.78$
$\Omega_m h^2$	$0.14154 \pm 0.00087$	$100\theta_D$	$0.16072 \pm 0.00019$	$\chi_{simall}^2$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00033$	$z_{eq}$	$3367 \pm 21$	$\chi_{lowl}^2$	$22.83 \pm 0.78$
$\sigma_8$	$0.8086 \pm 0.0059$	$k_{eq}$	$0.010277 \pm 0.000063$	$\chi_{H073p45}^2$	$10.7 \pm 1.6$
$S_8$	$0.816 \pm 0.010$	$100\theta_{eq}$	$0.8200 \pm 0.0039$	$\chi_{JLA}^2$	$706.63 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4472 \pm 0.0056$	$100\theta_{s,eq}$	$0.4528 \pm 0.0020$	$\chi_{6DF}^2$	$0.022 \pm 0.030$
$\sigma_8 \Omega_m^{0.25}$	$0.6013 \pm 0.0056$	$H(0.15)$	$73.25 \pm 0.34$	$\chi_{MGS}^2$	$1.63 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9803 \pm 0.0082$	$D_M(0.15)$	$637.7 \pm 3.4$	$\chi_{DR12BAO}^2$	$3.94 \pm 0.71$
$r_{drag} h$	$100.29 \pm 0.69$	$H(0.38)$	$83.27 \pm 0.26$	$\chi_{prior}^2$	$9.6 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.020$	$D_M(0.38)$	$1522.2 \pm 6.8$	$\chi_{CMB}^2$	$7368 \pm 5000$
$z_{re}$	$8.01^{+0.64}_{-0.76}$	$H(0.51)$	$89.93 \pm 0.21$	$\chi_{BAO}^2$	$5.59 \pm 0.53$

$$\bar{\chi}_{\text{eff}}^2 = 12675.50; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.72; R - 1 = 0.05354$$



2.65 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00014$	$10^9 A_s$	$2.104^{+0.025}_{-0.032}$	$D_M(0.51)$	$1978.9 \pm 8.2$
$\Omega_c h^2$	$0.11907 \pm 0.00090$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.39 \pm 0.18$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$D_M(0.61)$	$2302.9 \pm 8.8$
$\tau$	$0.0565^{+0.0056}_{-0.0077}$	$D_{220}$	$5733 \pm 40$	$H(2.33)$	$235.97 \pm 0.57$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5759.6 \pm 8.9$
$n_s$	$0.9671 \pm 0.0038$	$D_{1420}$	$817.2 \pm 4.8$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0054$
$y_{cal}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.6$	$\sigma_8(0.15)$	$0.7481^{+0.0049}_{-0.0056}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9671 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4740 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245401^{+0.000060}_{-0.000051}$	$\sigma_8(0.38)$	$0.6633^{+0.0042}_{-0.0050}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246728^{+0.000061}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0041$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.582^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.6208^{+0.0039}_{-0.0047}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.789 \pm 0.020$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.82 \pm 0.22$	$\sigma_8(0.61)$	$0.5908^{+0.0037}_{-0.0045}$
$A^{kSZ}$	$< 5.25$	$r_*$	$144.66 \pm 0.23$	$f\sigma_8(2.33)$	$0.2979^{+0.0019}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04118 \pm 0.00029$	$\sigma_8(2.33)$	$0.3072^{+0.0020}_{-0.0024}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.894 \pm 0.022$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$67.72 \pm 0.40$	$z_{\text{drag}}$	$1059.91 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_\Lambda$	$0.6901 \pm 0.0054$	$r_{\text{drag}}$	$147.32 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.3099 \pm 0.0054$	$k_D$	$0.14064 \pm 0.00032$	$\chi_{\text{lensing}}^2$	$9.17 \pm 0.64$
$\Omega_m h^2$	$0.14210 \pm 0.00087$	$100\theta_D$	$0.16077 \pm 0.00019$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09623 \pm 0.00032$	$z_{\text{eq}}$	$3380 \pm 21$	$\chi_{\text{lowl}}^2$	$23.07 \pm 0.80$
$\sigma_8$	$0.8094^{+0.0055}_{-0.0061}$	$k_{\text{eq}}$	$0.010317 \pm 0.000064$	$\chi_{\text{JLA}}^2$	$1035.04 \pm 0.26$
$S_8$	$0.823 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8174 \pm 0.0039$	$\chi_{6\text{DF}}^2$	$0.042 \pm 0.050$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0057$	$100\theta_{s,\text{eq}}$	$0.4515 \pm 0.0020$	$\chi_{\text{MGS}}^2$	$1.33 \pm 0.39$
$\sigma_8 \Omega_m^{0.25}$	$0.6039 \pm 0.0056$	$H(0.15)$	$72.99 \pm 0.35$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.1$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0082$	$D_M(0.15)$	$640.3 \pm 3.4$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$99.77 \pm 0.69$	$H(0.38)$	$83.08 \pm 0.26$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.020$	$D_M(0.38)$	$1527.4 \pm 6.9$	$\chi_{\text{BAO}}^2$	$5.92 \pm 0.87$
$z_{\text{re}}$	$7.87^{+0.60}_{-0.75}$	$H(0.51)$	$89.78 \pm 0.21$		

$$\bar{\chi}_{\text{eff}}^2 = 12992.25; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.51; R - 1 = 0.01504$$



2.66 base\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_Pantheon18\_Riess18\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00014$	$10^9 A_s$	$2.108^{+0.027}_{-0.032}$	$D_M(0.51)$	$1972.5 \pm 7.8$
$\Omega_c h^2$	$0.11842 \pm 0.00087$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.010$	$H(0.61)$	$95.51 \pm 0.18$
$100\theta_{MC}$	$1.04110 \pm 0.00029$	$D_{40}$	$1224 \pm 12$	$D_M(0.61)$	$2296.0 \pm 8.5$
$\tau$	$0.0581^{+0.0062}_{-0.0078}$	$D_{220}$	$5740 \pm 39$	$H(2.33)$	$235.62 \pm 0.55$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_M(2.33)$	$5754.0 \pm 8.7$
$n_s$	$0.9687 \pm 0.0037$	$D_{1420}$	$818.1 \pm 4.7$	$f\sigma_8(0.15)$	$0.4520 \pm 0.0052$
$y_{cal}$	$1.0009 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.6$	$\sigma_8(0.15)$	$0.7476^{+0.0051}_{-0.0057}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9687 \pm 0.0037$	$f\sigma_8(0.38)$	$0.4716 \pm 0.0045$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245426^{+0.000056}_{-0.000049}$	$\sigma_8(0.38)$	$0.6634^{+0.0044}_{-0.0050}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{BBN}$	$0.246753^{+0.000056}_{-0.000049}$	$f\sigma_8(0.51)$	$0.4709 \pm 0.0041$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.570 \pm 0.026$	$\sigma_8(0.51)$	$0.6211^{+0.0041}_{-0.0047}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.777 \pm 0.020$	$f\sigma_8(0.61)$	$0.4664 \pm 0.0038$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.68 \pm 0.21$	$\sigma_8(0.61)$	$0.5911^{+0.0039}_{-0.0045}$
$A^{kSZ}$	$< 5.14$	$r_*$	$144.78 \pm 0.23$	$f\sigma_8(2.33)$	$0.2983^{+0.0020}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04127 \pm 0.00029$	$\sigma_8(2.33)$	$0.3078^{+0.0021}_{-0.0025}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.904 \pm 0.022$	$f_{2000}^{143}$	$29.0 \pm 2.8$
$H_0$	$68.04 \pm 0.39$	$z_{drag}$	$1060.02 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\Lambda$	$0.6943 \pm 0.0051$	$r_{drag}$	$147.42 \pm 0.25$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$\Omega_m$	$0.3057 \pm 0.0051$	$k_D$	$0.14059 \pm 0.00032$	$\chi_{lensing}^2$	$9.28 \pm 0.79$
$\Omega_m h^2$	$0.14152 \pm 0.00085$	$100\theta_D$	$0.16072 \pm 0.00018$	$\chi_{simall}^2$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.09629 \pm 0.00032$	$z_{eq}$	$3367 \pm 20$	$\chi_{lowl}^2$	$22.83 \pm 0.77$
$\sigma_8$	$0.8085^{+0.0056}_{-0.0062}$	$k_{eq}$	$0.010275 \pm 0.000062$	$\chi_{H073p45}^2$	$10.7 \pm 1.5$
$S_8$	$0.816 \pm 0.010$	$100\theta_{eq}$	$0.8201 \pm 0.0038$	$\chi_{JLA}^2$	$1034.88 \pm 0.16$
$\sigma_8 \Omega_m^{0.5}$	$0.4470 \pm 0.0055$	$100\theta_{s,eq}$	$0.4529 \pm 0.0020$	$\chi_{6DF}^2$	$0.020 \pm 0.029$
$\sigma_8 \Omega_m^{0.25}$	$0.6012 \pm 0.0055$	$H(0.15)$	$73.26 \pm 0.34$	$\chi_{MGS}^2$	$1.64 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9801 \pm 0.0081$	$D_M(0.15)$	$637.6 \pm 3.3$	$\chi_{DR12BAO}^2$	$3.92 \pm 0.69$
$r_{drag} h$	$100.30 \pm 0.67$	$H(0.38)$	$83.28 \pm 0.25$	$\chi_{prior}^2$	$9.7 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.020$	$D_M(0.38)$	$1522.0 \pm 6.7$	$\chi_{CMB}^2$	$7367 \pm 5000$
$z_{re}$	$8.01^{+0.64}_{-0.75}$	$H(0.51)$	$89.94 \pm 0.21$	$\chi_{BAO}^2$	$5.58 \pm 0.51$

$\bar{\chi}_{\text{eff}}^2 = 13003.54$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.53$ ;  $R - 1 = 0.02380$



## 2.67 base\_CamSpecHM\_TT/base\_plikHM\_TT

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00029$	$r_{\text{drag}} h$	$100.7 \pm 2.2$	$100\theta_{\text{s,eq}}$	$0.4540 \pm 0.0061$
$\Omega_c h^2$	$0.1180 \pm 0.0027$	$\langle d^2 \rangle^{1/2}$	$2.594^{+0.069}_{-0.062}$	$H(0.15)$	$73.4 \pm 1.1$
$100\theta_{MC}$	$1.04120 \pm 0.00055$	$z_{\text{re}}$	$14.1^{+3.2}_{-2.1}$	$D_{\text{M}}(0.15)$	$636 \pm 11$
$\tau$	$0.131^{+0.039}_{-0.034}$	$10^9 A_s$	$2.44 \pm 0.17$	$H(0.38)$	$83.40 \pm 0.81$
$\ln(10^{10} A_s)$	$3.190^{+0.074}_{-0.064}$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.016$	$D_{\text{M}}(0.38)$	$1519 \pm 22$
$n_s$	$0.9719 \pm 0.0088$	$D_{40}$	$1254 \pm 18$	$H(0.51)$	$90.03 \pm 0.65$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{220}$	$5721 \pm 41$	$D_{\text{M}}(0.51)$	$1969 \pm 26$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2528 \pm 14$	$H(0.61)$	$95.59 \pm 0.52$
$A_{143}^{tSZ}$	$4.8^{+2.3}_{-2.1}$	$D_{1420}$	$814.3 \pm 5.2$	$D_{\text{M}}(0.61)$	$2292 \pm 28$
$A_{100}^{PS}$	$243 \pm 30$	$D_{2000}$	$231.7 \pm 2.2$	$H(2.33)$	$235.3 \pm 1.6$
$A_{143}^{PS}$	$39 \pm 10$	$n_{s,0.002}$	$0.9719 \pm 0.0088$	$D_{\text{M}}(2.33)$	$5752 \pm 23$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$Y_P$	$0.24542 \pm 0.00012$	$f\sigma_8(0.15)$	$0.483 \pm 0.014$
$A^{kSZ}$	$< 4.56$	$Y_P^{\text{BBN}}$	$0.24675 \pm 0.00012$	$\sigma_8(0.15)$	$0.802^{+0.026}_{-0.023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$10^5 D/H$	$2.573 \pm 0.053$	$f\sigma_8(0.38)$	$0.505 \pm 0.013$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	Age/Gyr	$13.772 \pm 0.051$	$\sigma_8(0.38)$	$0.712^{+0.024}_{-0.022}$
$y_{\text{cal}}$	$1.0002 \pm 0.0025$	$z_*$	$1089.65 \pm 0.55$	$f\sigma_8(0.51)$	$0.504 \pm 0.013$
$H_0$	$68.2 \pm 1.3$	$r_*$	$144.90 \pm 0.58$	$\sigma_8(0.51)$	$0.667 \pm 0.022$
$\Omega_\Lambda$	$0.697^{+0.018}_{-0.015}$	$100\theta_*$	$1.04137 \pm 0.00053$	$f\sigma_8(0.61)$	$0.500 \pm 0.013$
$\Omega_m$	$0.303^{+0.015}_{-0.018}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.915 \pm 0.052$	$\sigma_8(0.61)$	$0.635 \pm 0.021$
$\Omega_m h^2$	$0.1411 \pm 0.0025$	$z_{\text{drag}}$	$1059.96 \pm 0.54$	$f\sigma_8(2.33)$	$0.321 \pm 0.011$
$\Omega_m h^3$	$0.09623 \pm 0.00048$	$r_{\text{drag}}$	$147.55 \pm 0.55$	$\sigma_8(2.33)$	$0.331 \pm 0.012$
$\sigma_8$	$0.867^{+0.027}_{-0.024}$	$k_{\text{D}}$	$0.14044 \pm 0.00054$	$f_{2000}^{143}$	$27 \pm 4$
$S_8$	$0.872 \pm 0.026$	$100\theta_{\text{D}}$	$0.16077 \pm 0.00030$	$f_{2000}^{143 \times 217}$	$30.4 \pm 2.7$
$\sigma_8 \Omega_m^{0.5}$	$0.477 \pm 0.014$	$z_{\text{eq}}$	$3356 \pm 61$	$f_{2000}^{217}$	$105.3 \pm 2.5$
$\sigma_8 \Omega_m^{0.25}$	$0.643 \pm 0.017$	$k_{\text{eq}}$	$0.01024 \pm 0.00019$	$\chi^2_{\text{prior}}$	$7.2 \pm 3.5$
$\sigma_8/h^{0.5}$	$1.050 \pm 0.028$	$100\theta_{\text{eq}}$	$0.822 \pm 0.012$		

Best-fit  $\chi^2_{\text{eff}} = 7046.70$ ;  $\Delta\chi^2_{\text{eff}} = 6292.97$ ;  $\bar{\chi}^2_{\text{eff}} = 7066.87$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.41$ ;  $R - 1 = 0.00646$   
 $\chi^2_{\text{eff}}$ : CMB - CamSpec like\_10.7HM: 7045.25



## 2.68 base\_CamSpecHM\_TT\_lowl/base\_plikHM\_TT\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00027$	$\langle d^2 \rangle^{1/2}$	$2.540 \pm 0.061$	$D_M(0.15)$	$636 \pm 10$
$\Omega_c h^2$	$0.1179 \pm 0.0026$	$z_{\text{re}}$	$12.5^{+3.0}_{-2.1}$	$H(0.38)$	$83.37 \pm 0.76$
$100\theta_{MC}$	$1.04117 \pm 0.00052$	$10^9 A_s$	$2.34 \pm 0.15$	$D_M(0.38)$	$1519 \pm 20$
$\tau$	$0.111^{+0.035}_{-0.032}$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.015$	$H(0.51)$	$90.00 \pm 0.60$
$\ln(10^{10} A_s)$	$3.150^{+0.066}_{-0.059}$	$D_{40}$	$1239 \pm 16$	$D_M(0.51)$	$1969 \pm 24$
$n_s$	$0.9723 \pm 0.0080$	$D_{220}$	$5713 \pm 42$	$H(0.61)$	$95.55 \pm 0.49$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{810}$	$2530 \pm 14$	$D_M(0.61)$	$2293 \pm 26$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$815.2 \pm 5.2$	$H(2.33)$	$235.2 \pm 1.5$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.5 \pm 2.1$	$D_M(2.33)$	$5754 \pm 22$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$n_{s,0.002}$	$0.9723 \pm 0.0080$	$f\sigma_8(0.15)$	$0.473 \pm 0.013$
$A_{100}^{PS}$	$244 \pm 30$	$Y_P$	$0.24540 \pm 0.00011$	$\sigma_8(0.15)$	$0.786 \pm 0.022$
$A_{143}^{PS}$	$40 \pm 10$	$Y_P^{\text{BBN}}$	$0.24673 \pm 0.00011$	$f\sigma_8(0.38)$	$0.494 \pm 0.013$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.581 \pm 0.050$	$\sigma_8(0.38)$	$0.698 \pm 0.021$
$A^{kSZ}$	$< 4.66$	Age/Gyr	$13.777 \pm 0.047$	$f\sigma_8(0.51)$	$0.494 \pm 0.013$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1089.70 \pm 0.52$	$\sigma_8(0.51)$	$0.654 \pm 0.020$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$r_*$	$144.96 \pm 0.55$	$f\sigma_8(0.61)$	$0.490 \pm 0.012$
$H_0$	$68.2 \pm 1.2$	$100\theta_*$	$1.04135 \pm 0.00051$	$\sigma_8(0.61)$	$0.622 \pm 0.019$
$\Omega_\Lambda$	$0.697^{+0.016}_{-0.015}$	$D_M(z_*)/\text{Gpc}$	$13.920 \pm 0.050$	$f\sigma_8(2.33)$	$0.314 \pm 0.010$
$\Omega_m$	$0.303 \pm 0.016$	$z_{\text{drag}}$	$1059.86 \pm 0.53$	$\sigma_8(2.33)$	$0.324 \pm 0.011$
$\Omega_m h^2$	$0.1409 \pm 0.0024$	$r_{\text{drag}}$	$147.62 \pm 0.53$	$f_{2000}^{143}$	$28 \pm 4$
$\Omega_m h^3$	$0.09613 \pm 0.00048$	$k_D$	$0.14033 \pm 0.00053$	$f_{2000}^{143 \times 217}$	$30.8 \pm 2.6$
$\sigma_8$	$0.850 \pm 0.023$	$100\theta_D$	$0.16083 \pm 0.00029$	$f_{2000}^{217}$	$105.7 \pm 2.4$
$S_8$	$0.854 \pm 0.025$	$z_{\text{eq}}$	$3353 \pm 57$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.468 \pm 0.014$	$k_{\text{eq}}$	$0.01023 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.3 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.631 \pm 0.016$	$100\theta_{\text{eq}}$	$0.823 \pm 0.011$	$\chi_{\text{CMB}}^2$	$3939 \pm 3000$
$\sigma_8/h^{0.5}$	$1.029 \pm 0.026$	$100\theta_{s,\text{eq}}$	$0.4543 \pm 0.0057$		
$r_{\text{drag}} h$	$100.7 \pm 2.1$	$H(0.15)$	$73.4 \pm 1.0$		

Best-fit  $\chi_{\text{eff}}^2 = 7072.29$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.81$ ;  $\bar{\chi}_{\text{eff}}^2 = 7092.24$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.04$ ;  $R - 1 = 0.00797$   
 $\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 24.50 ( $\Delta$  -0.39) CamSpec like\_10.7HM: 7046.38



## 2.69 base\_CamSpecHM\_TT\_lowl\_post\_BAO/base\_plikHM\_TT\_lowl\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00021$	$z_{\text{re}}$	$12.4^{+2.5}_{-1.8}$	$D_{\text{M}}(0.38)$	$1521 \pm 10$
$\Omega_c h^2$	$0.1181 \pm 0.0013$	$10^9 A_s$	$2.33 \pm 0.12$	$H(0.51)$	$89.93 \pm 0.33$
$100\theta_{MC}$	$1.04114 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.012$	$D_{\text{M}}(0.51)$	$1972 \pm 12$
$\tau$	$0.108^{+0.029}_{-0.026}$	$D_{40}$	$1238 \pm 16$	$H(0.61)$	$95.50 \pm 0.28$
$\ln(10^{10} A_s)$	$3.145^{+0.056}_{-0.050}$	$D_{220}$	$5712 \pm 41$	$D_{\text{M}}(0.61)$	$2295 \pm 13$
$n_s$	$0.9715 \pm 0.0050$	$D_{810}$	$2530 \pm 14$	$H(2.33)$	$235.36 \pm 0.80$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{1420}$	$815.0 \pm 5.0$	$D_{\text{M}}(2.33)$	$5756 \pm 14$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.3 \pm 1.9$	$f\sigma_8(0.15)$	$0.474 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9715 \pm 0.0050$	$\sigma_8(0.15)$	$0.785 \pm 0.021$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$Y_P$	$0.245396 \pm 0.000085$	$f\sigma_8(0.38)$	$0.495 \pm 0.013$
$A_{100}^{PS}$	$244 \pm 30$	$Y_P^{\text{BBN}}$	$0.246723 \pm 0.000085$	$\sigma_8(0.38)$	$0.697 \pm 0.019$
$A_{143}^{PS}$	$40 \pm 9$	$10^5 D/H$	$2.585 \pm 0.039$	$f\sigma_8(0.51)$	$0.494 \pm 0.013$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.782 \pm 0.031$	$\sigma_8(0.51)$	$0.653 \pm 0.017$
$A^{kSZ}$	$< 4.76$	$z_*$	$1089.75 \pm 0.32$	$f\sigma_8(0.61)$	$0.489 \pm 0.012$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.91 \pm 0.32$	$\sigma_8(0.61)$	$0.621 \pm 0.017$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04133 \pm 0.00043$	$f\sigma_8(2.33)$	$0.3135 \pm 0.0085$
$H_0$	$68.10 \pm 0.60$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.916 \pm 0.031$	$\sigma_8(2.33)$	$0.3235 \pm 0.0090$
$\Omega_{\Lambda}$	$0.6955 \pm 0.0077$	$z_{\text{drag}}$	$1059.82 \pm 0.47$	$f_{2000}^{143}$	$28 \pm 3$
$\Omega_m$	$0.3045 \pm 0.0077$	$r_{\text{drag}}$	$147.58 \pm 0.34$	$f_{2000}^{143 \times 217}$	$30.9 \pm 2.4$
$\Omega_m h^2$	$0.1412 \pm 0.0012$	$k_{\text{D}}$	$0.14036 \pm 0.00044$	$f_{2000}^{217}$	$105.9 \pm 2.2$
$\Omega_m h^3$	$0.09612 \pm 0.00047$	$100\theta_{\text{D}}$	$0.16084 \pm 0.00027$	$\chi_{\text{lowl}}^2$	$24.8 \pm 1.7$
$\sigma_8$	$0.849 \pm 0.022$	$z_{\text{eq}}$	$3358 \pm 29$	$\chi_{6\text{DF}}^2$	$0.043 \pm 0.061$
$S_8$	$0.855 \pm 0.023$	$k_{\text{eq}}$	$0.010248 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.78 \pm 0.62$
$\sigma_8 \Omega_m^{0.5}$	$0.468 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8216 \pm 0.0056$	$\chi_{\text{DR12BAO}}^2$	$4.1 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.631 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4537 \pm 0.0029$	$\chi_{\text{prior}}^2$	$7.3 \pm 3.5$
$\sigma_8/h^{0.5}$	$1.029 \pm 0.026$	$H(0.15)$	$73.31 \pm 0.52$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$100.5 \pm 1.0$	$D_{\text{M}}(0.15)$	$637.1 \pm 5.1$	$\chi_{\text{CMB}}^2$	$3938 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.539^{+0.064}_{-0.058}$	$H(0.38)$	$83.29 \pm 0.39$		

$\bar{\chi}_{\text{eff}}^2 = 7097.63$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.21$ ;  $R - 1 = 0.01179$



## 2.70 base\_CamSpecHM\_TT\_lowl\_post\_zre6p5/base\_plikHM\_TT\_lowl\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02241 \pm 0.00027$	$\langle d^2 \rangle^{1/2}$	$2.543 \pm 0.058$	$D_M(0.15)$	$635.9 \pm 9.8$
$\Omega_c h^2$	$0.1178 \pm 0.0025$	$z_{\text{re}}$	$12.7^{+2.8}_{-2.2}$	$H(0.38)$	$83.40 \pm 0.74$
$100\theta_{MC}$	$1.04118 \pm 0.00052$	$10^9 A_s$	$2.35^{+0.13}_{-0.15}$	$D_M(0.38)$	$1519 \pm 20$
$\tau$	$0.112 \pm 0.031$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.015$	$H(0.51)$	$90.02^{+0.56}_{-0.62}$
$\ln(10^{10} A_s)$	$3.153 \pm 0.059$	$D_{40}$	$1239 \pm 16$	$D_M(0.51)$	$1969 \pm 23$
$n_s$	$0.9726^{+0.0074}_{-0.0082}$	$D_{220}$	$5713 \pm 42$	$H(0.61)$	$95.57^{+0.45}_{-0.51}$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{810}$	$2529 \pm 14$	$D_M(0.61)$	$2292 \pm 25$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$815.2 \pm 5.1$	$H(2.33)$	$235.2 \pm 1.5$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.5 \pm 2.1$	$D_M(2.33)$	$5753 \pm 21$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$n_{s,0.002}$	$0.9726^{+0.0074}_{-0.0082}$	$f\sigma_8(0.15)$	$0.474 \pm 0.013$
$A_{100}^{PS}$	$243 \pm 30$	$Y_P$	$0.24541 \pm 0.00011$	$\sigma_8(0.15)$	$0.788 \pm 0.021$
$A_{143}^{PS}$	$40 \pm 10$	$Y_P^{\text{BBN}}$	$0.24673 \pm 0.00011$	$f\sigma_8(0.38)$	$0.495 \pm 0.012$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.579 \pm 0.049$	$\sigma_8(0.38)$	$0.699 \pm 0.019$
$A^{kSZ}$	$< 4.61$	Age/Gyr	$13.776 \pm 0.046$	$f\sigma_8(0.51)$	$0.495 \pm 0.012$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$z_*$	$1089.68 \pm 0.51$	$\sigma_8(0.51)$	$0.655 \pm 0.018$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$r_*$	$144.97 \pm 0.54$	$f\sigma_8(0.61)$	$0.490 \pm 0.012$
$H_0$	$68.3 \pm 1.2$	$100\theta_*$	$1.04137 \pm 0.00051$	$\sigma_8(0.61)$	$0.623 \pm 0.018$
$\Omega_\Lambda$	$0.697 \pm 0.015$	$D_M(z_*)/\text{Gpc}$	$13.921 \pm 0.049$	$f\sigma_8(2.33)$	$0.3147 \pm 0.0094$
$\Omega_m$	$0.303 \pm 0.015$	$z_{\text{drag}}$	$1059.87 \pm 0.52$	$\sigma_8(2.33)$	$0.325 \pm 0.010$
$\Omega_m h^2$	$0.1409 \pm 0.0023$	$r_{\text{drag}}$	$147.63 \pm 0.52$	$f_{2000}^{143}$	$28 \pm 3$
$\Omega_m h^3$	$0.09614 \pm 0.00048$	$k_D$	$0.14033 \pm 0.00053$	$f_{2000}^{143 \times 217}$	$30.7 \pm 2.5$
$\sigma_8$	$0.851 \pm 0.022$	$100\theta_D$	$0.16082 \pm 0.00029$	$f_{2000}^{217}$	$105.6 \pm 2.3$
$S_8$	$0.855 \pm 0.025$	$z_{\text{eq}}$	$3351 \pm 56$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.468 \pm 0.014$	$k_{\text{eq}}$	$0.01023 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.3 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.631 \pm 0.016$	$100\theta_{\text{eq}}$	$0.823 \pm 0.011$	$\chi_{\text{CMB}}^2$	$3939 \pm 3000$
$\sigma_8/h^{0.5}$	$1.030 \pm 0.025$	$100\theta_{s,\text{eq}}$	$0.4544 \pm 0.0056$		
$r_{\text{drag}} h$	$100.8 \pm 2.0$	$H(0.15)$	$73.4 \pm 1.0$		

$\bar{\chi}_{\text{eff}}^2 = 7092.14$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.06$ ;  $R - 1 = 0.00760$



2.71 base\_CamSpecHM\_TT\_lowl\_post\_BAO\_zre6p5/base\_plikHM\_TT\_lowl\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00021$	$z_{\text{re}}$	$12.5^{+2.3}_{-1.9}$	$D_{\text{M}}(0.38)$	$1521 \pm 10$
$\Omega_c h^2$	$0.1181 \pm 0.0013$	$10^9 A_s$	$2.33 \pm 0.12$	$H(0.51)$	$89.94 \pm 0.32$
$100\theta_{MC}$	$1.04114 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.012$	$D_{\text{M}}(0.51)$	$1972 \pm 12$
$\tau$	$0.109 \pm 0.026$	$D_{40}$	$1239 \pm 16$	$H(0.61)$	$95.50 \pm 0.28$
$\ln(10^{10} A_s)$	$3.147 \pm 0.051$	$D_{220}$	$5712 \pm 41$	$D_{\text{M}}(0.61)$	$2295 \pm 13$
$n_s$	$0.9716 \pm 0.0050$	$D_{810}$	$2530 \pm 14$	$H(2.33)$	$235.35 \pm 0.80$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{1420}$	$815.0 \pm 5.0$	$D_{\text{M}}(2.33)$	$5756 \pm 13$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.4 \pm 1.9$	$f\sigma_8(0.15)$	$0.474 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9716 \pm 0.0050$	$\sigma_8(0.15)$	$0.786 \pm 0.020$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$Y_P$	$0.245397 \pm 0.000084$	$f\sigma_8(0.38)$	$0.495 \pm 0.012$
$A_{100}^{PS}$	$244 \pm 30$	$Y_P^{\text{BBN}}$	$0.246724 \pm 0.000084$	$\sigma_8(0.38)$	$0.698 \pm 0.018$
$A_{143}^{PS}$	$40 \pm 9$	$10^5 D/H$	$2.584 \pm 0.039$	$f\sigma_8(0.51)$	$0.495 \pm 0.012$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.781 \pm 0.031$	$\sigma_8(0.51)$	$0.653 \pm 0.017$
$A^{kSZ}$	$< 4.72$	$z_*$	$1089.74 \pm 0.32$	$f\sigma_8(0.61)$	$0.490 \pm 0.012$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.91 \pm 0.32$	$\sigma_8(0.61)$	$0.622 \pm 0.016$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04133 \pm 0.00043$	$f\sigma_8(2.33)$	$0.3138 \pm 0.0082$
$H_0$	$68.11 \pm 0.60$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.916 \pm 0.031$	$\sigma_8(2.33)$	$0.3238 \pm 0.0086$
$\Omega_{\Lambda}$	$0.6956 \pm 0.0077$	$z_{\text{drag}}$	$1059.83 \pm 0.47$	$f_{2000}^{143}$	$28 \pm 3$
$\Omega_m$	$0.3044 \pm 0.0077$	$r_{\text{drag}}$	$147.58 \pm 0.34$	$f_{2000}^{143 \times 217}$	$30.9 \pm 2.4$
$\Omega_m h^2$	$0.1411 \pm 0.0012$	$k_{\text{D}}$	$0.14036 \pm 0.00044$	$f_{2000}^{217}$	$105.8 \pm 2.2$
$\Omega_m h^3$	$0.09613 \pm 0.00047$	$100\theta_{\text{D}}$	$0.16084 \pm 0.00027$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.7$
$\sigma_8$	$0.850 \pm 0.021$	$z_{\text{eq}}$	$3358 \pm 29$	$\chi_{6\text{DF}}^2$	$0.043 \pm 0.060$
$S_8$	$0.856 \pm 0.022$	$k_{\text{eq}}$	$0.010248 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.79 \pm 0.62$
$\sigma_8 \Omega_m^{0.5}$	$0.469 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8216 \pm 0.0056$	$\chi_{\text{DR12BAO}}^2$	$4.1 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.631 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4537 \pm 0.0029$	$\chi_{\text{prior}}^2$	$7.3 \pm 3.5$
$\sigma_8/h^{0.5}$	$1.030 \pm 0.025$	$H(0.15)$	$73.31 \pm 0.52$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$100.5 \pm 1.0$	$D_{\text{M}}(0.15)$	$637.1 \pm 5.0$	$\chi_{\text{CMB}}^2$	$3938 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.542 \pm 0.059$	$H(0.38)$	$83.30 \pm 0.39$		

$\bar{\chi}_{\text{eff}}^2 = 7097.56$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.23$ ;  $R - 1 = 0.01150$



## 2.72 base\_CamSpecHM\_TT\_lowE/base\_plikHM\_TT\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02206 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.473 \pm 0.039$	$D_M(0.15)$	$651.5 \pm 8.2$
$\Omega_c h^2$	$0.1217 \pm 0.0022$	$z_{\text{re}}$	$7.47 \pm 0.83$	$H(0.38)$	$82.26 \pm 0.57$
$100\theta_{MC}$	$1.04069 \pm 0.00048$	$10^9 A_s$	$2.094 \pm 0.034$	$D_M(0.38)$	$1550 \pm 16$
$\tau$	$0.0516 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.014$	$H(0.51)$	$89.13 \pm 0.44$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{40}$	$1241 \pm 16$	$D_M(0.51)$	$2005 \pm 19$
$n_s$	$0.9593 \pm 0.0060$	$D_{220}$	$5713 \pm 42$	$H(0.61)$	$94.87 \pm 0.35$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_M(0.61)$	$2331 \pm 20$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$813.1 \pm 5.2$	$H(2.33)$	$237.3 \pm 1.3$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.1 \pm 1.8$	$D_M(2.33)$	$5783 \pm 16$
$A_{143}^{tSZ}$	$4.3^{+2.2}_{-2.4}$	$n_{s,0.002}$	$0.9593 \pm 0.0060$	$f\sigma_8(0.15)$	$0.469 \pm 0.013$
$A_{100}^{PS}$	$256 \pm 30$	$Y_P$	$0.24526^{+0.00011}_{-0.000089}$	$\sigma_8(0.15)$	$0.7513 \pm 0.0075$
$A_{143}^{PS}$	$46 \pm 9$	$Y_P^{\text{BBN}}$	$0.24659^{+0.00011}_{-0.000090}$	$f\sigma_8(0.38)$	$0.4842 \pm 0.0097$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.645 \pm 0.042$	$\sigma_8(0.38)$	$0.6643 \pm 0.0060$
$A^{kSZ}$	$4.6^{+1.5}_{-4.6}$	Age/Gyr	$13.842 \pm 0.036$	$f\sigma_8(0.51)$	$0.4809 \pm 0.0083$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1090.47 \pm 0.41$	$\sigma_8(0.51)$	$0.6210 \pm 0.0055$
$c_{217}$	$0.9998 \pm 0.0019$	$r_*$	$144.24 \pm 0.49$	$f\sigma_8(0.61)$	$0.4746 \pm 0.0073$
$H_0$	$66.44 \pm 0.93$	$100\theta_*$	$1.04090 \pm 0.00047$	$\sigma_8(0.61)$	$0.5905 \pm 0.0051$
$\Omega_\Lambda$	$0.673^{+0.014}_{-0.013}$	$D_M(z_*)/\text{Gpc}$	$13.857 \pm 0.045$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0025$
$\Omega_m$	$0.327^{+0.013}_{-0.014}$	$z_{\text{drag}}$	$1059.33 \pm 0.45$	$\sigma_8(2.33)$	$0.3057 \pm 0.0027$
$\Omega_m h^2$	$0.1444 \pm 0.0021$	$r_{\text{drag}}$	$147.00 \pm 0.49$	$f_{2000}^{143}$	$31.8 \pm 3.0$
$\Omega_m h^3$	$0.09592 \pm 0.00045$	$k_D$	$0.14072 \pm 0.00053$	$f_{2000}^{143 \times 217}$	$33.9 \pm 2.1$
$\sigma_8$	$0.8148 \pm 0.0090$	$100\theta_D$	$0.16111 \pm 0.00026$	$f_{2000}^{217}$	$108.3 \pm 2.0$
$S_8$	$0.851 \pm 0.025$	$z_{\text{eq}}$	$3435 \pm 49$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.466 \pm 0.014$	$k_{\text{eq}}$	$0.01048 \pm 0.00015$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.616 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8066 \pm 0.0091$	$\chi_{\text{CMB}}^2$	$4314 \pm 3000$
$\sigma_8/h^{0.5}$	$0.9997 \pm 0.016$	$100\theta_{s,\text{eq}}$	$0.4461 \pm 0.0047$		
$r_{\text{drag}} h$	$97.7 \pm 1.6$	$H(0.15)$	$71.89 \pm 0.79$		

Best-fit  $\chi_{\text{eff}}^2 = 7447.83$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.27$ ;  $\bar{\chi}_{\text{eff}}^2 = 7467.49$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.13$ ;  $R - 1 = 0.00861$   
 $\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.83 ( $\Delta$  -0.07) CamSpec like\_10.7HM: 7049.71



### 2.73 base\_CamSpecHM\_TTTEEE/base\_plikHM\_TTTEEE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02250 \pm 0.00018$	$r_{\text{drag}} h$	$100.3 \pm 1.3$	$100\theta_{\text{s,eq}}$	$0.4527 \pm 0.0036$
$\Omega_c h^2$	$0.1185 \pm 0.0017$	$\langle d^2 \rangle^{1/2}$	$2.564 \pm 0.061$	$H(0.15)$	$73.28 \pm 0.65$
$100\theta_{MC}$	$1.04106 \pm 0.00033$	$z_{\text{re}}$	$12.9^{+2.5}_{-2.0}$	$D_{\text{M}}(0.15)$	$637.5 \pm 6.4$
$\tau$	$0.115 \pm 0.030$	$10^9 A_s$	$2.36 \pm 0.14$	$H(0.38)$	$83.30 \pm 0.48$
$\ln(10^{10} A_s)$	$3.160 \pm 0.057$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.013$	$D_{\text{M}}(0.38)$	$1522 \pm 13$
$n_s$	$0.9702 \pm 0.0058$	$D_{40}$	$1247 \pm 16$	$H(0.51)$	$89.96 \pm 0.38$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(0.51)$	$1972 \pm 15$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2530 \pm 14$	$H(0.61)$	$95.54 \pm 0.31$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$D_{1420}$	$815.2 \pm 4.8$	$D_{\text{M}}(0.61)$	$2296 \pm 16$
$A_{100}^{PS}$	$242 \pm 30$	$D_{2000}$	$231.7 \pm 1.8$	$H(2.33)$	$235.69 \pm 0.97$
$A_{143}^{PS}$	$39 \pm 9$	$n_{s,0.002}$	$0.9702 \pm 0.0058$	$D_{\text{M}}(2.33)$	$5753 \pm 14$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$Y_P$	$0.245442 \pm 0.000071$	$f\sigma_8(0.15)$	$0.478 \pm 0.012$
$A^{kSZ}$	$< 4.35$	$Y_P^{\text{BBN}}$	$0.246769 \pm 0.000071$	$\sigma_8(0.15)$	$0.791 \pm 0.021$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$10^5 D/H$	$2.563 \pm 0.034$	$f\sigma_8(0.38)$	$0.499 \pm 0.012$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	Age/Gyr	$13.774 \pm 0.030$	$\sigma_8(0.38)$	$0.702 \pm 0.019$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$z_*$	$1089.63 \pm 0.34$	$f\sigma_8(0.51)$	$0.498 \pm 0.012$
$H_0$	$68.05 \pm 0.76$	$r_*$	$144.73 \pm 0.36$	$\sigma_8(0.51)$	$0.657 \pm 0.018$
$\Omega_\Lambda$	$0.694 \pm 0.010$	$100\theta_*$	$1.04123 \pm 0.00033$	$f\sigma_8(0.61)$	$0.493 \pm 0.012$
$\Omega_m$	$0.306 \pm 0.010$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.033$	$\sigma_8(0.61)$	$0.625 \pm 0.018$
$\Omega_m h^2$	$0.1416 \pm 0.0015$	$z_{\text{drag}}$	$1060.12 \pm 0.36$	$f\sigma_8(2.33)$	$0.3156 \pm 0.0091$
$\Omega_m h^3$	$0.09636 \pm 0.00032$	$r_{\text{drag}}$	$147.36 \pm 0.35$	$\sigma_8(2.33)$	$0.3256 \pm 0.0097$
$\sigma_8$	$0.855 \pm 0.022$	$k_{\text{D}}$	$0.14068 \pm 0.00036$	$f_{2000}^{143}$	$27 \pm 3$
$S_8$	$0.864 \pm 0.022$	$100\theta_{\text{D}}$	$0.16066 \pm 0.00021$	$f_{2000}^{143 \times 217}$	$30.3 \pm 2.3$
$\sigma_8 \Omega_m^{0.5}$	$0.473 \pm 0.012$	$z_{\text{eq}}$	$3369 \pm 37$	$f_{2000}^{217}$	$105.3 \pm 2.1$
$\sigma_8 \Omega_m^{0.25}$	$0.636 \pm 0.015$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi^2_{\text{prior}}$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$1.037 \pm 0.025$	$100\theta_{\text{eq}}$	$0.8199 \pm 0.0071$		

Best-fit  $\chi^2_{\text{eff}} = 11497.65$ ;  $\Delta\chi^2_{\text{eff}} = 9159.29$ ;  $\bar{\chi}^2_{\text{eff}} = 11519.77$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9154.63$ ;  $R - 1 = 0.00880$   
 $\chi^2_{\text{eff}}$ : CMB - CamSpec like\_10.7HM\_1400\_unified: 11495.79



## 2.74 base\_CamSpecHM\_TTTEEE\_lowl/base\_plikHM\_TTTEEE\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.525^{+0.058}_{-0.051}$	$D_M(0.15)$	$637.7 \pm 6.0$
$\Omega_c h^2$	$0.1184 \pm 0.0016$	$z_{\text{re}}$	$11.7^{+2.5}_{-1.8}$	$H(0.38)$	$83.28 \pm 0.45$
$100\theta_{MC}$	$1.04105 \pm 0.00033$	$10^9 A_s$	$2.29 \pm 0.12$	$D_M(0.38)$	$1522 \pm 12$
$\tau$	$0.0999^{+0.028}_{-0.025}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.012$	$H(0.51)$	$89.94 \pm 0.36$
$\ln(10^{10} A_s)$	$3.130^{+0.054}_{-0.048}$	$D_{40}$	$1237 \pm 14$	$D_M(0.51)$	$1973 \pm 14$
$n_s$	$0.9707 \pm 0.0053$	$D_{220}$	$5723 \pm 39$	$H(0.61)$	$95.52 \pm 0.29$
$y_{\text{cal}}$	$1.0003 \pm 0.0024$	$D_{810}$	$2532 \pm 14$	$D_M(0.61)$	$2296 \pm 15$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$816.1 \pm 4.8$	$H(2.33)$	$235.65 \pm 0.91$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.7 \pm 1.8$	$D_M(2.33)$	$5754 \pm 13$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9707 \pm 0.0053$	$f\sigma_8(0.15)$	$0.471 \pm 0.011$
$A_{100}^{PS}$	$242 \pm 30$	$Y_P$	$0.245432^{+0.000070}_{-0.000063}$	$\sigma_8(0.15)$	$0.780^{+0.020}_{-0.018}$
$A_{143}^{PS}$	$40 \pm 9$	$Y_P^{\text{BBN}}$	$0.246759^{+0.000070}_{-0.000063}$	$f\sigma_8(0.38)$	$0.492 \pm 0.011$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.568 \pm 0.032$	$\sigma_8(0.38)$	$0.692 \pm 0.017$
$A^{kSZ}$	$< 4.39$	Age/Gyr	$13.777 \pm 0.029$	$f\sigma_8(0.51)$	$0.491^{+0.012}_{-0.011}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1089.66 \pm 0.32$	$\sigma_8(0.51)$	$0.648 \pm 0.016$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.76 \pm 0.34$	$f\sigma_8(0.61)$	$0.486^{+0.012}_{-0.010}$
$H_0$	$68.04 \pm 0.71$	$100\theta_*$	$1.04122 \pm 0.00032$	$\sigma_8(0.61)$	$0.616 \pm 0.016$
$\Omega_\Lambda$	$0.6940 \pm 0.0094$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.031$	$f\sigma_8(2.33)$	$0.3110 \pm 0.0082$
$\Omega_m$	$0.3060 \pm 0.0094$	$z_{\text{drag}}$	$1060.06 \pm 0.35$	$\sigma_8(2.33)$	$0.3209 \pm 0.0087$
$\Omega_m h^2$	$0.1416 \pm 0.0014$	$r_{\text{drag}}$	$147.39 \pm 0.33$	$f_{2000}^{143}$	$27 \pm 3$
$\Omega_m h^3$	$0.09630 \pm 0.00033$	$k_D$	$0.14063 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.5 \pm 2.2$
$\sigma_8$	$0.843^{+0.021}_{-0.019}$	$100\theta_D$	$0.16069 \pm 0.00020$	$f_{2000}^{217}$	$105.5 \pm 2.0$
$S_8$	$0.851 \pm 0.020$	$z_{\text{eq}}$	$3367 \pm 35$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.466 \pm 0.011$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.627^{+0.015}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8200 \pm 0.0067$	$\chi_{\text{CMB}}^2$	$6958 \pm 5000$
$\sigma_8/h^{0.5}$	$1.022^{+0.024}_{-0.022}$	$100\theta_{s,\text{eq}}$	$0.4528 \pm 0.0034$		
$r_{\text{drag}} h$	$100.3 \pm 1.2$	$H(0.15)$	$73.26 \pm 0.61$		

Best-fit  $\chi_{\text{eff}}^2 = 11522.05$ ;  $\Delta\chi_{\text{eff}}^2 = 9158.41$ ;  $\bar{\chi}_{\text{eff}}^2 = 11544.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9153.56$ ;  $R - 1 = 0.00836$   
 $\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 23.92 ( $\Delta$  -0.85) CamSpec like\_10.7HM\_1400\_unified: 11496.23



## 2.75 base\_CamSpecHM\_TTTEEE\_lowl\_post\_BAO/base\_plikHM\_TTTEEE\_lowl\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02248 \pm 0.00016$	$z_{\text{re}}$	$11.8^{+2.2}_{-1.6}$	$D_{\text{M}}(0.38)$	$1521.2 \pm 8.4$
$\Omega_c h^2$	$0.1183 \pm 0.0011$	$10^9 A_s$	$2.29 \pm 0.11$	$H(0.51)$	$89.96 \pm 0.26$
$100\theta_{MC}$	$1.04107 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.011$	$D_{\text{M}}(0.51)$	$1971.6 \pm 9.9$
$\tau$	$0.101^{+0.025}_{-0.022}$	$D_{40}$	$1237 \pm 14$	$H(0.61)$	$95.54 \pm 0.21$
$\ln(10^{10} A_s)$	$3.132^{+0.050}_{-0.043}$	$D_{220}$	$5724 \pm 39$	$D_{\text{M}}(0.61)$	$2295 \pm 11$
$n_s$	$0.9710 \pm 0.0043$	$D_{810}$	$2532 \pm 14$	$H(2.33)$	$235.58 \pm 0.65$
$y_{\text{cal}}$	$1.0002 \pm 0.0025$	$D_{1420}$	$816.2 \pm 4.7$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{2000}$	$231.7 \pm 1.7$	$f\sigma_8(0.15)$	$0.471^{+0.011}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9710 \pm 0.0043$	$\sigma_8(0.15)$	$0.780^{+0.019}_{-0.017}$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$Y_P$	$0.245435^{+0.000061}_{-0.000054}$	$f\sigma_8(0.38)$	$0.492^{+0.012}_{-0.010}$
$A_{100}^{PS}$	$242 \pm 30$	$Y_P^{\text{BBN}}$	$0.246762^{+0.000061}_{-0.000054}$	$\sigma_8(0.38)$	$0.692^{+0.017}_{-0.015}$
$A_{143}^{PS}$	$39 \pm 9$	$10^5 D/H$	$2.566 \pm 0.028$	$f\sigma_8(0.51)$	$0.491^{+0.011}_{-0.010}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.775 \pm 0.023$	$\sigma_8(0.51)$	$0.648^{+0.016}_{-0.014}$
$A^{kSZ}$	$< 4.40$	$z_*$	$1089.64 \pm 0.25$	$f\sigma_8(0.61)$	$0.486^{+0.011}_{-0.010}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0016}$	$r_*$	$144.78 \pm 0.25$	$\sigma_8(0.61)$	$0.617^{+0.015}_{-0.014}$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04124 \pm 0.00030$	$f\sigma_8(2.33)$	$0.3113^{+0.0077}_{-0.0070}$
$H_0$	$68.09 \pm 0.49$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.905 \pm 0.024$	$\sigma_8(2.33)$	$0.3212^{+0.0081}_{-0.0073}$
$\Omega_{\Lambda}$	$0.6948 \pm 0.0065$	$z_{\text{drag}}$	$1060.07 \pm 0.33$	$f_{2000}^{143}$	$27.4 \pm 3.0$
$\Omega_m$	$0.3052 \pm 0.0065$	$r_{\text{drag}}$	$147.41 \pm 0.26$	$f_{2000}^{143 \times 217}$	$30.4 \pm 2.1$
$\Omega_m h^2$	$0.1415 \pm 0.0010$	$k_{\text{D}}$	$0.14061 \pm 0.00032$	$f_{2000}^{217}$	$105.5 \pm 2.0$
$\Omega_m h^3$	$0.09630 \pm 0.00033$	$100\theta_{\text{D}}$	$0.16069 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.4$
$\sigma_8$	$0.843^{+0.020}_{-0.018}$	$z_{\text{eq}}$	$3365 \pm 24$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.043$
$S_8$	$0.851^{+0.021}_{-0.018}$	$k_{\text{eq}}$	$0.010270 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.69 \pm 0.51$
$\sigma_8 \Omega_m^{0.5}$	$0.466^{+0.011}_{-0.010}$	$100\theta_{\text{eq}}$	$0.8205 \pm 0.0047$	$\chi_{\text{DR12BAO}}^2$	$4.04 \pm 0.89$
$\sigma_8 \Omega_m^{0.25}$	$0.627^{+0.015}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4531 \pm 0.0024$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$1.022^{+0.024}_{-0.021}$	$H(0.15)$	$73.30 \pm 0.43$	$\chi_{\text{BAO}}^2$	$5.76 \pm 0.75$
$r_{\text{drag}} h$	$100.37 \pm 0.84$	$D_{\text{M}}(0.15)$	$637.2 \pm 4.2$	$\chi_{\text{CMB}}^2$	$6957 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.525^{+0.058}_{-0.050}$	$H(0.38)$	$83.31 \pm 0.32$		

$\bar{\chi}_{\text{eff}}^2 = 11549.23$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9153.40$ ;  $R - 1 = 0.01419$



## 2.76 base\_CamSpecHM\_TTTEEE\_lowl\_post\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02248 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.528 \pm 0.052$	$D_M(0.15)$	$637.5 \pm 5.9$
$\Omega_c h^2$	$0.1184 \pm 0.0015$	$z_{\text{re}}$	$11.8^{+2.2}_{-1.9}$	$H(0.38)$	$83.29 \pm 0.44$
$100\theta_{MC}$	$1.04105 \pm 0.00033$	$10^9 A_s$	$2.30 \pm 0.11$	$D_M(0.38)$	$1522 \pm 12$
$\tau$	$0.101 \pm 0.025$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.012$	$H(0.51)$	$89.95 \pm 0.35$
$\ln(10^{10} A_s)$	$3.133 \pm 0.048$	$D_{40}$	$1237 \pm 14$	$D_M(0.51)$	$1972 \pm 14$
$n_s$	$0.9709 \pm 0.0052$	$D_{220}$	$5723 \pm 39$	$H(0.61)$	$95.53 \pm 0.29$
$y_{\text{cal}}$	$1.0002 \pm 0.0024$	$D_{810}$	$2532 \pm 14$	$D_M(0.61)$	$2296 \pm 15$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$816.1 \pm 4.7$	$H(2.33)$	$235.63 \pm 0.90$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.7 \pm 1.7$	$D_M(2.33)$	$5753 \pm 13$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9709 \pm 0.0052$	$f\sigma_8(0.15)$	$0.472 \pm 0.011$
$A_{100}^{PS}$	$242 \pm 30$	$Y_P$	$0.245434 \pm 0.000067$	$\sigma_8(0.15)$	$0.781 \pm 0.018$
$A_{143}^{PS}$	$39 \pm 9$	$Y_P^{\text{BBN}}$	$0.246761 \pm 0.000067$	$f\sigma_8(0.38)$	$0.492 \pm 0.011$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.567 \pm 0.032$	$\sigma_8(0.38)$	$0.693 \pm 0.016$
$A^{kSZ}$	$< 4.36$	Age/Gyr	$13.776 \pm 0.028$	$f\sigma_8(0.51)$	$0.492 \pm 0.011$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1089.65 \pm 0.32$	$\sigma_8(0.51)$	$0.648 \pm 0.015$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$r_*$	$144.76 \pm 0.34$	$f\sigma_8(0.61)$	$0.487 \pm 0.011$
$H_0$	$68.06 \pm 0.70$	$100\theta_*$	$1.04123 \pm 0.00032$	$\sigma_8(0.61)$	$0.617 \pm 0.015$
$\Omega_\Lambda$	$0.6943 \pm 0.0093$	$D_M(z_*)/\text{Gpc}$	$13.903 \pm 0.031$	$f\sigma_8(2.33)$	$0.3115 \pm 0.0076$
$\Omega_m$	$0.3057 \pm 0.0093$	$z_{\text{drag}}$	$1060.07 \pm 0.35$	$\sigma_8(2.33)$	$0.3214 \pm 0.0081$
$\Omega_m h^2$	$0.1415 \pm 0.0014$	$r_{\text{drag}}$	$147.40 \pm 0.33$	$f_{2000}^{143}$	$27.4 \pm 3.0$
$\Omega_m h^3$	$0.09631 \pm 0.00033$	$k_D$	$0.14062 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.4 \pm 2.1$
$\sigma_8$	$0.844 \pm 0.019$	$100\theta_D$	$0.16069 \pm 0.00020$	$f_{2000}^{217}$	$105.4 \pm 2.0$
$S_8$	$0.852 \pm 0.020$	$z_{\text{eq}}$	$3367 \pm 34$	$\chi_{\text{lowl}}^2$	$24.6 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.467 \pm 0.011$	$k_{\text{eq}}$	$0.01028 \pm 0.00010$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.628 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8202 \pm 0.0066$	$\chi_{\text{CMB}}^2$	$6958 \pm 5000$
$\sigma_8/h^{0.5}$	$1.023 \pm 0.022$	$100\theta_{\text{s,eq}}$	$0.4529 \pm 0.0034$		
$r_{\text{drag}} h$	$100.3 \pm 1.2$	$H(0.15)$	$73.28 \pm 0.60$		

$\bar{\chi}_{\text{eff}}^2 = 11543.93$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9153.44$ ;  $R - 1 = 0.00900$



**2.77**    **base\_CamSpecHM\_TTTEEE\_lowl\_post\_BAO\_zre6p5/base\_plikHM\_TTTEEE\_lowl\_post\_BAO\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02248 \pm 0.00015$	$z_{\text{re}}$	$11.9^{+2.1}_{-1.7}$	$D_{\text{M}}(0.38)$	$1521.1 \pm 8.3$
$\Omega_c h^2$	$0.1183 \pm 0.0011$	$10^9 A_s$	$2.30 \pm 0.10$	$H(0.51)$	$89.97 \pm 0.26$
$100\theta_{MC}$	$1.04107 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.011$	$D_{\text{M}}(0.51)$	$1971.4 \pm 9.8$
$\tau$	$0.102 \pm 0.023$	$D_{40}$	$1237 \pm 14$	$H(0.61)$	$95.54 \pm 0.21$
$\ln(10^{10} A_s)$	$3.134 \pm 0.045$	$D_{220}$	$5724 \pm 39$	$D_{\text{M}}(0.61)$	$2295 \pm 11$
$n_s$	$0.9711 \pm 0.0043$	$D_{810}$	$2532 \pm 14$	$H(2.33)$	$235.57 \pm 0.65$
$y_{\text{cal}}$	$1.0002 \pm 0.0025$	$D_{1420}$	$816.1 \pm 4.7$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{2000}$	$231.7 \pm 1.7$	$f\sigma_8(0.15)$	$0.472 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9711 \pm 0.0043$	$\sigma_8(0.15)$	$0.781 \pm 0.017$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$Y_P$	$0.245436^{+0.000060}_{-0.000054}$	$f\sigma_8(0.38)$	$0.492 \pm 0.011$
$A_{100}^{PS}$	$242 \pm 30$	$Y_P^{\text{BBN}}$	$0.246763^{+0.000060}_{-0.000054}$	$\sigma_8(0.38)$	$0.693 \pm 0.016$
$A_{143}^{PS}$	$39 \pm 9$	$10^5 D/H$	$2.566 \pm 0.028$	$f\sigma_8(0.51)$	$0.491 \pm 0.011$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.775 \pm 0.023$	$\sigma_8(0.51)$	$0.649 \pm 0.015$
$A^{kSZ}$	$< 4.38$	$z_*$	$1089.63 \pm 0.25$	$f\sigma_8(0.61)$	$0.487 \pm 0.010$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.78 \pm 0.25$	$\sigma_8(0.61)$	$0.617 \pm 0.014$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04124 \pm 0.00030$	$f\sigma_8(2.33)$	$0.3116 \pm 0.0072$
$H_0$	$68.09 \pm 0.49$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.905 \pm 0.024$	$\sigma_8(2.33)$	$0.3215 \pm 0.0075$
$\Omega_\Lambda$	$0.6949 \pm 0.0064$	$z_{\text{drag}}$	$1060.07 \pm 0.33$	$f_{2000}^{143}$	$27.4 \pm 3.0$
$\Omega_m$	$0.3051 \pm 0.0064$	$r_{\text{drag}}$	$147.41 \pm 0.26$	$f_{2000}^{143 \times 217}$	$30.4 \pm 2.1$
$\Omega_m h^2$	$0.1414 \pm 0.0010$	$k_{\text{D}}$	$0.14061 \pm 0.00032$	$f_{2000}^{217}$	$105.4 \pm 2.0$
$\Omega_m h^3$	$0.09631 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16068 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.4$
$\sigma_8$	$0.844 \pm 0.019$	$z_{\text{eq}}$	$3365 \pm 24$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.042$
$S_8$	$0.851 \pm 0.019$	$k_{\text{eq}}$	$0.010269 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.70 \pm 0.51$
$\sigma_8 \Omega_m^{0.5}$	$0.466 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8205 \pm 0.0046$	$\chi_{\text{DR12BAO}}^2$	$4.03 \pm 0.88$
$\sigma_8 \Omega_m^{0.25}$	$0.627 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4531 \pm 0.0024$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$1.023 \pm 0.022$	$H(0.15)$	$73.31 \pm 0.42$	$\chi_{\text{BAO}}^2$	$5.76 \pm 0.74$
$r_{\text{drag}} h$	$100.38 \pm 0.84$	$D_{\text{M}}(0.15)$	$637.1 \pm 4.1$	$\chi_{\text{CMB}}^2$	$6957 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.527 \pm 0.052$	$H(0.38)$	$83.31 \pm 0.32$		

$\bar{\chi}_{\text{eff}}^2 = 11549.09$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9153.30$ ;  $R - 1 = 0.01512$



**2.78 base\_CamSpecHM\_TTTEEE\_lowE/base\_plikHM\_TTTEEE\_lowE**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.030$	$D_M(0.15)$	$645.1 \pm 5.3$
$\Omega_c h^2$	$0.1203 \pm 0.0014$	$z_{\text{re}}$	$7.61 \pm 0.79$	$H(0.38)$	$82.73 \pm 0.38$
$100\theta_{MC}$	$1.04085 \pm 0.00032$	$10^9 A_s$	$2.098 \pm 0.034$	$D_M(0.38)$	$1537 \pm 11$
$\tau$	$0.0536 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.884 \pm 0.012$	$H(0.51)$	$89.51 \pm 0.30$
$\ln(10^{10} A_s)$	$3.043 \pm 0.016$	$D_{40}$	$1235 \pm 14$	$D_M(0.51)$	$1990 \pm 12$
$n_s$	$0.9632 \pm 0.0046$	$D_{220}$	$5732 \pm 40$	$H(0.61)$	$95.18 \pm 0.24$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$D_M(0.61)$	$2315 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.8 \pm 4.9$	$H(2.33)$	$236.71 \pm 0.87$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.3 \pm 1.6$	$D_M(2.33)$	$5768 \pm 11$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9632 \pm 0.0046$	$f\sigma_8(0.15)$	$0.4615 \pm 0.0086$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.245365^{+0.000068}_{-0.000059}$	$\sigma_8(0.15)$	$0.7493 \pm 0.0068$
$A_{143}^{PS}$	$44 \pm 9$	$Y_P^{\text{BBN}}$	$0.246691^{+0.000068}_{-0.000059}$	$f\sigma_8(0.38)$	$0.4785 \pm 0.0071$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.599 \pm 0.030$	$\sigma_8(0.38)$	$0.6635 \pm 0.0057$
$A^{kSZ}$	$< 5.53$	Age/Gyr	$13.808 \pm 0.025$	$f\sigma_8(0.51)$	$0.4763 \pm 0.0062$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1090.04 \pm 0.28$	$\sigma_8(0.51)$	$0.6206 \pm 0.0053$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$144.40 \pm 0.33$	$f\sigma_8(0.61)$	$0.4708 \pm 0.0057$
$H_0$	$67.16 \pm 0.62$	$100\theta_*$	$1.04104 \pm 0.00031$	$\sigma_8(0.61)$	$0.5904 \pm 0.0050$
$\Omega_\Lambda$	$0.6822 \pm 0.0087$	$D_M(z_*)/\text{Gpc}$	$13.871 \pm 0.031$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0025$
$\Omega_m$	$0.3178 \pm 0.0087$	$z_{\text{drag}}$	$1059.80 \pm 0.33$	$\sigma_8(2.33)$	$0.3064 \pm 0.0026$
$\Omega_m h^2$	$0.1433 \pm 0.0014$	$r_{\text{drag}}$	$147.08 \pm 0.33$	$f_{2000}^{143}$	$30.2 \pm 2.8$
$\Omega_m h^3$	$0.09622 \pm 0.00033$	$k_D$	$0.14082 \pm 0.00037$	$f_{2000}^{143 \times 217}$	$32.6 \pm 1.9$
$\sigma_8$	$0.8115 \pm 0.0078$	$100\theta_D$	$0.16084 \pm 0.00019$	$f_{2000}^{217}$	$107.3 \pm 1.9$
$S_8$	$0.835 \pm 0.017$	$z_{\text{eq}}$	$3409 \pm 32$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4575 \pm 0.0093$	$k_{\text{eq}}$	$0.010403 \pm 0.000099$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6093 \pm 0.0087$	$100\theta_{\text{eq}}$	$0.8120 \pm 0.0060$	$\chi_{\text{CMB}}^2$	$7334 \pm 5000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4487 \pm 0.0031$		
$r_{\text{drag}} h$	$98.8 \pm 1.1$	$H(0.15)$	$72.51 \pm 0.53$		

Best-fit  $\chi_{\text{eff}}^2 = 11897.49$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.25$ ;  $\bar{\chi}_{\text{eff}}^2 = 11919.09$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.94$ ;  $R - 1 = 0.00575$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  -0.20) CamSpec like\_10.7HM\_1400\_unified: 11499.49



### 3 Alens

#### 3.1 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE/base\_Alens\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02262 \pm 0.00029$	$r_{\text{drag}} h$	$101.9 \pm 2.1$	$H(0.15)$	$74.1 \pm 1.0$
$\Omega_c h^2$	$0.1165 \pm 0.0025$	$\langle d^2 \rangle^{1/2}$	$2.638 \pm 0.078$	$D_{\text{M}}(0.15)$	$629.9 \pm 9.9$
$100\theta_{MC}$	$1.04142 \pm 0.00053$	$z_{\text{re}}$	$7.12^{+0.93}_{-0.71}$	$H(0.38)$	$83.88 \pm 0.78$
$\tau$	$0.0501^{+0.0087}_{-0.0075}$	$10^9 A_s$	$2.063^{+0.038}_{-0.033}$	$D_{\text{M}}(0.38)$	$1506 \pm 20$
$A_L$	$1.244^{+0.092}_{-0.10}$	$10^9 A_s e^{-2\tau}$	$1.866 \pm 0.015$	$H(0.51)$	$90.42 \pm 0.63$
$\ln(10^{10} A_s)$	$3.027^{+0.019}_{-0.016}$	$D_{40}$	$1207 \pm 17$	$D_{\text{M}}(0.51)$	$1954 \pm 24$
$n_s$	$0.9748 \pm 0.0072$	$D_{220}$	$5732 \pm 42$	$H(0.61)$	$95.90^{+0.48}_{-0.54}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{810}$	$2526 \pm 14$	$D_{\text{M}}(0.61)$	$2276 \pm 26$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$814.3 \pm 5.1$	$H(2.33)$	$234.6 \pm 1.4$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.3 \pm 2.1$	$D_{\text{M}}(2.33)$	$5738 \pm 23$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$n_{s,0.002}$	$0.9748 \pm 0.0072$	$f\sigma_8(0.15)$	$0.437 \pm 0.015$
$A_{100}^{PS}$	$239^{+30}_{-30}$	$Y_P$	$0.24549^{+0.00010}_{-0.00012}$	$\sigma_8(0.15)$	$0.7357 \pm 0.0093$
$A_{143}^{PS}$	$38 \pm 10$	$Y_P^{\text{BBN}}$	$0.24682^{+0.00010}_{-0.00012}$	$f\sigma_8(0.38)$	$0.458 \pm 0.012$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.542 \pm 0.053$	$\sigma_8(0.38)$	$0.6541^{+0.0075}_{-0.0067}$
$A^{kSZ}$	$< 4.22$	Age/Gyr	$13.742 \pm 0.050$	$f\sigma_8(0.51)$	$0.459 \pm 0.011$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1089.32 \pm 0.53$	$\sigma_8(0.51)$	$0.6129^{+0.0066}_{-0.0059}$
$c_{217}$	$0.9995^{+0.0017}_{-0.0022}$	$r_*$	$145.15 \pm 0.53$	$f\sigma_8(0.61)$	$0.4555 \pm 0.0095$
$H_0$	$69.0 \pm 1.2$	$100\theta_*$	$1.04158 \pm 0.00052$	$\sigma_8(0.61)$	$0.5837^{+0.0061}_{-0.0054}$
$\Omega_\Lambda$	$0.706^{+0.016}_{-0.014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.936 \pm 0.048$	$f\sigma_8(2.33)$	$0.2950^{+0.0029}_{-0.0025}$
$\Omega_m$	$0.294^{+0.014}_{-0.016}$	$z_{\text{drag}}$	$1060.25 \pm 0.56$	$\sigma_8(2.33)$	$0.3050^{+0.0028}_{-0.0025}$
$\Omega_m h^2$	$0.1398 \pm 0.0023$	$r_{\text{drag}}$	$147.75 \pm 0.50$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.09639 \pm 0.00050$	$k_{\text{D}}$	$0.14035 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$29.6 \pm 2.5$
$\sigma_8$	$0.794 \pm 0.011$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00030$	$f_{2000}^{217}$	$104.6 \pm 2.3$
$S_8$	$0.787 \pm 0.029$	$z_{\text{eq}}$	$3325 \pm 55$	$\chi_{\text{small}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.431 \pm 0.016$	$k_{\text{eq}}$	$0.01015 \pm 0.00017$	$\chi_{\text{lowl}}^2$	$21.7 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.585 \pm 0.015$	$100\theta_{\text{eq}}$	$0.829 \pm 0.011$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8/h^{0.5}$	$0.957 \pm 0.020$	$100\theta_{\text{s,eq}}$	$0.4572 \pm 0.0056$	$\chi_{\text{CMB}}^2$	$4332 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7464.21$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.32$ ;  $\bar{\chi}_{\text{eff}}^2 = 7485.53$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.49$ ;  $R - 1 = 0.00653$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.71 ( $\Delta$  0.05) commander\_dx12\_v3.2.29: 21.18 ( $\Delta$  -0.17) CamSpec like\_10.7HM: 7045.95



### 3.2 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_Alens\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02250 \pm 0.00022$	$z_{\text{re}}$	$7.08^{+0.94}_{-0.70}$	$H(0.51)$	$90.09 \pm 0.33$
$\Omega_c h^2$	$0.1178 \pm 0.0013$	$10^9 A_s$	$2.066^{+0.038}_{-0.032}$	$D_{\text{M}}(0.51)$	$1967 \pm 12$
$100\theta_{MC}$	$1.04123 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.012$	$H(0.61)$	$95.63 \pm 0.29$
$\tau$	$0.0494^{+0.0087}_{-0.0072}$	$D_{40}$	$1213 \pm 13$	$D_{\text{M}}(0.61)$	$2290 \pm 13$
$A_L$	$1.210 \pm 0.079$	$D_{220}$	$5725 \pm 41$	$H(2.33)$	$235.29 \pm 0.79$
$\ln(10^{10} A_s)$	$3.028^{+0.019}_{-0.015}$	$D_{810}$	$2527 \pm 14$	$D_{\text{M}}(2.33)$	$5749 \pm 14$
$n_s$	$0.9714 \pm 0.0046$	$D_{1420}$	$813.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.4443 \pm 0.0084$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{2000}$	$231.8 \pm 1.9$	$\sigma_8(0.15)$	$0.7392^{+0.0078}_{-0.0068}$
$A_{217}^{CIB}$	$41 \pm 8$	$n_{s,0.002}$	$0.9714 \pm 0.0046$	$f\sigma_8(0.38)$	$0.4645 \pm 0.0072$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245442 \pm 0.000087$	$\sigma_8(0.38)$	$0.6563^{+0.0066}_{-0.0057}$
$A_{143}^{tSZ}$	$4.8^{+2.3}_{-2.1}$	$Y_P^{\text{BBN}}$	$0.246769 \pm 0.000087$	$f\sigma_8(0.51)$	$0.4642 \pm 0.0065$
$A_{100}^{PS}$	$241^{+26}_{-30}$	$10^5 D/H$	$2.563 \pm 0.040$	$\sigma_8(0.51)$	$0.6146^{+0.0061}_{-0.0052}$
$A_{143}^{PS}$	$39 \pm 9$	Age/Gyr	$13.766 \pm 0.032$	$f\sigma_8(0.61)$	$0.4601 \pm 0.0060$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$z_*$	$1089.57 \pm 0.33$	$\sigma_8(0.61)$	$0.5851^{+0.0057}_{-0.0049}$
$A^{kSZ}$	$< 4.33$	$r_*$	$144.90 \pm 0.32$	$f\sigma_8(2.33)$	$0.2954^{+0.0028}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04140 \pm 0.00043$	$\sigma_8(2.33)$	$0.3050^{+0.0029}_{-0.0025}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.914 \pm 0.031$	$f_{2000}^{143}$	$27 \pm 3$
$H_0$	$68.33 \pm 0.61$	$z_{\text{drag}}$	$1060.07 \pm 0.49$	$f_{2000}^{143 \times 217}$	$30.2 \pm 2.3$
$\Omega_\Lambda$	$0.6980 \pm 0.0077$	$r_{\text{drag}}$	$147.53 \pm 0.34$	$f_{2000}^{217}$	$105.2 \pm 2.1$
$\Omega_m$	$0.3020 \pm 0.0077$	$k_{\text{D}}$	$0.14050 \pm 0.00045$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\Omega_m h^2$	$0.1410 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16070 \pm 0.00027$	$\chi_{\text{lowl}}^2$	$22.12 \pm 0.81$
$\Omega_m h^3$	$0.09633 \pm 0.00049$	$z_{\text{eq}}$	$3354 \pm 29$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.068$
$\sigma_8$	$0.7989^{+0.0088}_{-0.0078}$	$k_{\text{eq}}$	$0.010235 \pm 0.000089$	$\chi_{\text{MGS}}^2$	$1.97 \pm 0.64$
$S_8$	$0.802 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8227 \pm 0.0056$	$\chi_{\text{DR12BAO}}^2$	$4.06 \pm 0.97$
$\sigma_8 \Omega_m^{0.5}$	$0.4391 \pm 0.0089$	$100\theta_{\text{s,eq}}$	$0.4542 \pm 0.0029$	$\chi_{\text{prior}}^2$	$7.2 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.5923 \pm 0.0088$	$H(0.15)$	$73.51 \pm 0.53$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.967 \pm 0.013$	$D_{\text{M}}(0.15)$	$635.2 \pm 5.1$	$\chi_{\text{CMB}}^2$	$4332 \pm 3000$
$r_{\text{drag}} h$	$100.8 \pm 1.0$	$H(0.38)$	$83.46 \pm 0.40$		
$\langle d^2 \rangle^{1/2}$	$2.627 \pm 0.076$	$D_{\text{M}}(0.38)$	$1517 \pm 10$		

$$\bar{\chi}_{\text{eff}}^2 = 7491.23; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.73; R - 1 = 0.01433$$



### 3.3 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE\_post\_Riess18/base\_Alens\_plikHM\_TT\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02292 \pm 0.00026$	$\langle d^2 \rangle^{1/2}$	$2.668 \pm 0.076$	$H(0.38)$	$84.91 \pm 0.66$
$\Omega_c h^2$	$0.1134 \pm 0.0020$	$z_{\text{re}}$	$7.22^{+0.89}_{-0.77}$	$D_{\text{M}}(0.38)$	$1480 \pm 16$
$100\theta_{MC}$	$1.04191 \pm 0.00049$	$10^9 A_s$	$2.057 \pm 0.037$	$H(0.51)$	$91.25 \pm 0.54$
$\tau$	$0.0522 \pm 0.0088$	$10^9 A_s e^{-2\tau}$	$1.853 \pm 0.013$	$D_{\text{M}}(0.51)$	$1923 \pm 19$
$A_L$	$1.332 \pm 0.095$	$D_{40}$	$1190 \pm 15$	$H(0.61)$	$96.58 \pm 0.45$
$\ln(10^{10} A_s)$	$3.024 \pm 0.018$	$D_{220}$	$5751 \pm 42$	$D_{\text{M}}(0.61)$	$2243 \pm 21$
$n_s$	$0.9832 \pm 0.0062$	$D_{810}$	$2522 \pm 14$	$H(2.33)$	$232.9 \pm 1.2$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{1420}$	$815.6 \pm 5.1$	$D_{\text{M}}(2.33)$	$5709 \pm 20$
$A_{217}^{CIB}$	$40 \pm 8$	$D_{2000}$	$233.7 \pm 2.0$	$f\sigma_8(0.15)$	$0.418 \pm 0.012$
$\xi^{tSZ-CIB}$	$> 0.391$	$n_{s,0.002}$	$0.9832 \pm 0.0062$	$\sigma_8(0.15)$	$0.7276 \pm 0.0086$
$A_{143}^{tSZ}$	$5.1^{+2.4}_{-2.1}$	$Y_P$	$0.24562 \pm 0.00011$	$f\sigma_8(0.38)$	$0.444 \pm 0.010$
$A_{100}^{PS}$	$235^{+30}_{-30}$	$Y_P^{\text{BBN}}$	$0.24695 \pm 0.00011$	$\sigma_8(0.38)$	$0.6490 \pm 0.0069$
$A_{143}^{PS}$	$34 \pm 9$	$10^5 D/H$	$2.487 \pm 0.046$	$f\sigma_8(0.51)$	$0.4464 \pm 0.0090$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.681 \pm 0.043$	$\sigma_8(0.51)$	$0.6091 \pm 0.0062$
$A^{kSZ}$	$< 3.70$	$z_*$	$1088.67 \pm 0.43$	$f\sigma_8(0.61)$	$0.4445 \pm 0.0082$
$c_{100}$	$0.9986^{+0.0017}_{-0.0010}$	$r_*$	$145.74 \pm 0.45$	$\sigma_8(0.61)$	$0.5806 \pm 0.0058$
$c_{217}$	$0.9993^{+0.0016}_{-0.0021}$	$100\theta_*$	$1.04204 \pm 0.00048$	$f\sigma_8(2.33)$	$0.2943 \pm 0.0028$
$H_0$	$70.55 \pm 0.99$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.986 \pm 0.042$	$\sigma_8(2.33)$	$0.3052 \pm 0.0028$
$\Omega_\Lambda$	$0.725^{+0.012}_{-0.011}$	$z_{\text{drag}}$	$1060.73 \pm 0.52$	$f_{2000}^{143}$	$25 \pm 3$
$\Omega_m$	$0.275^{+0.011}_{-0.012}$	$r_{\text{drag}}$	$148.25 \pm 0.45$	$f_{2000}^{143 \times 217}$	$28.0 \pm 2.4$
$\Omega_m h^2$	$0.1370 \pm 0.0019$	$k_{\text{D}}$	$0.14005 \pm 0.00049$	$f_{2000}^{217}$	$103.3 \pm 2.2$
$\Omega_m h^3$	$0.09661 \pm 0.00049$	$100\theta_{\text{D}}$	$0.16039 \pm 0.00028$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\sigma_8$	$0.783 \pm 0.010$	$z_{\text{eq}}$	$3257 \pm 45$	$\chi_{\text{lowl}}^2$	$20.72 \pm 0.64$
$S_8$	$0.751 \pm 0.023$	$k_{\text{eq}}$	$0.00994 \pm 0.00014$	$\chi_{\text{H073p45}}^2$	$3.4 \pm 2.2$
$\sigma_8 \Omega_m^{0.5}$	$0.411 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8427 \pm 0.0093$	$\chi_{\text{prior}}^2$	$7.0 \pm 3.3$
$\sigma_8 \Omega_m^{0.25}$	$0.568 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4643 \pm 0.0047$	$\chi_{\text{CMB}}^2$	$4334 \pm 3000$
$\sigma_8/h^{0.5}$	$0.933 \pm 0.017$	$H(0.15)$	$75.45 \pm 0.87$		
$r_{\text{drag}} h$	$104.6 \pm 1.7$	$D_{\text{M}}(0.15)$	$617.1 \pm 7.9$		

$\bar{\chi}_{\text{eff}}^2 = 7490.17$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.40$ ;  $R - 1 = 0.03353$



### 3.4 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_Alens\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02262 \pm 0.00029$	$r_{\text{drag}} h$	$102.0 \pm 2.1$	$H(0.15)$	$74.1 \pm 1.0$
$\Omega_c h^2$	$0.1165 \pm 0.0025$	$\langle d^2 \rangle^{1/2}$	$2.638 \pm 0.078$	$D_{\text{M}}(0.15)$	$630 \pm 10$
$100\theta_{MC}$	$1.04143 \pm 0.00053$	$z_{\text{re}}$	$7.47^{+0.38}_{-0.82}$	$H(0.38)$	$83.90 \pm 0.78$
$\tau$	$0.0534^{+0.0038}_{-0.0078}$	$10^9 A_s$	$2.076^{+0.023}_{-0.032}$	$D_{\text{M}}(0.38)$	$1506 \pm 20$
$A_L$	$1.237^{+0.090}_{-0.10}$	$10^9 A_s e^{-2\tau}$	$1.866 \pm 0.015$	$H(0.51)$	$90.43 \pm 0.63$
$\ln(10^{10} A_s)$	$3.033^{+0.011}_{-0.015}$	$D_{40}$	$1207 \pm 17$	$D_{\text{M}}(0.51)$	$1954 \pm 24$
$n_s$	$0.9751 \pm 0.0072$	$D_{220}$	$5732 \pm 42$	$H(0.61)$	$95.91^{+0.48}_{-0.55}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{810}$	$2526 \pm 14$	$D_{\text{M}}(0.61)$	$2276 \pm 26$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$814.3 \pm 5.1$	$H(2.33)$	$234.5 \pm 1.4$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.3 \pm 2.1$	$D_{\text{M}}(2.33)$	$5737 \pm 23$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$n_{s,0.002}$	$0.9751 \pm 0.0072$	$f\sigma_8(0.15)$	$0.438 \pm 0.015$
$A_{100}^{PS}$	$239 \pm 30$	$Y_P$	$0.24549^{+0.00010}_{-0.00012}$	$\sigma_8(0.15)$	$0.7380 \pm 0.0083$
$A_{143}^{PS}$	$37 \pm 10$	$Y_P^{\text{BBN}}$	$0.24682^{+0.00010}_{-0.00012}$	$f\sigma_8(0.38)$	$0.460 \pm 0.012$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.542 \pm 0.053$	$\sigma_8(0.38)$	$0.6561 \pm 0.0061$
$A^{kSZ}$	$< 4.20$	Age/Gyr	$13.741 \pm 0.050$	$f\sigma_8(0.51)$	$0.460 \pm 0.010$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1089.31 \pm 0.53$	$\sigma_8(0.51)$	$0.6148 \pm 0.0053$
$c_{217}$	$0.9995^{+0.0017}_{-0.0022}$	$r_*$	$145.17 \pm 0.53$	$f\sigma_8(0.61)$	$0.4567 \pm 0.0092$
$H_0$	$69.0 \pm 1.2$	$100\theta_*$	$1.04159 \pm 0.00052$	$\sigma_8(0.61)$	$0.5855 \pm 0.0048$
$\Omega_\Lambda$	$0.706^{+0.016}_{-0.014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.937 \pm 0.048$	$f\sigma_8(2.33)$	$0.2960^{+0.0019}_{-0.0024}$
$\Omega_m$	$0.294 \pm 0.015$	$z_{\text{drag}}$	$1060.25 \pm 0.56$	$\sigma_8(2.33)$	$0.3060^{+0.0017}_{-0.0024}$
$\Omega_m h^2$	$0.1397 \pm 0.0023$	$r_{\text{drag}}$	$147.76 \pm 0.50$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.09639 \pm 0.00050$	$k_{\text{D}}$	$0.14034 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$29.5 \pm 2.6$
$\sigma_8$	$0.797 \pm 0.010$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00030$	$f_{2000}^{217}$	$104.6 \pm 2.3$
$S_8$	$0.788 \pm 0.029$	$z_{\text{eq}}$	$3324 \pm 55$	$\chi_{\text{simall}}^2$	$396.4 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.432 \pm 0.016$	$k_{\text{eq}}$	$0.01014 \pm 0.00017$	$\chi_{\text{lowl}}^2$	$21.7 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.587 \pm 0.014$	$100\theta_{\text{eq}}$	$0.829 \pm 0.011$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8/h^{0.5}$	$0.959 \pm 0.020$	$100\theta_{\text{s,eq}}$	$0.4573 \pm 0.0056$	$\chi_{\text{CMB}}^2$	$4332 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7485.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.48$ ;  $R - 1 = 0.00928$



### 3.5 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_Alens\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02250 \pm 0.00022$	$z_{\text{re}}$	$7.45^{+0.35}_{-0.82}$	$H(0.51)$	$90.09 \pm 0.33$
$\Omega_c h^2$	$0.1178 \pm 0.0013$	$10^9 A_s$	$2.079^{+0.022}_{-0.031}$	$D_{\text{M}}(0.51)$	$1967 \pm 12$
$100\theta_{MC}$	$1.04123 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.012$	$H(0.61)$	$95.63 \pm 0.29$
$\tau$	$0.0527^{+0.0038}_{-0.0074}$	$D_{40}$	$1214 \pm 13$	$D_{\text{M}}(0.61)$	$2290 \pm 13$
$A_L$	$1.202 \pm 0.077$	$D_{220}$	$5724 \pm 41$	$H(2.33)$	$235.28 \pm 0.79$
$\ln(10^{10} A_s)$	$3.034^{+0.011}_{-0.015}$	$D_{810}$	$2527 \pm 14$	$D_{\text{M}}(2.33)$	$5749 \pm 14$
$n_s$	$0.9715 \pm 0.0045$	$D_{1420}$	$813.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.4458 \pm 0.0080$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{2000}$	$231.8 \pm 1.9$	$\sigma_8(0.15)$	$0.7417^{+0.0056}_{-0.0063}$
$A_{217}^{CIB}$	$41 \pm 8$	$n_{s,0.002}$	$0.9715 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4660 \pm 0.0066$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245441 \pm 0.000087$	$\sigma_8(0.38)$	$0.6585^{+0.0044}_{-0.0053}$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$Y_P^{\text{BBN}}$	$0.246768 \pm 0.000087$	$f\sigma_8(0.51)$	$0.4657 \pm 0.0058$
$A_{100}^{PS}$	$240 \pm 30$	$10^5 D/H$	$2.563 \pm 0.040$	$\sigma_8(0.51)$	$0.6167^{+0.0039}_{-0.0049}$
$A_{143}^{PS}$	$39 \pm 9$	Age/Gyr	$13.766 \pm 0.032$	$f\sigma_8(0.61)$	$0.4616 \pm 0.0053$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$z_*$	$1089.57 \pm 0.33$	$\sigma_8(0.61)$	$0.5870^{+0.0036}_{-0.0046}$
$A^{kSZ}$	$< 4.30$	$r_*$	$144.90 \pm 0.32$	$f\sigma_8(2.33)$	$0.2964^{+0.0017}_{-0.0023}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04140 \pm 0.00042$	$\sigma_8(2.33)$	$0.3060^{+0.0017}_{-0.0024}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.914 \pm 0.031$	$f_{2000}^{143}$	$27 \pm 3$
$H_0$	$68.34 \pm 0.60$	$z_{\text{drag}}$	$1060.07 \pm 0.49$	$f_{2000}^{143 \times 217}$	$30.2 \pm 2.3$
$\Omega_\Lambda$	$0.6980 \pm 0.0076$	$r_{\text{drag}}$	$147.53 \pm 0.34$	$f_{2000}^{217}$	$105.1 \pm 2.1$
$\Omega_m$	$0.3020 \pm 0.0076$	$k_{\text{D}}$	$0.14050 \pm 0.00045$	$\chi_{\text{small}}^2$	$396.4 \pm 1.1$
$\Omega_m h^2$	$0.1410 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16071 \pm 0.00027$	$\chi_{\text{lowl}}^2$	$22.17 \pm 0.81$
$\Omega_m h^3$	$0.09632 \pm 0.00049$	$z_{\text{eq}}$	$3353 \pm 29$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.068$
$\sigma_8$	$0.8016 \pm 0.0069$	$k_{\text{eq}}$	$0.010234 \pm 0.000089$	$\chi_{\text{MGS}}^2$	$1.98 \pm 0.64$
$S_8$	$0.804 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8228 \pm 0.0055$	$\chi_{\text{DR12BAO}}^2$	$4.05 \pm 0.97$
$\sigma_8 \Omega_m^{0.5}$	$0.4405 \pm 0.0085$	$100\theta_{\text{s,eq}}$	$0.4542 \pm 0.0028$	$\chi_{\text{prior}}^2$	$7.2 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.5942 \pm 0.0080$	$H(0.15)$	$73.52 \pm 0.52$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.970 \pm 0.011$	$D_{\text{M}}(0.15)$	$635.1 \pm 5.1$	$\chi_{\text{CMB}}^2$	$4331 \pm 3000$
$r_{\text{drag}} h$	$100.8 \pm 1.0$	$H(0.38)$	$83.46 \pm 0.40$		
$\langle d^2 \rangle^{1/2}$	$2.626 \pm 0.076$	$D_{\text{M}}(0.38)$	$1517 \pm 10$		

$\bar{\chi}_{\text{eff}}^2 = 7490.78$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.70$ ;  $R - 1 = 0.01851$



### 3.6 base\_Alens\_CamSpecHM\_TT\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_Alens\_plikHM\_TT\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02293 \pm 0.00026$	$\langle d^2 \rangle^{1/2}$	$2.668 \pm 0.076$	$H(0.38)$	$84.92 \pm 0.66$
$\Omega_c h^2$	$0.1133 \pm 0.0020$	$z_{\text{re}}$	$7.52^{+0.39}_{-0.87}$	$D_{\text{M}}(0.38)$	$1480 \pm 16$
$100\theta_{MC}$	$1.04191 \pm 0.00049$	$10^9 A_s$	$2.068^{+0.023}_{-0.034}$	$H(0.51)$	$91.26 \pm 0.54$
$\tau$	$0.0551^{+0.0043}_{-0.0081}$	$10^9 A_s e^{-2\tau}$	$1.853 \pm 0.013$	$D_{\text{M}}(0.51)$	$1923 \pm 19$
$A_L$	$1.326 \pm 0.094$	$D_{40}$	$1190 \pm 15$	$H(0.61)$	$96.58 \pm 0.45$
$\ln(10^{10} A_s)$	$3.029^{+0.011}_{-0.016}$	$D_{220}$	$5750 \pm 41$	$D_{\text{M}}(0.61)$	$2242 \pm 21$
$n_s$	$0.9835 \pm 0.0062$	$D_{810}$	$2522 \pm 14$	$H(2.33)$	$232.8 \pm 1.2$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$815.6 \pm 5.1$	$D_{\text{M}}(2.33)$	$5709 \pm 20$
$A_{217}^{CIB}$	$40 \pm 8$	$D_{2000}$	$233.7 \pm 2.0$	$f\sigma_8(0.15)$	$0.419 \pm 0.012$
$\xi^{tSZ-CIB}$	$> 0.394$	$n_{s,0.002}$	$0.9835 \pm 0.0062$	$\sigma_8(0.15)$	$0.7295 \pm 0.0077$
$A_{143}^{tSZ}$	$5.1^{+2.4}_{-2.0}$	$Y_P$	$0.24562 \pm 0.00011$	$f\sigma_8(0.38)$	$0.445 \pm 0.010$
$A_{100}^{PS}$	$235^{+30}_{-30}$	$Y_P^{\text{BBN}}$	$0.24695 \pm 0.00011$	$\sigma_8(0.38)$	$0.6507^{+0.0057}_{-0.0063}$
$A_{143}^{PS}$	$34 \pm 9$	$10^5 D/H$	$2.487 \pm 0.046$	$f\sigma_8(0.51)$	$0.4475 \pm 0.0088$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.681 \pm 0.043$	$\sigma_8(0.51)$	$0.6107^{+0.0049}_{-0.0057}$
$A^{kSZ}$	$< 3.64$	$z_*$	$1088.66 \pm 0.43$	$f\sigma_8(0.61)$	$0.4456 \pm 0.0079$
$c_{100}$	$0.9986^{+0.0017}_{-0.0010}$	$r_*$	$145.75 \pm 0.45$	$\sigma_8(0.61)$	$0.5822^{+0.0044}_{-0.0052}$
$c_{217}$	$0.9993^{+0.0016}_{-0.0021}$	$100\theta_*$	$1.04205 \pm 0.00048$	$f\sigma_8(2.33)$	$0.2951^{+0.0020}_{-0.0025}$
$H_0$	$70.57 \pm 0.99$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.987 \pm 0.041$	$\sigma_8(2.33)$	$0.3060^{+0.0018}_{-0.0025}$
$\Omega_\Lambda$	$0.725^{+0.012}_{-0.011}$	$z_{\text{drag}}$	$1060.73 \pm 0.52$	$f_{2000}^{143}$	$24 \pm 3$
$\Omega_m$	$0.275^{+0.011}_{-0.012}$	$r_{\text{drag}}$	$148.26 \pm 0.45$	$f_{2000}^{143 \times 217}$	$28.0 \pm 2.4$
$\Omega_m h^2$	$0.1369 \pm 0.0019$	$k_{\text{D}}$	$0.14003 \pm 0.00049$	$f_{2000}^{217}$	$103.2 \pm 2.2$
$\Omega_m h^3$	$0.09661 \pm 0.00049$	$100\theta_{\text{D}}$	$0.16039 \pm 0.00028$	$\chi_{\text{small}}^2$	$396.4 \pm 1.2$
$\sigma_8$	$0.7855 \pm 0.0093$	$z_{\text{eq}}$	$3256 \pm 45$	$\chi_{\text{lowl}}^2$	$20.73 \pm 0.65$
$S_8$	$0.752 \pm 0.023$	$k_{\text{eq}}$	$0.00994 \pm 0.00014$	$\chi_{\text{H073p45}}^2$	$3.4 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.412 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8429 \pm 0.0092$	$\chi_{\text{prior}}^2$	$7.0 \pm 3.3$
$\sigma_8 \Omega_m^{0.25}$	$0.569 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4644 \pm 0.0047$	$\chi_{\text{CMB}}^2$	$4333 \pm 3000$
$\sigma_8/h^{0.5}$	$0.935 \pm 0.017$	$H(0.15)$	$75.46 \pm 0.87$		
$r_{\text{drag}} h$	$104.6 \pm 1.7$	$D_{\text{M}}(0.15)$	$616.9 \pm 7.9$		

$$\bar{\chi}_{\text{eff}}^2 = 7489.90; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.46; R - 1 = 0.05184$$



### 3.7 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02255 \pm 0.00019$	$r_{\text{drag}} h$	$100.7 \pm 1.2$	$H(0.15)$	$73.47 \pm 0.62$
$\Omega_c h^2$	$0.1180 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.581 \pm 0.065$	$D_{\text{M}}(0.15)$	$635.6 \pm 6.1$
$100\theta_{MC}$	$1.04111 \pm 0.00033$	$z_{\text{re}}$	$7.08^{+0.92}_{-0.71}$	$H(0.38)$	$83.44 \pm 0.46$
$\tau$	$0.0494^{+0.0085}_{-0.0073}$	$10^9 A_s$	$2.067^{+0.036}_{-0.032}$	$D_{\text{M}}(0.38)$	$1518 \pm 12$
$A_L$	$1.165 \pm 0.070$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$H(0.51)$	$90.07 \pm 0.37$
$\ln(10^{10} A_s)$	$3.028^{+0.018}_{-0.015}$	$D_{40}$	$1215 \pm 14$	$D_{\text{M}}(0.51)$	$1968 \pm 14$
$n_s$	$0.9710 \pm 0.0050$	$D_{220}$	$5731 \pm 39$	$H(0.61)$	$95.63 \pm 0.30$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2530 \pm 14$	$D_{\text{M}}(0.61)$	$2291 \pm 16$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$815.1 \pm 4.8$	$H(2.33)$	$235.43 \pm 0.91$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.9 \pm 1.7$	$D_{\text{M}}(2.33)$	$5749 \pm 14$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9710 \pm 0.0050$	$f\sigma_8(0.15)$	$0.4451 \pm 0.0098$
$A_{100}^{PS}$	$240 \pm 30$	$Y_P$	$0.245462 \pm 0.000072$	$\sigma_8(0.15)$	$0.7394 \pm 0.0076$
$A_{143}^{PS}$	$39 \pm 9$	$Y_P^{\text{BBN}}$	$0.246789 \pm 0.000072$	$f\sigma_8(0.38)$	$0.4651 \pm 0.0082$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.554 \pm 0.034$	$\sigma_8(0.38)$	$0.6563 \pm 0.0063$
$A^{kSZ}$	$< 4.15$	Age/Gyr	$13.765 \pm 0.030$	$f\sigma_8(0.51)$	$0.4647 \pm 0.0072$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.52 \pm 0.33$	$\sigma_8(0.51)$	$0.6146^{+0.0058}_{-0.0052}$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.82 \pm 0.34$	$f\sigma_8(0.61)$	$0.4604 \pm 0.0066$
$H_0$	$68.28 \pm 0.72$	$100\theta_*$	$1.04127 \pm 0.00032$	$\sigma_8(0.61)$	$0.5851^{+0.0054}_{-0.0049}$
$\Omega_\Lambda$	$0.6970 \pm 0.0094$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.908 \pm 0.031$	$f\sigma_8(2.33)$	$0.2953^{+0.0027}_{-0.0024}$
$\Omega_m$	$0.3030 \pm 0.0094$	$z_{\text{drag}}$	$1060.20 \pm 0.37$	$\sigma_8(2.33)$	$0.3049^{+0.0027}_{-0.0024}$
$\Omega_m h^2$	$0.1412 \pm 0.0014$	$r_{\text{drag}}$	$147.43 \pm 0.33$	$f_{2000}^{143}$	$26.9 \pm 3.0$
$\Omega_m h^3$	$0.09639 \pm 0.00034$	$k_{\text{D}}$	$0.14065 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.0 \pm 2.1$
$\sigma_8$	$0.7992 \pm 0.0088$	$100\theta_{\text{D}}$	$0.16061 \pm 0.00021$	$f_{2000}^{217}$	$105.1 \pm 2.0$
$S_8$	$0.803 \pm 0.019$	$z_{\text{eq}}$	$3359 \pm 35$	$\chi_{\text{small}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.440 \pm 0.010$	$k_{\text{eq}}$	$0.01025 \pm 0.00011$	$\chi_{\text{lowl}}^2$	$22.22 \pm 0.89$
$\sigma_8 \Omega_m^{0.25}$	$0.5930 \pm 0.0099$	$100\theta_{\text{eq}}$	$0.8219 \pm 0.0067$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$0.967 \pm 0.014$	$100\theta_{\text{s,eq}}$	$0.4537 \pm 0.0034$	$\chi_{\text{CMB}}^2$	$7352 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11915.94$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.83$ ;  $\bar{\chi}_{\text{eff}}^2 = 11938.97$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.70$ ;  $R - 1 = 0.01096$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.68 ( $\Delta$  0.01) commander\_dx12\_v3.2.29: 21.90 ( $\Delta$  -0.06) CamSpec like\_10.7HM\_1400\_unified: 11496.51



### 3.8 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02254 \pm 0.00016$	$z_{\text{re}}$	$7.07^{+0.94}_{-0.71}$	$H(0.51)$	$90.04 \pm 0.26$
$\Omega_c h^2$	$0.1181 \pm 0.0011$	$10^9 A_s$	$2.067^{+0.037}_{-0.033}$	$D_{\text{M}}(0.51)$	$1969 \pm 10$
$100\theta_{MC}$	$1.04109 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.011$	$H(0.61)$	$95.60 \pm 0.22$
$\tau$	$0.0492^{+0.0086}_{-0.0073}$	$D_{40}$	$1216 \pm 12$	$D_{\text{M}}(0.61)$	$2292 \pm 11$
$A_L$	$1.161 \pm 0.065$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$235.51 \pm 0.65$
$\ln(10^{10} A_s)$	$3.028^{+0.018}_{-0.016}$	$D_{810}$	$2530 \pm 14$	$D_{\text{M}}(2.33)$	$5750 \pm 10$
$n_s$	$0.9707 \pm 0.0040$	$D_{1420}$	$815.0 \pm 4.8$	$f\sigma_8(0.15)$	$0.4459 \pm 0.0073$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{2000}$	$231.8 \pm 1.7$	$\sigma_8(0.15)$	$0.7397 \pm 0.0071$
$A_{217}^{CIB}$	$41 \pm 8$	$n_{s,0.002}$	$0.9707 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4657 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245457 \pm 0.000062$	$\sigma_8(0.38)$	$0.6565 \pm 0.0061$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$Y_P^{\text{BBN}}$	$0.246784 \pm 0.000062$	$f\sigma_8(0.51)$	$0.4652 \pm 0.0058$
$A_{100}^{PS}$	$241 \pm 30$	$10^5 D/H$	$2.556 \pm 0.029$	$\sigma_8(0.51)$	$0.6148 \pm 0.0056$
$A_{143}^{PS}$	$39 \pm 9$	Age/Gyr	$13.767 \pm 0.024$	$f\sigma_8(0.61)$	$0.4609 \pm 0.0054$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$z_*$	$1089.55 \pm 0.26$	$\sigma_8(0.61)$	$0.5852 \pm 0.0053$
$A^{kSZ}$	$< 4.20$	$r_*$	$144.79 \pm 0.25$	$f\sigma_8(2.33)$	$0.2954^{+0.0027}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04126 \pm 0.00029$	$\sigma_8(2.33)$	$0.3049^{+0.0028}_{-0.0025}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.905 \pm 0.024$	$f_{2000}^{143}$	$27.0 \pm 2.9$
$H_0$	$68.21 \pm 0.50$	$z_{\text{drag}}$	$1060.19 \pm 0.35$	$f_{2000}^{143 \times 217}$	$30.1 \pm 2.0$
$\Omega_{\Lambda}$	$0.6962 \pm 0.0064$	$r_{\text{drag}}$	$147.40 \pm 0.26$	$f_{2000}^{217}$	$105.1 \pm 1.9$
$\Omega_m$	$0.3038 \pm 0.0064$	$k_{\text{D}}$	$0.14066 \pm 0.00032$	$\chi_{\text{small}}^2$	$396.8 \pm 1.6$
$\Omega_m h^2$	$0.1413 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00020$	$\chi_{\text{lowl}}^2$	$22.25 \pm 0.76$
$\Omega_m h^3$	$0.09639 \pm 0.00033$	$z_{\text{eq}}$	$3361 \pm 24$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.043$
$\sigma_8$	$0.7997 \pm 0.0080$	$k_{\text{eq}}$	$0.010260 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.80 \pm 0.52$
$S_8$	$0.805 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8213 \pm 0.0046$	$\chi_{\text{DR12BAO}}^2$	$3.94 \pm 0.78$
$\sigma_8 \Omega_m^{0.5}$	$0.4408 \pm 0.0077$	$100\theta_{\text{s,eq}}$	$0.4534 \pm 0.0024$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.5937 \pm 0.0078$	$H(0.15)$	$73.42 \pm 0.43$	$\chi_{\text{BAO}}^2$	$5.77 \pm 0.77$
$\sigma_8/h^{0.5}$	$0.968 \pm 0.012$	$D_{\text{M}}(0.15)$	$636.1 \pm 4.2$	$\chi_{\text{CMB}}^2$	$7352 \pm 5000$
$r_{\text{drag}} h$	$100.55 \pm 0.85$	$H(0.38)$	$83.40 \pm 0.32$		
$\langle d^2 \rangle^{1/2}$	$2.580 \pm 0.064$	$D_{\text{M}}(0.38)$	$1519.0 \pm 8.5$		

$$\bar{\chi}_{\text{eff}}^2 = 11944.29; \Delta\bar{\chi}_{\text{eff}}^2 = 9154.75; R - 1 = 0.01598$$



### 3.9 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02271 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.596 \pm 0.065$	$H(0.38)$	$83.97 \pm 0.43$
$\Omega_c h^2$	$0.1163^{+0.0013}_{-0.0015}$	$z_{\text{re}}$	$7.13^{+0.89}_{-0.71}$	$D_{\text{M}}(0.38)$	$1504 \pm 11$
$100\theta_{MC}$	$1.04133 \pm 0.00033$	$10^9 A_s$	$2.063^{+0.035}_{-0.032}$	$H(0.51)$	$90.49 \pm 0.35$
$\tau$	$0.0505^{+0.0083}_{-0.0073}$	$10^9 A_s e^{-2\tau}$	$1.865 \pm 0.012$	$D_{\text{M}}(0.51)$	$1951 \pm 13$
$A_L$	$1.207 \pm 0.070$	$D_{40}$	$1206 \pm 13$	$H(0.61)$	$95.97 \pm 0.29$
$\ln(10^{10} A_s)$	$3.027^{+0.017}_{-0.015}$	$D_{220}$	$5741 \pm 39$	$D_{\text{M}}(0.61)$	$2273 \pm 14$
$n_s$	$0.9755 \pm 0.0047$	$D_{810}$	$2528 \pm 13$	$H(2.33)$	$234.50 \pm 0.82$
$y_{\text{cal}}$	$0.99998 \pm 0.0024$	$D_{1420}$	$815.8 \pm 4.6$	$D_{\text{M}}(2.33)$	$5734 \pm 13$
$A_{217}^{CIB}$	$40 \pm 8$	$D_{2000}$	$232.6^{+1.7}_{-1.5}$	$f\sigma_8(0.15)$	$0.4351 \pm 0.0089$
$\xi^{tSZ-CIB}$	$> 0.382$	$n_{s,0.002}$	$0.9755 \pm 0.0047$	$\sigma_8(0.15)$	$0.7351 \pm 0.0074$
$A_{143}^{tSZ}$	$5.0^{+2.4}_{-2.1}$	$Y_P$	$0.245525^{+0.000064}_{-0.000074}$	$f\sigma_8(0.38)$	$0.4572 \pm 0.0076$
$A_{100}^{PS}$	$237 \pm 30$	$Y_P^{\text{BBN}}$	$0.246852^{+0.000064}_{-0.000075}$	$\sigma_8(0.38)$	$0.6537^{+0.0062}_{-0.0056}$
$A_{143}^{PS}$	$37 \pm 9$	$10^5 D/H$	$2.524 \pm 0.031$	$f\sigma_8(0.51)$	$0.4580 \pm 0.0068$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.734 \pm 0.028$	$\sigma_8(0.51)$	$0.6126^{+0.0057}_{-0.0051}$
$A^{kSZ}$	$< 3.84$	$z_*$	$1089.18^{+0.28}_{-0.32}$	$f\sigma_8(0.61)$	$0.4547 \pm 0.0062$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$145.14 \pm 0.31$	$\sigma_8(0.61)$	$0.5835^{+0.0053}_{-0.0048}$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04149 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2950^{+0.0026}_{-0.0023}$
$H_0$	$69.11 \pm 0.66$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.936 \pm 0.029$	$\sigma_8(2.33)$	$0.3050^{+0.0027}_{-0.0024}$
$\Omega_\Lambda$	$0.7075^{+0.0087}_{-0.0076}$	$z_{\text{drag}}$	$1060.45 \pm 0.35$	$f_{2000}^{143}$	$25.8 \pm 2.9$
$\Omega_m$	$0.2925^{+0.0076}_{-0.0087}$	$r_{\text{drag}}$	$147.70 \pm 0.31$	$f_{2000}^{143 \times 217}$	$29.1 \pm 2.0$
$\Omega_m h^2$	$0.1396 \pm 0.0013$	$k_{\text{D}}$	$0.14048 \pm 0.00034$	$f_{2000}^{217}$	$104.3 \pm 1.9$
$\Omega_m h^3$	$0.09649 \pm 0.00034$	$100\theta_{\text{D}}$	$0.16048 \pm 0.00020$	$\chi_{\text{small}}^2$	$396.8 \pm 1.5$
$\sigma_8$	$0.7935 \pm 0.0084$	$z_{\text{eq}}$	$3322 \pm 31$	$\chi_{\text{lowl}}^2$	$21.56 \pm 0.72$
$S_8$	$0.784 \pm 0.017$	$k_{\text{eq}}$	$0.010138 \pm 0.000095$	$\chi_{\text{H073p45}}^2$	$7.0 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4292 \pm 0.0094$	$100\theta_{\text{eq}}$	$0.8293 \pm 0.0062$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.5835 \pm 0.0092$	$100\theta_{\text{s,eq}}$	$0.4575 \pm 0.0032$	$\chi_{\text{CMB}}^2$	$7353 \pm 5000$
$\sigma_8/h^{0.5}$	$0.955 \pm 0.013$	$H(0.15)$	$74.19 \pm 0.57$		
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$628.7 \pm 5.5$		

$\bar{\chi}_{\text{eff}}^2 = 11947.36$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9155.26$ ;  $R - 1 = 0.04484$



### 3.10 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02255 \pm 0.00019$	$r_{\text{drag}} h$	$100.7 \pm 1.3$	$H(0.15)$	$73.48 \pm 0.63$
$\Omega_c h^2$	$0.1180 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.581^{+0.068}_{-0.061}$	$D_{\text{M}}(0.15)$	$635.5 \pm 6.1$
$100\theta_{MC}$	$1.04111 \pm 0.00033$	$z_{\text{re}}$	$7.43^{+0.33}_{-0.83}$	$H(0.38)$	$83.45 \pm 0.47$
$\tau$	$0.0527^{+0.0034}_{-0.0077}$	$10^9 A_s$	$2.080^{+0.020}_{-0.032}$	$D_{\text{M}}(0.38)$	$1518 \pm 12$
$A_L$	$1.158 \pm 0.069$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$H(0.51)$	$90.08 \pm 0.37$
$\ln(10^{10} A_s)$	$3.035^{+0.010}_{-0.015}$	$D_{40}$	$1215 \pm 14$	$D_{\text{M}}(0.51)$	$1967 \pm 15$
$n_s$	$0.9712 \pm 0.0050$	$D_{220}$	$5731 \pm 39$	$H(0.61)$	$95.63 \pm 0.30$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2530 \pm 14$	$D_{\text{M}}(0.61)$	$2290 \pm 16$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$815.1 \pm 4.8$	$H(2.33)$	$235.41 \pm 0.91$
$\xi^{tSZ-CIB}$	$> 0.377$	$D_{2000}$	$231.9 \pm 1.7$	$D_{\text{M}}(2.33)$	$5748 \pm 14$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9712 \pm 0.0050$	$f\sigma_8(0.15)$	$0.4464 \pm 0.0096$
$A_{100}^{PS}$	$240 \pm 30$	$Y_P$	$0.245462 \pm 0.000073$	$\sigma_8(0.15)$	$0.7417^{+0.0057}_{-0.0067}$
$A_{143}^{PS}$	$39 \pm 9$	$Y_P^{\text{BBN}}$	$0.246789 \pm 0.000073$	$f\sigma_8(0.38)$	$0.4664 \pm 0.0078$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.554 \pm 0.034$	$\sigma_8(0.38)$	$0.6584^{+0.0043}_{-0.0055}$
$A^{kSZ}$	$< 4.13$	Age/Gyr	$13.765 \pm 0.030$	$f\sigma_8(0.51)$	$0.4661 \pm 0.0068$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.52 \pm 0.34$	$\sigma_8(0.51)$	$0.6166^{+0.0038}_{-0.0050}$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.82 \pm 0.34$	$f\sigma_8(0.61)$	$0.4618 \pm 0.0061$
$H_0$	$68.29 \pm 0.73$	$100\theta_*$	$1.04128 \pm 0.00032$	$\sigma_8(0.61)$	$0.5869^{+0.0034}_{-0.0047}$
$\Omega_\Lambda$	$0.6972 \pm 0.0095$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.908 \pm 0.031$	$f\sigma_8(2.33)$	$0.2963^{+0.0016}_{-0.0023}$
$\Omega_m$	$0.3028 \pm 0.0095$	$z_{\text{drag}}$	$1060.20 \pm 0.37$	$\sigma_8(2.33)$	$0.3059^{+0.0016}_{-0.0023}$
$\Omega_m h^2$	$0.1412 \pm 0.0015$	$r_{\text{drag}}$	$147.43 \pm 0.33$	$f_{2000}^{143}$	$26.9 \pm 3.0$
$\Omega_m h^3$	$0.09639 \pm 0.00034$	$k_{\text{D}}$	$0.14064 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.0 \pm 2.1$
$\sigma_8$	$0.8017^{+0.0070}_{-0.0079}$	$100\theta_{\text{D}}$	$0.16061 \pm 0.00021$	$f_{2000}^{217}$	$105.0 \pm 2.0$
$S_8$	$0.805 \pm 0.019$	$z_{\text{eq}}$	$3358 \pm 35$	$\chi_{\text{simall}}^2$	$396.4 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.441 \pm 0.010$	$k_{\text{eq}}$	$0.01025 \pm 0.00011$	$\chi_{\text{lowl}}^2$	$22.27 \pm 0.90$
$\sigma_8 \Omega_m^{0.25}$	$0.5947 \pm 0.0095$	$100\theta_{\text{eq}}$	$0.8221 \pm 0.0068$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$0.970 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4538 \pm 0.0035$	$\chi_{\text{CMB}}^2$	$7352 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11938.62$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.74$ ;  $R - 1 = 0.01153$



### 3.11 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02254 \pm 0.00016$	$z_{\text{re}}$	$7.43^{+0.33}_{-0.83}$	$H(0.51)$	$90.04 \pm 0.26$
$\Omega_c h^2$	$0.1181 \pm 0.0011$	$10^9 A_s$	$2.081^{+0.020}_{-0.031}$	$D_{\text{M}}(0.51)$	$1969 \pm 10$
$100\theta_{MC}$	$1.04110 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.011$	$H(0.61)$	$95.60 \pm 0.22$
$\tau$	$0.0526^{+0.0034}_{-0.0076}$	$D_{40}$	$1216 \pm 12$	$D_{\text{M}}(0.61)$	$2292 \pm 11$
$A_L$	$1.154 \pm 0.063$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$235.50 \pm 0.65$
$\ln(10^{10} A_s)$	$3.035^{+0.010}_{-0.015}$	$D_{810}$	$2530 \pm 14$	$D_{\text{M}}(2.33)$	$5750 \pm 10$
$n_s$	$0.9708 \pm 0.0041$	$D_{1420}$	$815.1 \pm 4.8$	$f\sigma_8(0.15)$	$0.4473 \pm 0.0069$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{2000}$	$231.8 \pm 1.7$	$\sigma_8(0.15)$	$0.7422^{+0.0048}_{-0.0062}$
$A_{217}^{CIB}$	$41 \pm 8$	$n_{s,0.002}$	$0.9708 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4672 \pm 0.0058$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245457 \pm 0.000062$	$\sigma_8(0.38)$	$0.6587^{+0.0038}_{-0.0053}$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$Y_P^{\text{BBN}}$	$0.246784 \pm 0.000062$	$f\sigma_8(0.51)$	$0.4667 \pm 0.0052$
$A_{100}^{PS}$	$241 \pm 30$	$10^5 D/H$	$2.556 \pm 0.029$	$\sigma_8(0.51)$	$0.6168^{+0.0035}_{-0.0049}$
$A_{143}^{PS}$	$39 \pm 9$	Age/Gyr	$13.767 \pm 0.024$	$f\sigma_8(0.61)$	$0.4624 \pm 0.0047$
$A_{217}^{PS}$	$111^{+10}_{-10}$	$z_*$	$1089.55 \pm 0.26$	$\sigma_8(0.61)$	$0.5872^{+0.0032}_{-0.0046}$
$A^{kSZ}$	$< 4.17$	$r_*$	$144.79 \pm 0.25$	$f\sigma_8(2.33)$	$0.2964^{+0.0015}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0016}$	$100\theta_*$	$1.04126 \pm 0.00029$	$\sigma_8(2.33)$	$0.3059^{+0.0016}_{-0.0023}$
$c_{217}$	$0.9995^{+0.0017}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.906 \pm 0.024$	$f_{2000}^{143}$	$26.9 \pm 2.9$
$H_0$	$68.22 \pm 0.50$	$z_{\text{drag}}$	$1060.18 \pm 0.35$	$f_{2000}^{143 \times 217}$	$30.0 \pm 2.0$
$\Omega_\Lambda$	$0.6963 \pm 0.0065$	$r_{\text{drag}}$	$147.41 \pm 0.26$	$f_{2000}^{217}$	$105.1 \pm 1.9$
$\Omega_m$	$0.3037 \pm 0.0065$	$k_{\text{D}}$	$0.14066 \pm 0.00032$	$\chi_{\text{simall}}^2$	$396.4 \pm 1.1$
$\Omega_m h^2$	$0.1413 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00020$	$\chi_{\text{lowl}}^2$	$22.31 \pm 0.77$
$\Omega_m h^3$	$0.09639 \pm 0.00033$	$z_{\text{eq}}$	$3361 \pm 24$	$\chi_{6\text{DF}}^2$	$0.031 \pm 0.044$
$\sigma_8$	$0.8023^{+0.0057}_{-0.0070}$	$k_{\text{eq}}$	$0.010258 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.81 \pm 0.53$
$S_8$	$0.807 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8214 \pm 0.0047$	$\chi_{\text{DR12BAO}}^2$	$3.94 \pm 0.78$
$\sigma_8 \Omega_m^{0.5}$	$0.4421 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4535 \pm 0.0024$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.5956 \pm 0.0071$	$H(0.15)$	$73.42 \pm 0.43$	$\chi_{\text{BAO}}^2$	$5.78 \pm 0.78$
$\sigma_8/h^{0.5}$	$0.971 \pm 0.010$	$D_{\text{M}}(0.15)$	$636.1 \pm 4.2$	$\chi_{\text{CMB}}^2$	$7351 \pm 5000$
$r_{\text{drag}} h$	$100.56 \pm 0.85$	$H(0.38)$	$83.40 \pm 0.32$		
$\langle d^2 \rangle^{1/2}$	$2.580^{+0.067}_{-0.060}$	$D_{\text{M}}(0.38)$	$1518.9 \pm 8.5$		

$$\bar{\chi}_{\text{eff}}^2 = 11943.89; \Delta\bar{\chi}_{\text{eff}}^2 = 9154.76; R - 1 = 0.01823$$



3.12 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02271 \pm 0.00017$	$\langle d^2 \rangle^{1/2}$	$2.597 \pm 0.064$	$H(0.38)$	$83.97 \pm 0.42$
$\Omega_c h^2$	$0.1163^{+0.0013}_{-0.0015}$	$z_{\text{re}}$	$7.46^{+0.36}_{-0.81}$	$D_{\text{M}}(0.38)$	$1504^{+10}_{-11}$
$100\theta_{MC}$	$1.04134 \pm 0.00032$	$10^9 A_s$	$2.076^{+0.021}_{-0.030}$	$H(0.51)$	$90.50 \pm 0.34$
$\tau$	$0.0535^{+0.0039}_{-0.0073}$	$10^9 A_s e^{-2\tau}$	$1.865 \pm 0.012$	$D_{\text{M}}(0.51)$	$1951^{+12}_{-13}$
$A_L$	$1.201 \pm 0.069$	$D_{40}$	$1206 \pm 13$	$H(0.61)$	$95.97 \pm 0.28$
$\ln(10^{10} A_s)$	$3.033^{+0.010}_{-0.015}$	$D_{220}$	$5740 \pm 39$	$D_{\text{M}}(0.61)$	$2273^{+13}_{-15}$
$n_s$	$0.9756 \pm 0.0047$	$D_{810}$	$2527 \pm 13$	$H(2.33)$	$234.48 \pm 0.81$
$y_{\text{cal}}$	$0.99997 \pm 0.0024$	$D_{1420}$	$815.8 \pm 4.6$	$D_{\text{M}}(2.33)$	$5734 \pm 12$
$A_{217}^{CIB}$	$40 \pm 8$	$D_{2000}$	$232.6 \pm 1.6$	$f\sigma_8(0.15)$	$0.4362^{+0.0079}_{-0.0091}$
$\xi^{tSZ-CIB}$	$> 0.377$	$n_{s,0.002}$	$0.9756 \pm 0.0047$	$\sigma_8(0.15)$	$0.7373^{+0.0054}_{-0.0065}$
$A_{143}^{tSZ}$	$5.0^{+2.4}_{-2.1}$	$Y_P$	$0.245525^{+0.000063}_{-0.000072}$	$f\sigma_8(0.38)$	$0.4584^{+0.0065}_{-0.0076}$
$A_{100}^{PS}$	$237 \pm 30$	$Y_P^{\text{BBN}}$	$0.246852^{+0.000063}_{-0.000073}$	$\sigma_8(0.38)$	$0.6556^{+0.0042}_{-0.0053}$
$A_{143}^{PS}$	$37 \pm 9$	$10^5 D/H$	$2.525 \pm 0.031$	$f\sigma_8(0.51)$	$0.4593^{+0.0057}_{-0.0066}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	Age/Gyr	$13.734 \pm 0.027$	$\sigma_8(0.51)$	$0.6144^{+0.0037}_{-0.0048}$
$A^{kSZ}$	$< 3.84$	$z_*$	$1089.17^{+0.27}_{-0.31}$	$f\sigma_8(0.61)$	$0.4559^{+0.0052}_{-0.0060}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$145.14 \pm 0.31$	$\sigma_8(0.61)$	$0.5852^{+0.0035}_{-0.0045}$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04149 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2959^{+0.0016}_{-0.0022}$
$H_0$	$69.12^{+0.68}_{-0.62}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.936 \pm 0.029$	$\sigma_8(2.33)$	$0.3059^{+0.0017}_{-0.0022}$
$\Omega_\Lambda$	$0.7076^{+0.0087}_{-0.0074}$	$z_{\text{drag}}$	$1060.45 \pm 0.35$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m$	$0.2924^{+0.0074}_{-0.0087}$	$r_{\text{drag}}$	$147.71 \pm 0.31$	$f_{2000}^{143 \times 217}$	$29.1 \pm 2.0$
$\Omega_m h^2$	$0.1396^{+0.0012}_{-0.0014}$	$k_{\text{D}}$	$0.14047 \pm 0.00034$	$f_{2000}^{217}$	$104.2 \pm 1.9$
$\Omega_m h^3$	$0.09649 \pm 0.00033$	$100\theta_{\text{D}}$	$0.16048^{+0.00018}_{-0.00020}$	$\chi_{\text{simall}}^2$	$396.4 \pm 1.1$
$\sigma_8$	$0.7958^{+0.0064}_{-0.0076}$	$z_{\text{eq}}$	$3321^{+29}_{-33}$	$\chi_{\text{lowl}}^2$	$21.59 \pm 0.72$
$S_8$	$0.786^{+0.015}_{-0.018}$	$k_{\text{eq}}$	$0.010136^{+0.000090}_{-0.00010}$	$\chi_{\text{H073p45}}^2$	$7.0 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4303^{+0.0083}_{-0.0097}$	$100\theta_{\text{eq}}$	$0.8295 \pm 0.0061$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.5852^{+0.0078}_{-0.0091}$	$100\theta_{\text{s,eq}}$	$0.4576 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7353 \pm 5000$
$\sigma_8/h^{0.5}$	$0.957^{+0.011}_{-0.013}$	$H(0.15)$	$74.19 \pm 0.56$		
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$628.6^{+5.0}_{-5.7}$		

$\bar{\chi}_{\text{eff}}^2 = 11946.84$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9155.07$ ;  $R - 1 = 0.04629$



### 3.13 base\_Alens\_CamSpecHM\_TE\_lowE/base\_Alens\_plikHM\_TE\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02228 \pm 0.00039$	$D_{40}$	$1226 \pm 41$	$D_M(0.15)$	$638 \pm 11$
$\Omega_c h^2$	$0.1184 \pm 0.0027$	$D_{220}$	$5693 \pm 63$	$H(0.38)$	$83.23 \pm 0.85$
$100\theta_{MC}$	$1.04131 \pm 0.00053$	$D_{810}$	$2505 \pm 49$	$D_M(0.38)$	$1523 \pm 22$
$\tau$	$0.0491 \pm 0.0088$	$D_{1420}$	$805^{+22}_{-25}$	$H(0.51)$	$89.89 \pm 0.69$
$A_L$	$0.85^{+0.22}_{-0.25}$	$D_{2000}$	$225.2^{+9.6}_{-11}$	$D_M(0.51)$	$1974 \pm 26$
$\ln(10^{10} A_s)$	$3.017 \pm 0.025$	$n_{s,0.002}$	$0.961 \pm 0.024$	$H(0.61)$	$95.46^{+0.52}_{-0.59}$
$n_s$	$0.961 \pm 0.024$	$Y_P$	$0.24535^{+0.00017}_{-0.00015}$	$D_M(0.61)$	$2298 \pm 29$
$y_{cal}$	$1.0000 \pm 0.0025$	$Y_P^{BBN}$	$0.24668^{+0.00017}_{-0.00015}$	$H(2.33)$	$235.4 \pm 1.5$
$H_0$	$68.0 \pm 1.3$	$10^5 D/H$	$2.604 \pm 0.074$	$D_M(2.33)$	$5758 \pm 26$
$\Omega_\Lambda$	$0.694 \pm 0.017$	Age/Gyr	$13.787 \pm 0.058$	$f\sigma_8(0.15)$	$0.444 \pm 0.014$
$\Omega_m$	$0.306 \pm 0.017$	$z_*$	$1089.89 \pm 0.69$	$\sigma_8(0.15)$	$0.734 \pm 0.011$
$\Omega_m h^2$	$0.1413 \pm 0.0025$	$r_*$	$144.93 \pm 0.55$	$f\sigma_8(0.38)$	$0.463 \pm 0.011$
$\Omega_m h^3$	$0.09606 \pm 0.00062$	$100\theta_*$	$1.04150 \pm 0.00052$	$\sigma_8(0.38)$	$0.651 \pm 0.010$
$\sigma_8$	$0.794 \pm 0.012$	$D_M(z_*)/\text{Gpc}$	$13.915 \pm 0.051$	$f\sigma_8(0.51)$	$0.4623 \pm 0.0094$
$S_8$	$0.802 \pm 0.027$	$z_{drag}$	$1059.61 \pm 0.79$	$\sigma_8(0.51)$	$0.6098 \pm 0.0099$
$\sigma_8 \Omega_m^{0.5}$	$0.439 \pm 0.015$	$r_{drag}$	$147.63 \pm 0.53$	$f\sigma_8(0.61)$	$0.4579 \pm 0.0085$
$\sigma_8 \Omega_m^{0.25}$	$0.590 \pm 0.013$	$k_D$	$0.14023 \pm 0.00060$	$\sigma_8(0.61)$	$0.5804 \pm 0.0095$
$\sigma_8/h^{0.5}$	$0.963 \pm 0.018$	$100\theta_D$	$0.16100 \pm 0.00047$	$f\sigma_8(2.33)$	$0.2929 \pm 0.0051$
$r_{drag} h$	$100.4 \pm 2.2$	$z_{eq}$	$3361 \pm 60$	$\sigma_8(2.33)$	$0.3023 \pm 0.0056$
$\langle d^2 \rangle^{1/2}$	$2.18^{+0.31}_{-0.24}$	$k_{eq}$	$0.01026 \pm 0.00018$	$\chi^2_{small}$	$396.9 \pm 1.7$
$z_{re}$	$7.11^{+0.94}_{-0.76}$	$100\theta_{eq}$	$0.821 \pm 0.012$	$\chi^2_{prior}$	$9.2 \pm 3.3$
$10^9 A_s$	$2.043 \pm 0.051$	$100\theta_{s,eq}$	$0.4535 \pm 0.0059$	$\chi^2_{CMB}$	$2118 \pm 900$
$10^9 A_s e^{-2\tau}$	$1.851 \pm 0.029$	$H(0.15)$	$73.2 \pm 1.1$		

Best-fit  $\chi^2_{\text{eff}} = 2981.49$ ;  $\Delta\chi^2_{\text{eff}} = 1733.88$ ;  $\bar{\chi}^2_{\text{eff}} = 2989.81$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1725.95$ ;  $R - 1 = 0.00461$

$\chi^2_{\text{eff}}$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.66 ( $\Delta$  0.02) CamSpec like\_10.7HM\_1400\_unified: 2575.80



### 3.14 base\_Alens\_CamSpecHM\_TE\_lowE\_post\_BAO/base\_Alens\_plikHM\_TE\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02228 \pm 0.00030$	$D_{220}$	$5694 \pm 62$	$D_M(0.38)$	$1523 \pm 11$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$D_{810}$	$2505 \pm 44$	$H(0.51)$	$89.88 \pm 0.37$
$100\theta_{MC}$	$1.04131 \pm 0.00047$	$D_{1420}$	$805 \pm 20$	$D_M(0.51)$	$1974 \pm 13$
$\tau$	$0.0491 \pm 0.0086$	$D_{2000}$	$225.0^{+8.0}_{-8.9}$	$H(0.61)$	$95.45 \pm 0.32$
$A_L$	$0.84 \pm 0.19$	$n_{s,0.002}$	$0.960 \pm 0.018$	$D_M(0.61)$	$2297 \pm 14$
$\ln(10^{10} A_s)$	$3.016 \pm 0.024$	$Y_P$	$0.24535^{+0.00013}_{-0.00011}$	$H(2.33)$	$235.40 \pm 0.83$
$n_s$	$0.960 \pm 0.018$	$Y_P^{\text{BBN}}$	$0.24668^{+0.00014}_{-0.00011}$	$D_M(2.33)$	$5758 \pm 16$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$10^5 D/H$	$2.604 \pm 0.057$	$f\sigma_8(0.15)$	$0.4437 \pm 0.0087$
$H_0$	$68.01 \pm 0.64$	Age/Gyr	$13.788 \pm 0.038$	$\sigma_8(0.15)$	$0.734 \pm 0.011$
$\Omega_\Lambda$	$0.6945 \pm 0.0080$	$z_*$	$1089.89 \pm 0.44$	$f\sigma_8(0.38)$	$0.4629 \pm 0.0080$
$\Omega_m$	$0.3055 \pm 0.0080$	$r_*$	$144.94 \pm 0.35$	$\sigma_8(0.38)$	$0.651 \pm 0.010$
$\Omega_m h^2$	$0.1412 \pm 0.0013$	$100\theta_*$	$1.04151 \pm 0.00046$	$f\sigma_8(0.51)$	$0.4623 \pm 0.0077$
$\Omega_m h^3$	$0.09605 \pm 0.00060$	$D_M(z_*)/\text{Gpc}$	$13.916 \pm 0.034$	$\sigma_8(0.51)$	$0.6098 \pm 0.0096$
$\sigma_8$	$0.794 \pm 0.012$	$z_{\text{drag}}$	$1059.60 \pm 0.68$	$f\sigma_8(0.61)$	$0.4579 \pm 0.0074$
$S_8$	$0.801 \pm 0.016$	$r_{\text{drag}}$	$147.64 \pm 0.40$	$\sigma_8(0.61)$	$0.5804 \pm 0.0092$
$\sigma_8 \Omega_m^{0.5}$	$0.4387 \pm 0.0090$	$k_D$	$0.14022 \pm 0.00058$	$f\sigma_8(2.33)$	$0.2929 \pm 0.0047$
$\sigma_8 \Omega_m^{0.25}$	$0.590 \pm 0.010$	$100\theta_D$	$0.16101 \pm 0.00040$	$\sigma_8(2.33)$	$0.3022 \pm 0.0050$
$\sigma_8/h^{0.5}$	$0.963 \pm 0.015$	$z_{\text{eq}}$	$3360 \pm 30$	$\chi^2_{\text{small}}$	$396.9 \pm 1.7$
$r_{\text{drag}} h$	$100.4 \pm 1.0$	$k_{\text{eq}}$	$0.010255 \pm 0.000092$	$\chi^2_{6\text{DF}}$	$0.045 \pm 0.063$
$\langle d^2 \rangle^{1/2}$	$2.19^{+0.27}_{-0.21}$	$100\theta_{\text{eq}}$	$0.8210 \pm 0.0057$	$\chi^2_{\text{MGS}}$	$1.73 \pm 0.63$
$z_{\text{re}}$	$7.11^{+0.92}_{-0.77}$	$100\theta_{s,\text{eq}}$	$0.4535 \pm 0.0029$	$\chi^2_{\text{DR12BAO}}$	$4.2 \pm 1.2$
$10^9 A_s$	$2.042 \pm 0.049$	$H(0.15)$	$73.22 \pm 0.56$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.851 \pm 0.029$	$D_M(0.15)$	$637.9 \pm 5.4$	$\chi^2_{\text{BAO}}$	$6.0 \pm 1.1$
$D_{40}$	$1226 \pm 31$	$H(0.38)$	$83.22 \pm 0.44$	$\chi^2_{\text{CMB}}$	$2117 \pm 900$

$\bar{\chi}^2_{\text{eff}} = 2995.04$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1725.89$ ;  $R - 1 = 0.00758$



### 3.15 base\_Alens\_CamSpecHM\_TE\_lowE\_post\_zre6p5/base\_Alens\_plikHM\_TE\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00039$	$D_{40}$	$1225 \pm 41$	$D_M(0.15)$	$638 \pm 11$
$\Omega_c h^2$	$0.1183 \pm 0.0027$	$D_{220}$	$5693 \pm 63$	$H(0.38)$	$83.26 \pm 0.85$
$100\theta_{MC}$	$1.04132 \pm 0.00053$	$D_{810}$	$2507 \pm 49$	$D_M(0.38)$	$1522 \pm 22$
$\tau$	$0.0525^{+0.0037}_{-0.0080}$	$D_{1420}$	$806^{+22}_{-25}$	$H(0.51)$	$89.91^{+0.64}_{-0.72}$
$A_L$	$0.85^{+0.22}_{-0.25}$	$D_{2000}$	$225.5^{+9.6}_{-11}$	$D_M(0.51)$	$1973 \pm 26$
$\ln(10^{10} A_s)$	$3.024^{+0.019}_{-0.023}$	$n_{s,0.002}$	$0.962 \pm 0.023$	$H(0.61)$	$95.48^{+0.52}_{-0.59}$
$n_s$	$0.962 \pm 0.023$	$Y_P$	$0.24536^{+0.00017}_{-0.00015}$	$D_M(0.61)$	$2297 \pm 29$
$y_{cal}$	$1.0000 \pm 0.0025$	$Y_P^{BBN}$	$0.24668^{+0.00017}_{-0.00015}$	$H(2.33)$	$235.4 \pm 1.5$
$H_0$	$68.1 \pm 1.3$	$10^5 D/H$	$2.602 \pm 0.074$	$D_M(2.33)$	$5757 \pm 26$
$\Omega_\Lambda$	$0.695 \pm 0.017$	Age/Gyr	$13.785 \pm 0.057$	$f\sigma_8(0.15)$	$0.445 \pm 0.013$
$\Omega_m$	$0.305 \pm 0.017$	$z_*$	$1089.87 \pm 0.68$	$\sigma_8(0.15)$	$0.7367^{+0.0098}_{-0.011}$
$\Omega_m h^2$	$0.1412 \pm 0.0025$	$r_*$	$144.94 \pm 0.55$	$f\sigma_8(0.38)$	$0.464 \pm 0.011$
$\Omega_m h^3$	$0.09607 \pm 0.00062$	$100\theta_*$	$1.04151 \pm 0.00052$	$\sigma_8(0.38)$	$0.6537^{+0.0088}_{-0.010}$
$\sigma_8$	$0.797 \pm 0.011$	$D_M(z_*)/\text{Gpc}$	$13.916 \pm 0.051$	$f\sigma_8(0.51)$	$0.4637 \pm 0.0091$
$S_8$	$0.804 \pm 0.027$	$z_{drag}$	$1059.63 \pm 0.79$	$\sigma_8(0.51)$	$0.6120^{+0.0083}_{-0.0097}$
$\sigma_8 \Omega_m^{0.5}$	$0.440 \pm 0.015$	$r_{drag}$	$147.64 \pm 0.53$	$f\sigma_8(0.61)$	$0.4593 \pm 0.0081$
$\sigma_8 \Omega_m^{0.25}$	$0.592 \pm 0.013$	$k_D$	$0.14023 \pm 0.00061$	$\sigma_8(0.61)$	$0.5826^{+0.0081}_{-0.0094}$
$\sigma_8/h^{0.5}$	$0.966 \pm 0.017$	$100\theta_D$	$0.16099 \pm 0.00047$	$f\sigma_8(2.33)$	$0.2940^{+0.0043}_{-0.0051}$
$r_{drag}h$	$100.5 \pm 2.2$	$z_{eq}$	$3359 \pm 59$	$\sigma_8(2.33)$	$0.3034^{+0.0048}_{-0.0057}$
$\langle d^2 \rangle^{1/2}$	$2.19^{+0.31}_{-0.24}$	$k_{eq}$	$0.01025 \pm 0.00018$	$\chi^2_{small}$	$396.5 \pm 1.3$
$z_{re}$	$7.48^{+0.34}_{-0.86}$	$100\theta_{eq}$	$0.821 \pm 0.012$	$\chi^2_{prior}$	$9.2 \pm 3.3$
$10^9 A_s$	$2.057^{+0.039}_{-0.049}$	$100\theta_{s,eq}$	$0.4536 \pm 0.0059$	$\chi^2_{CMB}$	$2117 \pm 900$
$10^9 A_s e^{-2\tau}$	$1.852 \pm 0.029$	$H(0.15)$	$73.3 \pm 1.1$		

$\bar{\chi}^2_{\text{eff}} = 2989.43$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1725.99$ ;  $R - 1 = 0.00501$



### 3.16 base\_Alens\_CamSpecHM\_TE\_lowE\_post\_BAO\_zre6p5/base\_Alens\_plikHM\_TE\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02228 \pm 0.00030$	$D_{220}$	$5693 \pm 62$	$D_M(0.38)$	$1523 \pm 11$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$D_{810}$	$2506 \pm 44$	$H(0.51)$	$89.88 \pm 0.37$
$100\theta_{MC}$	$1.04131 \pm 0.00047$	$D_{1420}$	$805 \pm 20$	$D_M(0.51)$	$1974 \pm 13$
$\tau$	$0.0524^{+0.0035}_{-0.0077}$	$D_{2000}$	$225.1^{+8.1}_{-9.1}$	$H(0.61)$	$95.45 \pm 0.32$
$A_L$	$0.84 \pm 0.20$	$n_{s,0.002}$	$0.961 \pm 0.018$	$D_M(0.61)$	$2297 \pm 14$
$\ln(10^{10} A_s)$	$3.023^{+0.019}_{-0.022}$	$Y_P$	$0.24535^{+0.00014}_{-0.00011}$	$H(2.33)$	$235.39 \pm 0.83$
$n_s$	$0.961 \pm 0.018$	$Y_P^{\text{BBN}}$	$0.24668^{+0.00014}_{-0.00011}$	$D_M(2.33)$	$5758 \pm 16$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$10^5 D/H$	$2.604 \pm 0.057$	$f\sigma_8(0.15)$	$0.4451 \pm 0.0083$
$H_0$	$68.01 \pm 0.64$	Age/Gyr	$13.788 \pm 0.038$	$\sigma_8(0.15)$	$0.7366^{+0.0098}_{-0.011}$
$\Omega_\Lambda$	$0.6946 \pm 0.0080$	$z_*$	$1089.89 \pm 0.44$	$f\sigma_8(0.38)$	$0.4645 \pm 0.0075$
$\Omega_m$	$0.3054 \pm 0.0080$	$r_*$	$144.94 \pm 0.35$	$\sigma_8(0.38)$	$0.6537^{+0.0087}_{-0.010}$
$\Omega_m h^2$	$0.1412 \pm 0.0013$	$100\theta_*$	$1.04151 \pm 0.00046$	$f\sigma_8(0.51)$	$0.4638^{+0.0067}_{-0.0075}$
$\Omega_m h^3$	$0.09605 \pm 0.00060$	$D_M(z_*)/\text{Gpc}$	$13.917 \pm 0.034$	$\sigma_8(0.51)$	$0.6120^{+0.0082}_{-0.0095}$
$\sigma_8$	$0.797^{+0.011}_{-0.012}$	$z_{\text{drag}}$	$1059.60 \pm 0.68$	$f\sigma_8(0.61)$	$0.4594^{+0.0064}_{-0.0072}$
$S_8$	$0.804 \pm 0.016$	$r_{\text{drag}}$	$147.65 \pm 0.40$	$\sigma_8(0.61)$	$0.5825^{+0.0079}_{-0.0091}$
$\sigma_8 \Omega_m^{0.5}$	$0.4402 \pm 0.0086$	$k_D$	$0.14021 \pm 0.00058$	$f\sigma_8(2.33)$	$0.2939^{+0.0041}_{-0.0047}$
$\sigma_8 \Omega_m^{0.25}$	$0.5921 \pm 0.0094$	$100\theta_D$	$0.16101 \pm 0.00041$	$\sigma_8(2.33)$	$0.3033^{+0.0043}_{-0.0050}$
$\sigma_8/h^{0.5}$	$0.966^{+0.013}_{-0.015}$	$z_{\text{eq}}$	$3359 \pm 30$	$\chi^2_{\text{small}}$	$396.5 \pm 1.3$
$r_{\text{drag}} h$	$100.4 \pm 1.0$	$k_{\text{eq}}$	$0.010253 \pm 0.000092$	$\chi^2_{6\text{DF}}$	$0.045 \pm 0.063$
$\langle d^2 \rangle^{1/2}$	$2.19^{+0.27}_{-0.21}$	$100\theta_{\text{eq}}$	$0.8211 \pm 0.0057$	$\chi^2_{\text{MGS}}$	$1.74 \pm 0.63$
$z_{\text{re}}$	$7.47^{+0.34}_{-0.85}$	$100\theta_{s,\text{eq}}$	$0.4535 \pm 0.0029$	$\chi^2_{\text{DR12BAO}}$	$4.2 \pm 1.1$
$10^9 A_s$	$2.056^{+0.037}_{-0.047}$	$H(0.15)$	$73.23 \pm 0.56$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.3$
$10^9 A_s e^{-2\tau}$	$1.851 \pm 0.029$	$D_M(0.15)$	$637.9 \pm 5.4$	$\chi^2_{\text{BAO}}$	$6.0 \pm 1.1$
$D_{40}$	$1226 \pm 32$	$H(0.38)$	$83.23 \pm 0.44$	$\chi^2_{\text{CMB}}$	$2117 \pm 900$

$\bar{\chi}^2_{\text{eff}} = 2994.70$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1726.03$ ;  $R - 1 = 0.00997$



### 3.17 base\_Alens\_CamSpecHM\_EE\_lowE/base\_Alens\_plikHM\_EE\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.0241 \pm 0.0014$	$D_{40}$	$1239 \pm 36$	$D_M(0.15)$	$622^{+24}_{-27}$
$\Omega_c h^2$	$0.1156^{+0.0050}_{-0.0056}$	$D_{220}$	$6012 \pm 200$	$H(0.38)$	$84.8^{+2.1}_{-2.4}$
$100\theta_{MC}$	$1.03969 \pm 0.00096$	$D_{810}$	$2598 \pm 39$	$D_M(0.38)$	$1489 \pm 53$
$\tau$	$0.0518 \pm 0.0092$	$D_{1420}$	$845 \pm 19$	$H(0.51)$	$91.3^{+1.7}_{-2.1}$
$A_L$	$1.24^{+0.24}_{-0.28}$	$D_{2000}$	$243.7 \pm 8.2$	$D_M(0.51)$	$1932 \pm 64$
$\ln(10^{10} A_s)$	$3.057 \pm 0.023$	$n_{s,0.002}$	$0.980 \pm 0.018$	$H(0.61)$	$96.8^{+1.5}_{-1.8}$
$n_s$	$0.980 \pm 0.018$	$Y_P$	$0.24607 \pm 0.00053$	$D_M(0.61)$	$2251 \pm 70$
$y_{cal}$	$0.9999 \pm 0.0025$	$Y_P^{BBN}$	$0.24740 \pm 0.00053$	$H(2.33)$	$235.3^{+2.1}_{-2.5}$
$H_0$	$70.0 \pm 3.2$	$10^5 D/H$	$2.31^{+0.19}_{-0.23}$	$D_M(2.33)$	$5694 \pm 77$
$\Omega_\Lambda$	$0.711^{+0.039}_{-0.028}$	Age/Gyr	$13.64 \pm 0.17$	$f\sigma_8(0.15)$	$0.433^{+0.031}_{-0.035}$
$\Omega_m$	$0.289^{+0.028}_{-0.039}$	$z_*$	$1087.6^{+1.7}_{-2.0}$	$\sigma_8(0.15)$	$0.738^{+0.017}_{-0.015}$
$\Omega_m h^2$	$0.1404^{+0.0038}_{-0.0045}$	$r_*$	$144.26 \pm 0.69$	$f\sigma_8(0.38)$	$0.456 \pm 0.027$
$\Omega_m h^3$	$0.0981^{+0.0018}_{-0.0021}$	$100\theta_*$	$1.03970 \pm 0.00091$	$\sigma_8(0.38)$	$0.657^{+0.012}_{-0.010}$
$\sigma_8$	$0.796 \pm 0.021$	$D_M(z_*)/\text{Gpc}$	$13.875 \pm 0.064$	$f\sigma_8(0.51)$	$0.457 \pm 0.023$
$S_8$	$0.781^{+0.059}_{-0.070}$	$z_{\text{drag}}$	$1063.4 \pm 2.7$	$\sigma_8(0.51)$	$0.6156^{+0.0099}_{-0.0086}$
$\sigma_8 \Omega_m^{0.5}$	$0.428^{+0.032}_{-0.039}$	$r_{\text{drag}}$	$146.39 \pm 0.72$	$f\sigma_8(0.61)$	$0.454 \pm 0.020$
$\sigma_8 \Omega_m^{0.25}$	$0.583 \pm 0.031$	$k_D$	$0.1427 \pm 0.0013$	$\sigma_8(0.61)$	$0.5865^{+0.0087}_{-0.0077}$
$\sigma_8/h^{0.5}$	$0.952 \pm 0.045$	$100\theta_D$	$0.1587^{+0.0012}_{-0.0015}$	$f\sigma_8(2.33)$	$0.2967 \pm 0.0036$
$r_{\text{drag}} h$	$102.5 \pm 4.6$	$z_{\text{eq}}$	$3339^{+92}_{-110}$	$\sigma_8(2.33)$	$0.3072 \pm 0.0038$
$\langle d^2 \rangle^{1/2}$	$2.63^{+0.26}_{-0.23}$	$k_{\text{eq}}$	$0.01019^{+0.00028}_{-0.00033}$	$\chi^2_{\text{small}}$	$396.8 \pm 1.6$
$z_{\text{re}}$	$6.99^{+0.89}_{-0.76}$	$100\theta_{\text{eq}}$	$0.829 \pm 0.022$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s$	$2.127 \pm 0.048$	$100\theta_{s,\text{eq}}$	$0.456 \pm 0.011$	$\chi^2_{\text{CMB}}$	$1715 \pm 600$
$10^9 A_s e^{-2\tau}$	$1.917 \pm 0.027$	$H(0.15)$	$75.1 \pm 2.8$		

Best-fit  $\chi^2_{\text{eff}} = 2291.75$ ;  $\Delta\chi^2_{\text{eff}} = 1158.60$ ;  $\bar{\chi}^2_{\text{eff}} = 2300.05$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.75$ ;  $R - 1 = 0.00814$

$\chi^2_{\text{eff}}$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.60 ( $\Delta$  0.03) CamSpec like\_10.7HM\_1400\_unified: 1886.12



### 3.18 base\_Alens\_CamSpecHM\_EE\_lowE\_post\_BAO/base\_Alens\_plikHM\_EE\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02358 \pm 0.00066$	$D_{220}$	$5945 \pm 140$	$D_M(0.38)$	$1508 \pm 15$
$\Omega_c h^2$	$0.1174 \pm 0.0015$	$D_{810}$	$2589 \pm 36$	$H(0.51)$	$90.54 \pm 0.60$
$100\theta_{MC}$	$1.03956 \pm 0.00082$	$D_{1420}$	$839 \pm 15$	$D_M(0.51)$	$1955 \pm 18$
$\tau$	$0.0509 \pm 0.0086$	$D_{2000}$	$241.3 \pm 5.7$	$H(0.61)$	$96.09 \pm 0.56$
$A_L$	$1.20^{+0.21}_{-0.24}$	$n_{s,0.002}$	$0.975 \pm 0.011$	$D_M(0.61)$	$2277 \pm 20$
$\ln(10^{10} A_s)$	$3.054 \pm 0.022$	$Y_P$	$0.24588^{+0.00027}_{-0.00023}$	$H(2.33)$	$236.0 \pm 1.0$
$n_s$	$0.975 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.24721^{+0.00027}_{-0.00023}$	$D_M(2.33)$	$5723 \pm 29$
$y_{\text{cal}}$	$0.9999 \pm 0.0025$	$10^5 D/H$	$2.38 \pm 0.11$	$f\sigma_8(0.15)$	$0.4449 \pm 0.0098$
$H_0$	$68.81 \pm 0.86$	Age/Gyr	$13.706 \pm 0.068$	$\sigma_8(0.15)$	$0.7433 \pm 0.0091$
$\Omega_\Lambda$	$0.7006 \pm 0.0092$	$z_*$	$1088.28 \pm 0.79$	$f\sigma_8(0.38)$	$0.4657 \pm 0.0084$
$\Omega_m$	$0.2994 \pm 0.0092$	$r_*$	$144.17 \pm 0.52$	$\sigma_8(0.38)$	$0.6602 \pm 0.0078$
$\Omega_m h^2$	$0.1417 \pm 0.0014$	$100\theta_*$	$1.03962 \pm 0.00083$	$f\sigma_8(0.51)$	$0.4658 \pm 0.0076$
$\Omega_m h^3$	$0.0975 \pm 0.0012$	$D_M(z_*)/\text{Gpc}$	$13.868 \pm 0.051$	$\sigma_8(0.51)$	$0.6184 \pm 0.0072$
$\sigma_8$	$0.803 \pm 0.010$	$z_{\text{drag}}$	$1062.5 \pm 1.4$	$f\sigma_8(0.61)$	$0.4618 \pm 0.0071$
$S_8$	$0.802 \pm 0.019$	$r_{\text{drag}}$	$146.45 \pm 0.69$	$\sigma_8(0.61)$	$0.5888 \pm 0.0068$
$\sigma_8 \Omega_m^{0.5}$	$0.439 \pm 0.010$	$k_D$	$0.1424 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0034$
$\sigma_8 \Omega_m^{0.25}$	$0.594 \pm 0.010$	$100\theta_D$	$0.15909 \pm 0.00082$	$\sigma_8(2.33)$	$0.3071 \pm 0.0036$
$\sigma_8/h^{0.5}$	$0.968 \pm 0.015$	$z_{\text{eq}}$	$3370 \pm 34$	$\chi^2_{\text{small}}$	$396.8 \pm 1.6$
$r_{\text{drag}} h$	$100.8 \pm 1.2$	$k_{\text{eq}}$	$0.01029 \pm 0.00010$	$\chi^2_{6\text{DF}}$	$0.058 \pm 0.082$
$\langle d^2 \rangle^{1/2}$	$2.63 \pm 0.25$	$100\theta_{\text{eq}}$	$0.8215 \pm 0.0061$	$\chi^2_{\text{MGS}}$	$1.92 \pm 0.72$
$z_{\text{re}}$	$7.02^{+0.89}_{-0.75}$	$100\theta_{s,\text{eq}}$	$0.4527 \pm 0.0031$	$\chi^2_{\text{DR12BAO}}$	$4.5 \pm 1.3$
$10^9 A_s$	$2.121 \pm 0.047$	$H(0.15)$	$73.98 \pm 0.78$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.915 \pm 0.026$	$D_M(0.15)$	$631.0 \pm 7.3$	$\chi^2_{\text{BAO}}$	$6.5 \pm 1.4$
$D_{40}$	$1242 \pm 34$	$H(0.38)$	$83.92 \pm 0.66$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$

$$\bar{\chi}^2_{\text{eff}} = 2305.61; \Delta\bar{\chi}^2_{\text{eff}} = 1158.23; R - 1 = 0.01338$$



### 3.19 base\_Alens\_CamSpecHM\_EE\_lowE\_post\_zre6p5/base\_Alens\_plikHM\_EE\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.0241 \pm 0.0014$	$D_{40}$	$1239 \pm 36$	$D_M(0.15)$	$622^{+24}_{-27}$
$\Omega_c h^2$	$0.1156^{+0.0050}_{-0.0056}$	$D_{220}$	$6005 \pm 200$	$H(0.38)$	$84.8^{+2.1}_{-2.3}$
$100\theta_{MC}$	$1.03969 \pm 0.00096$	$D_{810}$	$2597 \pm 39$	$D_M(0.38)$	$1489 \pm 53$
$\tau$	$0.0557^{+0.0050}_{-0.0080}$	$D_{1420}$	$844 \pm 19$	$H(0.51)$	$91.3^{+1.7}_{-2.0}$
$A_L$	$1.23^{+0.24}_{-0.27}$	$D_{2000}$	$243.6 \pm 8.2$	$D_M(0.51)$	$1933 \pm 64$
$\ln(10^{10} A_s)$	$3.064 \pm 0.019$	$n_{s,0.002}$	$0.981 \pm 0.018$	$H(0.61)$	$96.7^{+1.5}_{-1.8}$
$n_s$	$0.981 \pm 0.018$	$Y_P$	$0.24606 \pm 0.00053$	$D_M(0.61)$	$2252 \pm 70$
$y_{cal}$	$0.9999 \pm 0.0025$	$Y_P^{BBN}$	$0.24739 \pm 0.00053$	$H(2.33)$	$235.3^{+2.1}_{-2.5}$
$H_0$	$70.0 \pm 3.2$	$10^5 D/H$	$2.31^{+0.19}_{-0.23}$	$D_M(2.33)$	$5695^{+80}_{-73}$
$\Omega_\Lambda$	$0.711^{+0.039}_{-0.028}$	Age/Gyr	$13.64 \pm 0.17$	$f\sigma_8(0.15)$	$0.435^{+0.031}_{-0.035}$
$\Omega_m$	$0.289^{+0.028}_{-0.039}$	$z_*$	$1087.7^{+1.7}_{-2.0}$	$\sigma_8(0.15)$	$0.741^{+0.016}_{-0.014}$
$\Omega_m h^2$	$0.1403^{+0.0038}_{-0.0045}$	$r_*$	$144.28 \pm 0.69$	$f\sigma_8(0.38)$	$0.458 \pm 0.026$
$\Omega_m h^3$	$0.0981^{+0.0018}_{-0.0020}$	$100\theta_*$	$1.03970 \pm 0.00091$	$\sigma_8(0.38)$	$0.659^{+0.011}_{-0.0095}$
$\sigma_8$	$0.799 \pm 0.020$	$D_M(z_*)/\text{Gpc}$	$13.877 \pm 0.064$	$f\sigma_8(0.51)$	$0.459 \pm 0.022$
$S_8$	$0.784^{+0.059}_{-0.070}$	$z_{\text{drag}}$	$1063.4 \pm 2.7$	$\sigma_8(0.51)$	$0.6180^{+0.0089}_{-0.0079}$
$\sigma_8 \Omega_m^{0.5}$	$0.429^{+0.032}_{-0.039}$	$r_{\text{drag}}$	$146.42 \pm 0.72$	$f\sigma_8(0.61)$	$0.456 \pm 0.020$
$\sigma_8 \Omega_m^{0.25}$	$0.586 \pm 0.031$	$k_D$	$0.1427 \pm 0.0013$	$\sigma_8(0.61)$	$0.5888 \pm 0.0075$
$\sigma_8/h^{0.5}$	$0.956 \pm 0.044$	$100\theta_D$	$0.1587^{+0.0012}_{-0.0015}$	$f\sigma_8(2.33)$	$0.2979 \pm 0.0032$
$r_{\text{drag}} h$	$102.5 \pm 4.6$	$z_{\text{eq}}$	$3338^{+92}_{-110}$	$\sigma_8(2.33)$	$0.3083 \pm 0.0033$
$\langle d^2 \rangle^{1/2}$	$2.63^{+0.26}_{-0.22}$	$k_{\text{eq}}$	$0.01019^{+0.00028}_{-0.00033}$	$\chi^2_{\text{small}}$	$396.4 \pm 1.3$
$z_{\text{re}}$	$< 7.60$	$100\theta_{\text{eq}}$	$0.829 \pm 0.022$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s$	$2.142^{+0.038}_{-0.044}$	$100\theta_{s,\text{eq}}$	$0.456 \pm 0.011$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$
$10^9 A_s e^{-2\tau}$	$1.916 \pm 0.027$	$H(0.15)$	$75.0 \pm 2.8$		

$\bar{\chi}^2_{\text{eff}} = 2299.69$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 1158.80$ ;  $R - 1 = 0.00845$



### 3.20 base\_Alens\_CamSpecHM\_EE\_lowE\_post\_BAO\_zre6p5/base\_Alens\_plikHM\_EE\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02356 \pm 0.00065$	$D_{220}$	$5940 \pm 140$	$D_M(0.38)$	$1508 \pm 15$
$\Omega_c h^2$	$0.1174 \pm 0.0015$	$D_{810}$	$2589 \pm 35$	$H(0.51)$	$90.53 \pm 0.59$
$100\theta_{MC}$	$1.03954 \pm 0.00082$	$D_{1420}$	$839 \pm 15$	$D_M(0.51)$	$1955 \pm 18$
$\tau$	$0.0545^{+0.0040}_{-0.0074}$	$D_{2000}$	$241.2 \pm 5.6$	$H(0.61)$	$96.07 \pm 0.55$
$A_L$	$1.19 \pm 0.23$	$n_{s,0.002}$	$0.975 \pm 0.011$	$D_M(0.61)$	$2277 \pm 20$
$\ln(10^{10} A_s)$	$3.061^{+0.017}_{-0.020}$	$Y_P$	$0.24587^{+0.00026}_{-0.00023}$	$H(2.33)$	$235.9 \pm 1.0$
$n_s$	$0.975 \pm 0.011$	$Y_P^{\text{BBN}}$	$0.24720^{+0.00027}_{-0.00023}$	$D_M(2.33)$	$5724 \pm 29$
$y_{\text{cal}}$	$0.9999 \pm 0.0025$	$10^5 D/H$	$2.38 \pm 0.11$	$f\sigma_8(0.15)$	$0.4465 \pm 0.0094$
$H_0$	$68.80 \pm 0.85$	Age/Gyr	$13.708 \pm 0.068$	$\sigma_8(0.15)$	$0.7460^{+0.0073}_{-0.0081}$
$\Omega_\Lambda$	$0.7006 \pm 0.0091$	$z_*$	$1088.30 \pm 0.79$	$f\sigma_8(0.38)$	$0.4674 \pm 0.0079$
$\Omega_m$	$0.2994 \pm 0.0091$	$r_*$	$144.19 \pm 0.52$	$\sigma_8(0.38)$	$0.6626^{+0.0061}_{-0.0069}$
$\Omega_m h^2$	$0.1416 \pm 0.0014$	$100\theta_*$	$1.03960 \pm 0.00083$	$f\sigma_8(0.51)$	$0.4675 \pm 0.0071$
$\Omega_m h^3$	$0.0974 \pm 0.0012$	$D_M(z_*)/\text{Gpc}$	$13.870 \pm 0.051$	$\sigma_8(0.51)$	$0.6207^{+0.0056}_{-0.0064}$
$\sigma_8$	$0.8060 \pm 0.0090$	$z_{\text{drag}}$	$1062.4 \pm 1.4$	$f\sigma_8(0.61)$	$0.4635 \pm 0.0065$
$S_8$	$0.805 \pm 0.018$	$r_{\text{drag}}$	$146.47 \pm 0.69$	$\sigma_8(0.61)$	$0.5909^{+0.0053}_{-0.0060}$
$\sigma_8 \Omega_m^{0.5}$	$0.441 \pm 0.010$	$k_D$	$0.1424 \pm 0.0011$	$f\sigma_8(2.33)$	$0.2984^{+0.0027}_{-0.0030}$
$\sigma_8 \Omega_m^{0.25}$	$0.5962 \pm 0.0096$	$100\theta_D$	$0.15911 \pm 0.00081$	$\sigma_8(2.33)$	$0.3082^{+0.0028}_{-0.0032}$
$\sigma_8/h^{0.5}$	$0.972 \pm 0.014$	$z_{\text{eq}}$	$3369 \pm 34$	$\chi^2_{\text{small}}$	$396.4 \pm 1.4$
$r_{\text{drag}} h$	$100.8 \pm 1.2$	$k_{\text{eq}}$	$0.01028 \pm 0.00010$	$\chi^2_{6\text{DF}}$	$0.058 \pm 0.081$
$\langle d^2 \rangle^{1/2}$	$2.62^{+0.26}_{-0.23}$	$100\theta_{\text{eq}}$	$0.8216 \pm 0.0061$	$\chi^2_{\text{MGS}}$	$1.92 \pm 0.72$
$z_{\text{re}}$	$7.40^{+0.26}_{-0.86}$	$100\theta_{s,\text{eq}}$	$0.4528 \pm 0.0031$	$\chi^2_{\text{DR12BAO}}$	$4.5 \pm 1.3$
$10^9 A_s$	$2.135^{+0.036}_{-0.042}$	$H(0.15)$	$73.97 \pm 0.77$	$\chi^2_{\text{prior}}$	$6.0 \pm 5.2$
$10^9 A_s e^{-2\tau}$	$1.915 \pm 0.026$	$D_M(0.15)$	$631.1 \pm 7.2$	$\chi^2_{\text{BAO}}$	$6.5 \pm 1.3$
$D_{40}$	$1241 \pm 34$	$H(0.38)$	$83.91 \pm 0.65$	$\chi^2_{\text{CMB}}$	$1714 \pm 600$

$$\bar{\chi}^2_{\text{eff}} = 2305.22; \Delta \bar{\chi}^2_{\text{eff}} = 1158.23; R - 1 = 0.01446$$



### 3.21 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.476 \pm 0.031$	$H(0.38)$	$83.33 \pm 0.45$
$\Omega_c h^2$	$0.1182 \pm 0.0015$	$z_{\text{re}}$	$7.06^{+0.91}_{-0.72}$	$D_{\text{M}}(0.38)$	$1521 \pm 12$
$100\theta_{MC}$	$1.04107 \pm 0.00032$	$10^9 A_s$	$2.065^{+0.036}_{-0.032}$	$H(0.51)$	$89.98 \pm 0.36$
$\tau$	$0.0490^{+0.0084}_{-0.0074}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$D_{\text{M}}(0.51)$	$1971 \pm 14$
$A_L$	$1.068 \pm 0.041$	$D_{40}$	$1217 \pm 14$	$H(0.61)$	$95.54 \pm 0.29$
$\ln(10^{10} A_s)$	$3.028^{+0.018}_{-0.015}$	$D_{220}$	$5728 \pm 40$	$D_{\text{M}}(0.61)$	$2294 \pm 15$
$n_s$	$0.9695 \pm 0.0050$	$D_{810}$	$2532 \pm 14$	$H(2.33)$	$235.49 \pm 0.90$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{1420}$	$815.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5753 \pm 13$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.0 \pm 1.6$	$f\sigma_8(0.15)$	$0.4463 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9695 \pm 0.0050$	$\sigma_8(0.15)$	$0.7395 \pm 0.0074$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P$	$0.245432 \pm 0.000069$	$f\sigma_8(0.38)$	$0.4659 \pm 0.0080$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.246759 \pm 0.000069$	$\sigma_8(0.38)$	$0.6562 \pm 0.0062$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.568 \pm 0.033$	$f\sigma_8(0.51)$	$0.4653 \pm 0.0071$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.775 \pm 0.029$	$\sigma_8(0.51)$	$0.6144 \pm 0.0056$
$A^{kSZ}$	$< 5.01$	$z_*$	$1089.64 \pm 0.32$	$f\sigma_8(0.61)$	$0.4610 \pm 0.0065$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.82 \pm 0.33$	$\sigma_8(0.61)$	$0.5849 \pm 0.0053$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04125 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2952^{+0.0026}_{-0.0024}$
$H_0$	$68.13 \pm 0.71$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.031$	$\sigma_8(2.33)$	$0.3046^{+0.0027}_{-0.0024}$
$\Omega_\Lambda$	$0.6954 \pm 0.0093$	$z_{\text{drag}}$	$1060.04 \pm 0.35$	$f_{2000}^{143}$	$28.6 \pm 2.8$
$\Omega_m$	$0.3046 \pm 0.0093$	$r_{\text{drag}}$	$147.46 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.0$
$\Omega_m h^2$	$0.1413 \pm 0.0014$	$k_{\text{D}}$	$0.14056 \pm 0.00034$	$f_{2000}^{217}$	$106.1 \pm 1.9$
$\Omega_m h^3$	$0.09627 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16070 \pm 0.00020$	$\chi_{\text{lensing}}^2$	$10.2 \pm 2.0$
$\sigma_8$	$0.7995 \pm 0.0086$	$z_{\text{eq}}$	$3362 \pm 34$	$\chi_{\text{small}}^2$	$396.8 \pm 1.5$
$S_8$	$0.806 \pm 0.019$	$k_{\text{eq}}$	$0.01026 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.42 \pm 0.93$
$\sigma_8 \Omega_m^{0.5}$	$0.441 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8211 \pm 0.0067$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.5939 \pm 0.0098$	$100\theta_{\text{s,eq}}$	$0.4534 \pm 0.0034$	$\chi_{\text{CMB}}^2$	$7365 \pm 5000$
$\sigma_8/h^{0.5}$	$0.969 \pm 0.014$	$H(0.15)$	$73.34 \pm 0.61$		
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.15)$	$636.9 \pm 6.0$		

Best-fit  $\chi_{\text{eff}}^2 = 11927.65$ ;  $\Delta\chi_{\text{eff}}^2 = 9156.45$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.88$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.48$ ;  $R - 1 = 0.01480$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 9.02 ( $\Delta$  -1.15) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.66 ( $\Delta$  -0.00) commander\_dx12\_v3\_2\_29: 22.23 ( $\Delta$  0.17) CamSpec like\_10.7HM\_1400\_unified: 11498.60



### 3.22 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$z_{\text{re}}$	$7.06^{+0.91}_{-0.73}$	$H(0.51)$	$89.97 \pm 0.26$
$\Omega_c h^2$	$0.1182 \pm 0.0011$	$10^9 A_s$	$2.065 \pm 0.035$	$D_{\text{M}}(0.51)$	$1971.0 \pm 9.9$
$100\theta_{\text{MC}}$	$1.04107 \pm 0.00029$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.011$	$H(0.61)$	$95.54 \pm 0.22$
$\tau$	$0.0490^{+0.0083}_{-0.0074}$	$D_{40}$	$1217 \pm 13$	$D_{\text{M}}(0.61)$	$2294 \pm 11$
$A_L$	$1.067 \pm 0.037$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.49 \pm 0.65$
$\ln(10^{10} A_s)$	$3.028^{+0.017}_{-0.016}$	$D_{810}$	$2532 \pm 14$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$n_s$	$0.9695 \pm 0.0041$	$D_{1420}$	$815.7 \pm 4.9$	$f\sigma_8(0.15)$	$0.4464 \pm 0.0073$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.15)$	$0.7396 \pm 0.0070$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9695 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4660 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245431 \pm 0.000059$	$\sigma_8(0.38)$	$0.6563 \pm 0.0060$
$A_{143}^{tSZ}$	$4.8^{+2.4}_{-2.2}$	$Y_P^{\text{BBN}}$	$0.246758 \pm 0.000060$	$f\sigma_8(0.51)$	$0.4654 \pm 0.0058$
$A_{100}^{PS}$	$246 \pm 30$	$10^5 D/H$	$2.568 \pm 0.028$	$\sigma_8(0.51)$	$0.6145 \pm 0.0055$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.775 \pm 0.023$	$f\sigma_8(0.61)$	$0.4611 \pm 0.0054$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.64 \pm 0.25$	$\sigma_8(0.61)$	$0.5849 \pm 0.0052$
$A^{kSZ}$	$< 5.05$	$r_*$	$144.82 \pm 0.25$	$f\sigma_8(2.33)$	$0.2952 \pm 0.0026$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04125 \pm 0.00029$	$\sigma_8(2.33)$	$0.3046 \pm 0.0027$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.908 \pm 0.024$	$f_{2000}^{143}$	$28.6 \pm 2.8$
$H_0$	$68.12 \pm 0.49$	$z_{\text{drag}}$	$1060.03 \pm 0.33$	$f_{2000}^{143 \times 217}$	$31.3 \pm 1.9$
$\Omega_\Lambda$	$0.6954 \pm 0.0065$	$r_{\text{drag}}$	$147.46 \pm 0.26$	$f_{2000}^{217}$	$106.1 \pm 1.9$
$\Omega_m$	$0.3046 \pm 0.0065$	$k_{\text{D}}$	$0.14055 \pm 0.00031$	$\chi_{\text{lensing}}^2$	$10.2 \pm 2.0$
$\Omega_m h^2$	$0.1413 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16071 \pm 0.00019$	$\chi_{\text{small}}^2$	$396.8 \pm 1.5$
$\Omega_m h^3$	$0.09627 \pm 0.00032$	$z_{\text{eq}}$	$3362 \pm 24$	$\chi_{\text{lowl}}^2$	$22.41 \pm 0.80$
$\sigma_8$	$0.7996 \pm 0.0078$	$k_{\text{eq}}$	$0.010261 \pm 0.000074$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.042$
$S_8$	$0.806 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8210 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.74 \pm 0.52$
$\sigma_8 \Omega_m^{0.5}$	$0.4413 \pm 0.0077$	$100\theta_{\text{s,eq}}$	$0.4533 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$3.99 \pm 0.83$
$\sigma_8 \Omega_m^{0.25}$	$0.5940 \pm 0.0078$	$H(0.15)$	$73.33 \pm 0.43$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.969 \pm 0.011$	$D_{\text{M}}(0.15)$	$636.9 \pm 4.2$	$\chi_{\text{CMB}}^2$	$7364 \pm 5000$
$r_{\text{drag}} h$	$100.45 \pm 0.85$	$H(0.38)$	$83.32 \pm 0.32$	$\chi_{\text{BAO}}^2$	$5.76 \pm 0.75$
$\langle d^2 \rangle^{1/2}$	$2.476 \pm 0.031$	$D_{\text{M}}(0.38)$	$1520.7 \pm 8.4$		

$$\bar{\chi}_{\text{eff}}^2 = 11955.09; \Delta\bar{\chi}_{\text{eff}}^2 = 9151.42; R - 1 = 0.01872$$



### 3.23 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.477 \pm 0.031$	$H(0.38)$	$83.34 \pm 0.45$
$\Omega_c h^2$	$0.1182 \pm 0.0015$	$z_{\text{re}}$	$7.42^{+0.33}_{-0.82}$	$D_{\text{M}}(0.38)$	$1520 \pm 12$
$100\theta_{MC}$	$1.04107 \pm 0.00032$	$10^9 A_s$	$2.079^{+0.021}_{-0.030}$	$H(0.51)$	$89.99 \pm 0.36$
$\tau$	$0.0524^{+0.0034}_{-0.0076}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$D_{\text{M}}(0.51)$	$1971 \pm 14$
$A_L$	$1.061 \pm 0.040$	$D_{40}$	$1218 \pm 14$	$H(0.61)$	$95.55 \pm 0.29$
$\ln(10^{10} A_s)$	$3.034^{+0.010}_{-0.015}$	$D_{220}$	$5727 \pm 40$	$D_{\text{M}}(0.61)$	$2294 \pm 15$
$n_s$	$0.9697 \pm 0.0050$	$D_{810}$	$2531 \pm 14$	$H(2.33)$	$235.47 \pm 0.90$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$815.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5753 \pm 13$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.0 \pm 1.7$	$f\sigma_8(0.15)$	$0.4476 \pm 0.0095$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9697 \pm 0.0050$	$\sigma_8(0.15)$	$0.7418 \pm 0.0062$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P$	$0.245433 \pm 0.000070$	$f\sigma_8(0.38)$	$0.4673 \pm 0.0077$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.246759 \pm 0.000070$	$\sigma_8(0.38)$	$0.6583^{+0.0045}_{-0.0053}$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.567 \pm 0.033$	$f\sigma_8(0.51)$	$0.4667 \pm 0.0067$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.774 \pm 0.029$	$\sigma_8(0.51)$	$0.6164^{+0.0039}_{-0.0048}$
$A^{kSZ}$	$< 4.99$	$z_*$	$1089.63 \pm 0.33$	$f\sigma_8(0.61)$	$0.4624 \pm 0.0060$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$r_*$	$144.83 \pm 0.33$	$\sigma_8(0.61)$	$0.5867^{+0.0035}_{-0.0045}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04125 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2961^{+0.0016}_{-0.0022}$
$H_0$	$68.14 \pm 0.71$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.031$	$\sigma_8(2.33)$	$0.3056^{+0.0016}_{-0.0023}$
$\Omega_\Lambda$	$0.6956 \pm 0.0093$	$z_{\text{drag}}$	$1060.04 \pm 0.36$	$f_{2000}^{143}$	$28.6 \pm 2.8$
$\Omega_m$	$0.3044 \pm 0.0093$	$r_{\text{drag}}$	$147.47 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.0$
$\Omega_m h^2$	$0.1413 \pm 0.0014$	$k_{\text{D}}$	$0.14055 \pm 0.00035$	$f_{2000}^{217}$	$106.1 \pm 1.9$
$\Omega_m h^3$	$0.09626 \pm 0.00032$	$100\theta_{\text{D}}$	$0.16070 \pm 0.00020$	$\chi_{\text{lensing}}^2$	$10.2 \pm 2.0$
$\sigma_8$	$0.8020 \pm 0.0074$	$z_{\text{eq}}$	$3361 \pm 34$	$\chi_{\text{small}}^2$	$396.3 \pm 1.0$
$S_8$	$0.808 \pm 0.018$	$k_{\text{eq}}$	$0.01026 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.47 \pm 0.94$
$\sigma_8 \Omega_m^{0.5}$	$0.442 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8213 \pm 0.0067$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.5957 \pm 0.0093$	$100\theta_{\text{s,eq}}$	$0.4535 \pm 0.0034$	$\chi_{\text{CMB}}^2$	$7364 \pm 5000$
$\sigma_8/h^{0.5}$	$0.972 \pm 0.013$	$H(0.15)$	$73.35 \pm 0.61$		
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.15)$	$636.8 \pm 6.0$		

$\bar{\chi}_{\text{eff}}^2 = 11949.57$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.61$ ;  $R - 1 = 0.01602$



### 3.24 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$z_{\text{re}}$	$7.42^{+0.32}_{-0.82}$	$H(0.51)$	$89.97 \pm 0.26$
$\Omega_c h^2$	$0.1182 \pm 0.0011$	$10^9 A_s$	$2.079^{+0.020}_{-0.031}$	$D_{\text{M}}(0.51)$	$1970.9 \pm 9.9$
$100\theta_{\text{MC}}$	$1.04107 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.011$	$H(0.61)$	$95.54 \pm 0.22$
$\tau$	$0.0523^{+0.0034}_{-0.0074}$	$D_{40}$	$1218 \pm 13$	$D_{\text{M}}(0.61)$	$2294 \pm 11$
$A_L$	$1.061 \pm 0.035$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$235.48 \pm 0.65$
$\ln(10^{10} A_s)$	$3.034^{+0.010}_{-0.015}$	$D_{810}$	$2532 \pm 14$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$n_s$	$0.9696 \pm 0.0041$	$D_{1420}$	$815.7 \pm 4.9$	$f\sigma_8(0.15)$	$0.4478 \pm 0.0069$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.15)$	$0.7419^{+0.0049}_{-0.0061}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9696 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4675 \pm 0.0058$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245431^{+0.000061}_{-0.000055}$	$\sigma_8(0.38)$	$0.6584^{+0.0040}_{-0.0052}$
$A_{143}^{tSZ}$	$4.8^{+2.5}_{-2.2}$	$Y_P^{\text{BBN}}$	$0.246758^{+0.000061}_{-0.000056}$	$f\sigma_8(0.51)$	$0.4669 \pm 0.0052$
$A_{100}^{PS}$	$246 \pm 30$	$10^5 D/H$	$2.568 \pm 0.028$	$\sigma_8(0.51)$	$0.6165^{+0.0036}_{-0.0048}$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.775 \pm 0.023$	$f\sigma_8(0.61)$	$0.4625 \pm 0.0047$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.64 \pm 0.25$	$\sigma_8(0.61)$	$0.5868^{+0.0033}_{-0.0045}$
$A^{kSZ}$	$< 5.02$	$r_*$	$144.82 \pm 0.25$	$f\sigma_8(2.33)$	$0.2962^{+0.0016}_{-0.0022}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04125 \pm 0.00029$	$\sigma_8(2.33)$	$0.3056^{+0.0016}_{-0.0023}$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.024$	$f_{2000}^{143}$	$28.6 \pm 2.8$
$H_0$	$68.13 \pm 0.50$	$z_{\text{drag}}$	$1060.03 \pm 0.33$	$f_{2000}^{143 \times 217}$	$31.3 \pm 1.9$
$\Omega_\Lambda$	$0.6955 \pm 0.0065$	$r_{\text{drag}}$	$147.46 \pm 0.26$	$f_{2000}^{217}$	$106.1 \pm 1.9$
$\Omega_m$	$0.3045 \pm 0.0065$	$k_{\text{D}}$	$0.14055 \pm 0.00032$	$\chi_{\text{lensing}}^2$	$10.2 \pm 2.0$
$\Omega_m h^2$	$0.1413 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16071 \pm 0.00019$	$\chi_{\text{small}}^2$	$396.3 \pm 1.0$
$\Omega_m h^3$	$0.09626 \pm 0.00032$	$z_{\text{eq}}$	$3361 \pm 24$	$\chi_{\text{lowl}}^2$	$22.47 \pm 0.80$
$\sigma_8$	$0.8022^{+0.0058}_{-0.0069}$	$k_{\text{eq}}$	$0.010259 \pm 0.000074$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.042$
$S_8$	$0.808 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8211 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.74 \pm 0.52$
$\sigma_8 \Omega_m^{0.5}$	$0.4427 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4534 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$3.98 \pm 0.83$
$\sigma_8 \Omega_m^{0.25}$	$0.5959 \pm 0.0071$	$H(0.15)$	$73.33 \pm 0.43$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.972 \pm 0.010$	$D_{\text{M}}(0.15)$	$636.9 \pm 4.2$	$\chi_{\text{CMB}}^2$	$7364 \pm 5000$
$r_{\text{drag}} h$	$100.46 \pm 0.85$	$H(0.38)$	$83.33 \pm 0.32$	$\chi_{\text{BAO}}^2$	$5.76 \pm 0.75$
$\langle d^2 \rangle^{1/2}$	$2.477 \pm 0.030$	$D_{\text{M}}(0.38)$	$1520.6 \pm 8.4$		

$$\bar{\chi}_{\text{eff}}^2 = 11954.75; \Delta\bar{\chi}_{\text{eff}}^2 = 9151.56; R - 1 = 0.02132$$



### 3.25 base\_Alens\_CamSpecHM\_TT/base\_Alens\_plikHM\_TT

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02254 \pm 0.00030$	$\sigma_8/h^{0.5}$	$1.008^{+0.046}_{-0.063}$	$100\theta_{\text{eq}}$	$0.825 \pm 0.012$
$\Omega_c h^2$	$0.1174 \pm 0.0028$	$r_{\text{drag}} h$	$101.2 \pm 2.2$	$100\theta_{\text{s,eq}}$	$0.4552 \pm 0.0061$
$100\theta_{MC}$	$1.04131 \pm 0.00055$	$\langle d^2 \rangle^{1/2}$	$2.630 \pm 0.078$	$H(0.15)$	$73.7 \pm 1.1$
$\tau$	$< 0.119$	$z_{\text{re}}$	$10.8^{+5.3}_{-4.5}$	$D_{\text{M}}(0.15)$	$633 \pm 11$
$A_L$	$1.12^{+0.13}_{-0.15}$	$10^9 A_s$	$2.27^{+0.13}_{-0.33}$	$H(0.38)$	$83.61 \pm 0.84$
$\ln(10^{10} A_s)$	$3.115^{+0.070}_{-0.14}$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.016$	$D_{\text{M}}(0.38)$	$1514 \pm 22$
$n_s$	$0.9729 \pm 0.0084$	$D_{40}$	$1234^{+22}_{-32}$	$H(0.51)$	$90.21 \pm 0.67$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{220}$	$5728 \pm 42$	$D_{\text{M}}(0.51)$	$1963 \pm 26$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2527 \pm 14$	$H(0.61)$	$95.73^{+0.51}_{-0.57}$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$D_{1420}$	$814.0 \pm 5.1$	$D_{\text{M}}(0.61)$	$2285 \pm 28$
$A_{100}^{PS}$	$241 \pm 30$	$D_{2000}$	$232.0 \pm 2.2$	$H(2.33)$	$235.1 \pm 1.6$
$A_{143}^{PS}$	$38 \pm 10$	$n_{s,0.002}$	$0.9729 \pm 0.0084$	$D_{\text{M}}(2.33)$	$5745 \pm 24$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$Y_P$	$0.24546 \pm 0.00012$	$f\sigma_8(0.15)$	$0.462^{+0.025}_{-0.029}$
$A^{kSZ}$	$< 4.35$	$Y_P^{\text{BBN}}$	$0.24678 \pm 0.00012$	$\sigma_8(0.15)$	$0.772^{+0.030}_{-0.052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$10^5 D/H$	$2.557 \pm 0.055$	$f\sigma_8(0.38)$	$0.484^{+0.024}_{-0.030}$
$c_{217}$	$0.9995^{+0.0019}_{-0.0022}$	Age/Gyr	$13.758 \pm 0.053$	$\sigma_8(0.38)$	$0.686^{+0.025}_{-0.048}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$z_*$	$1089.49 \pm 0.57$	$f\sigma_8(0.51)$	$0.484^{+0.023}_{-0.030}$
$H_0$	$68.6 \pm 1.3$	$r_*$	$144.98 \pm 0.58$	$\sigma_8(0.51)$	$0.642^{+0.023}_{-0.045}$
$\Omega_\Lambda$	$0.700^{+0.017}_{-0.016}$	$100\theta_*$	$1.04148 \pm 0.00053$	$f\sigma_8(0.61)$	$0.480^{+0.022}_{-0.030}$
$\Omega_m$	$0.300 \pm 0.017$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.921 \pm 0.052$	$\sigma_8(0.61)$	$0.612^{+0.021}_{-0.043}$
$\Omega_m h^2$	$0.1406 \pm 0.0025$	$z_{\text{drag}}$	$1060.13 \pm 0.57$	$f\sigma_8(2.33)$	$0.309^{+0.010}_{-0.022}$
$\Omega_m h^3$	$0.09635 \pm 0.00050$	$r_{\text{drag}}$	$147.60 \pm 0.55$	$\sigma_8(2.33)$	$0.319^{+0.010}_{-0.024}$
$\sigma_8$	$0.834^{+0.033}_{-0.055}$	$k_{\text{D}}$	$0.14045 \pm 0.00054$	$f_{2000}^{143}$	$27 \pm 4$
$S_8$	$0.833^{+0.046}_{-0.054}$	$100\theta_{\text{D}}$	$0.16068 \pm 0.00031$	$f_{2000}^{143 \times 217}$	$29.9 \pm 2.7$
$\sigma_8 \Omega_m^{0.5}$	$0.457^{+0.025}_{-0.030}$	$z_{\text{eq}}$	$3344 \pm 61$	$f_{2000}^{217}$	$104.9 \pm 2.4$
$\sigma_8 \Omega_m^{0.25}$	$0.617^{+0.030}_{-0.038}$	$k_{\text{eq}}$	$0.01021 \pm 0.00019$	$\chi^2_{\text{prior}}$	$7.1 \pm 3.4$

Best-fit  $\chi^2_{\text{eff}} = 7046.45$ ;  $\Delta\chi^2_{\text{eff}} = 6293.22$ ;  $\bar{\chi}^2_{\text{eff}} = 7067.10$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.84$ ;  $R - 1 = 0.00805$   
 $\chi^2_{\text{eff}}$ : CMB - CamSpec like\_10.7HM: 7045.02



### 3.26 base\_Alens\_CamSpecHM\_TT\_post\_zre6p5/base\_Alens\_plikHM\_TT\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02254 \pm 0.00030$	$\sigma_8/h^{0.5}$	$1.024^{+0.038}_{-0.054}$	$100\theta_{\text{eq}}$	$0.825 \pm 0.012$
$\Omega_c h^2$	$0.1173 \pm 0.0028$	$r_{\text{drag}} h$	$101.3 \pm 2.3$	$100\theta_{\text{s,eq}}$	$0.4555 \pm 0.0061$
$100\theta_{MC}$	$1.04132 \pm 0.00055$	$\langle d^2 \rangle^{1/2}$	$2.629 \pm 0.078$	$H(0.15)$	$73.8 \pm 1.1$
$\tau$	$0.111^{+0.024}_{-0.063}$	$z_{\text{re}}$	$12.4^{+2.9}_{-4.6}$	$D_{\text{M}}(0.15)$	$633 \pm 11$
$A_L$	$1.09^{+0.11}_{-0.13}$	$10^9 A_s$	$2.34^{+0.11}_{-0.28}$	$H(0.38)$	$83.65 \pm 0.84$
$\ln(10^{10} A_s)$	$3.149^{+0.054}_{-0.12}$	$10^9 A_s e^{-2\tau}$	$1.868 \pm 0.016$	$D_{\text{M}}(0.38)$	$1513 \pm 22$
$n_s$	$0.9736 \pm 0.0084$	$D_{40}$	$1240^{+23}_{-31}$	$H(0.51)$	$90.23 \pm 0.67$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{220}$	$5726 \pm 42$	$D_{\text{M}}(0.51)$	$1961 \pm 26$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2526 \pm 14$	$H(0.61)$	$95.75^{+0.51}_{-0.58}$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$D_{1420}$	$814.1 \pm 5.2$	$D_{\text{M}}(0.61)$	$2284 \pm 28$
$A_{100}^{PS}$	$240 \pm 30$	$D_{2000}$	$232.1 \pm 2.2$	$H(2.33)$	$235.0 \pm 1.6$
$A_{143}^{PS}$	$38 \pm 10$	$n_{s,0.002}$	$0.9736 \pm 0.0084$	$D_{\text{M}}(2.33)$	$5744 \pm 24$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$Y_P$	$0.24546 \pm 0.00012$	$f\sigma_8(0.15)$	$0.469^{+0.022}_{-0.027}$
$A^{kSZ}$	$< 4.28$	$Y_P^{\text{BBN}}$	$0.24679 \pm 0.00012$	$\sigma_8(0.15)$	$0.785^{+0.024}_{-0.043}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$10^5 D/H$	$2.556 \pm 0.055$	$f\sigma_8(0.38)$	$0.491^{+0.020}_{-0.026}$
$c_{217}$	$0.9995^{+0.0019}_{-0.0022}$	Age/Gyr	$13.756 \pm 0.053$	$\sigma_8(0.38)$	$0.697^{+0.020}_{-0.039}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$z_*$	$1089.47 \pm 0.57$	$f\sigma_8(0.51)$	$0.491^{+0.019}_{-0.026}$
$H_0$	$68.6 \pm 1.3$	$r_*$	$145.01 \pm 0.58$	$\sigma_8(0.51)$	$0.653^{+0.018}_{-0.037}$
$\Omega_\Lambda$	$0.701 \pm 0.017$	$100\theta_*$	$1.04149 \pm 0.00053$	$f\sigma_8(0.61)$	$0.487^{+0.018}_{-0.026}$
$\Omega_m$	$0.299 \pm 0.017$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.923 \pm 0.052$	$\sigma_8(0.61)$	$0.622^{+0.017}_{-0.036}$
$\Omega_m h^2$	$0.1405 \pm 0.0025$	$z_{\text{drag}}$	$1060.13 \pm 0.57$	$f\sigma_8(2.33)$	$0.3141^{+0.0082}_{-0.019}$
$\Omega_m h^3$	$0.09635 \pm 0.00050$	$r_{\text{drag}}$	$147.63 \pm 0.55$	$\sigma_8(2.33)$	$0.3245^{+0.0081}_{-0.020}$
$\sigma_8$	$0.848^{+0.027}_{-0.046}$	$k_{\text{D}}$	$0.14043 \pm 0.00054$	$f_{2000}^{143}$	$27 \pm 4$
$S_8$	$0.846^{+0.041}_{-0.049}$	$100\theta_{\text{D}}$	$0.16068 \pm 0.00031$	$f_{2000}^{143 \times 217}$	$29.8 \pm 2.7$
$\sigma_8 \Omega_m^{0.5}$	$0.463^{+0.022}_{-0.027}$	$z_{\text{eq}}$	$3341 \pm 61$	$f_{2000}^{217}$	$104.8 \pm 2.4$
$\sigma_8 \Omega_m^{0.25}$	$0.627^{+0.025}_{-0.034}$	$k_{\text{eq}}$	$0.01020 \pm 0.00019$	$\chi^2_{\text{prior}}$	$7.1 \pm 3.4$

$\bar{\chi}^2_{\text{eff}} = 7067.05$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.74$ ;  $R - 1 = 0.01053$



### 3.27 base\_Alens\_CamSpecHM\_TT\_lowl/base\_Alens\_plikHM\_TT\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02264 \pm 0.00030$	$r_{\text{drag}} h$	$102.1 \pm 2.1$	$H(0.15)$	$74.2 \pm 1.1$
$\Omega_c h^2$	$0.1163 \pm 0.0025$	$\langle d^2 \rangle^{1/2}$	$2.639 \pm 0.077$	$D_{\text{M}}(0.15)$	$629 \pm 10$
$100\theta_{MC}$	$1.04145 \pm 0.00053$	$z_{\text{re}}$	$7.8^{+2.2}_{-5.0}$	$H(0.38)$	$83.95 \pm 0.80$
$\tau$	$< 0.0745$	$10^9 A_s$	$2.109^{+0.072}_{-0.20}$	$D_{\text{M}}(0.38)$	$1505 \pm 21$
$A_L$	$1.23 \pm 0.12$	$10^9 A_s e^{-2\tau}$	$1.865 \pm 0.015$	$H(0.51)$	$90.47 \pm 0.65$
$\ln(10^{10} A_s)$	$3.046^{+0.038}_{-0.094}$	$D_{40}$	$1211 \pm 19$	$D_{\text{M}}(0.51)$	$1952 \pm 24$
$n_s$	$0.9758 \pm 0.0076$	$D_{220}$	$5731 \pm 42$	$H(0.61)$	$95.95^{+0.50}_{-0.55}$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2525 \pm 14$	$D_{\text{M}}(0.61)$	$2274 \pm 26$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$814.5 \pm 5.1$	$H(2.33)$	$234.5 \pm 1.5$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.5 \pm 2.1$	$D_{\text{M}}(2.33)$	$5736 \pm 23$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9758 \pm 0.0076$	$f\sigma_8(0.15)$	$0.440^{+0.018}_{-0.021}$
$A_{100}^{PS}$	$238 \pm 30$	$Y_P$	$0.24550^{+0.00011}_{-0.00012}$	$\sigma_8(0.15)$	$0.743^{+0.017}_{-0.034}$
$A_{143}^{PS}$	$37 \pm 10$	$Y_P^{\text{BBN}}$	$0.24683^{+0.00011}_{-0.00013}$	$f\sigma_8(0.38)$	$0.462^{+0.016}_{-0.021}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.538 \pm 0.053$	$\sigma_8(0.38)$	$0.661^{+0.014}_{-0.030}$
$A^{kSZ}$	$< 4.15$	Age/Gyr	$13.738 \pm 0.051$	$f\sigma_8(0.51)$	$0.463^{+0.015}_{-0.020}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1089.27 \pm 0.54$	$\sigma_8(0.51)$	$0.619^{+0.013}_{-0.028}$
$c_{217}$	$0.9995^{+0.0017}_{-0.0022}$	$r_*$	$145.19 \pm 0.53$	$f\sigma_8(0.61)$	$0.460^{+0.014}_{-0.020}$
$H_0$	$69.1 \pm 1.2$	$100\theta_*$	$1.04161 \pm 0.00052$	$\sigma_8(0.61)$	$0.590^{+0.012}_{-0.027}$
$\Omega_\Lambda$	$0.707^{+0.016}_{-0.014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.939 \pm 0.048$	$f\sigma_8(2.33)$	$0.2982^{+0.0055}_{-0.014}$
$\Omega_m$	$0.293 \pm 0.015$	$z_{\text{drag}}$	$1060.28 \pm 0.57$	$\sigma_8(2.33)$	$0.3083^{+0.0055}_{-0.015}$
$\Omega_m h^2$	$0.1396 \pm 0.0023$	$r_{\text{drag}}$	$147.78 \pm 0.51$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.09641 \pm 0.00050$	$k_{\text{D}}$	$0.14034 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$29.3 \pm 2.6$
$\sigma_8$	$0.802^{+0.019}_{-0.036}$	$100\theta_{\text{D}}$	$0.16060 \pm 0.00031$	$f_{2000}^{217}$	$104.4 \pm 2.4$
$S_8$	$0.793^{+0.033}_{-0.039}$	$z_{\text{eq}}$	$3321 \pm 56$	$\chi_{\text{lowl}}^2$	$22.1 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.434^{+0.018}_{-0.022}$	$k_{\text{eq}}$	$0.01014 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8 \Omega_m^{0.25}$	$0.590^{+0.019}_{-0.026}$	$100\theta_{\text{eq}}$	$0.830 \pm 0.011$	$\chi_{\text{CMB}}^2$	$3936 \pm 3000$
$\sigma_8/h^{0.5}$	$0.965^{+0.029}_{-0.043}$	$100\theta_{\text{s,eq}}$	$0.4576 \pm 0.0057$		

Best-fit  $\chi_{\text{eff}}^2 = 7068.30$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.30$ ;  $\bar{\chi}_{\text{eff}}^2 = 7089.14$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.70$ ;  $R - 1 = 0.00730$   
 $\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 20.86 ( $\Delta$  -0.12) CamSpec like\_10.7HM: 7046.06



### 3.28 base\_Alens\_CamSpecHM\_TT\_lowl\_post\_zre6p5/base\_Alens\_plikHM\_TT\_lowl\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02266 \pm 0.00030$	$r_{\text{drag}} h$	$102.3 \pm 2.1$	$H(0.15)$	$74.3 \pm 1.1$
$\Omega_c h^2$	$0.1160 \pm 0.0025$	$\langle d^2 \rangle^{1/2}$	$2.640 \pm 0.077$	$D_{\text{M}}(0.15)$	$628 \pm 10$
$100\theta_{MC}$	$1.04149 \pm 0.00053$	$z_{\text{re}}$	$< 11.1$	$H(0.38)$	$84.04 \pm 0.80$
$\tau$	$0.082^{+0.012}_{-0.038}$	$10^9 A_s$	$2.200^{+0.057}_{-0.16}$	$D_{\text{M}}(0.38)$	$1502 \pm 21$
$A_L$	$1.18 \pm 0.11$	$10^9 A_s e^{-2\tau}$	$1.863 \pm 0.015$	$H(0.51)$	$90.54 \pm 0.65$
$\ln(10^{10} A_s)$	$3.090^{+0.028}_{-0.073}$	$D_{40}$	$1215 \pm 19$	$D_{\text{M}}(0.51)$	$1949 \pm 24$
$n_s$	$0.9770 \pm 0.0076$	$D_{220}$	$5730 \pm 42$	$H(0.61)$	$96.00^{+0.50}_{-0.56}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{810}$	$2525 \pm 14$	$D_{\text{M}}(0.61)$	$2271 \pm 26$
$A_{217}^{CIB}$	$40 \pm 8$	$D_{1420}$	$814.8 \pm 5.1$	$H(2.33)$	$234.3 \pm 1.4$
$\xi^{tSZ-CIB}$	$> 0.380$	$D_{2000}$	$232.7 \pm 2.1$	$D_{\text{M}}(2.33)$	$5734 \pm 23$
$A_{143}^{tSZ}$	$4.9^{+2.3}_{-2.1}$	$n_{s,0.002}$	$0.9770 \pm 0.0076$	$f\sigma_8(0.15)$	$0.448^{+0.017}_{-0.019}$
$A_{100}^{PS}$	$237 \pm 30$	$Y_P$	$0.24551^{+0.00011}_{-0.00013}$	$\sigma_8(0.15)$	$0.759^{+0.014}_{-0.027}$
$A_{143}^{PS}$	$37 \pm 10$	$Y_P^{\text{BBN}}$	$0.24683^{+0.00011}_{-0.00013}$	$f\sigma_8(0.38)$	$0.471^{+0.015}_{-0.018}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.534 \pm 0.054$	$\sigma_8(0.38)$	$0.675^{+0.011}_{-0.024}$
$A^{kSZ}$	$< 4.06$	Age/Gyr	$13.733 \pm 0.051$	$f\sigma_8(0.51)$	$0.472^{+0.013}_{-0.017}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1089.22 \pm 0.54$	$\sigma_8(0.51)$	$0.633^{+0.010}_{-0.023}$
$c_{217}$	$0.9995^{+0.0016}_{-0.0022}$	$r_*$	$145.25 \pm 0.53$	$f\sigma_8(0.61)$	$0.469^{+0.012}_{-0.017}$
$H_0$	$69.2 \pm 1.2$	$100\theta_*$	$1.04164 \pm 0.00052$	$\sigma_8(0.61)$	$0.6025^{+0.0093}_{-0.022}$
$\Omega_\Lambda$	$0.709 \pm 0.015$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.945 \pm 0.048$	$f\sigma_8(2.33)$	$0.3046^{+0.0043}_{-0.011}$
$\Omega_m$	$0.291 \pm 0.015$	$z_{\text{drag}}$	$1060.31 \pm 0.57$	$\sigma_8(2.33)$	$0.3151^{+0.0042}_{-0.012}$
$\Omega_m h^2$	$0.1393 \pm 0.0023$	$r_{\text{drag}}$	$147.84 \pm 0.51$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.09641 \pm 0.00050$	$k_{\text{D}}$	$0.14029 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$29.1 \pm 2.6$
$\sigma_8$	$0.819^{+0.016}_{-0.029}$	$100\theta_{\text{D}}$	$0.16059 \pm 0.00031$	$f_{2000}^{217}$	$104.2 \pm 2.4$
$S_8$	$0.806^{+0.032}_{-0.036}$	$z_{\text{eq}}$	$3314 \pm 56$	$\chi_{\text{lowl}}^2$	$22.5 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.442^{+0.017}_{-0.020}$	$k_{\text{eq}}$	$0.01011 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.2 \pm 3.4$
$\sigma_8 \Omega_m^{0.25}$	$0.601^{+0.018}_{-0.023}$	$100\theta_{\text{eq}}$	$0.831 \pm 0.011$	$\chi_{\text{CMB}}^2$	$3936 \pm 3000$
$\sigma_8/h^{0.5}$	$0.984^{+0.026}_{-0.036}$	$100\theta_{\text{s,eq}}$	$0.4583 \pm 0.0057$		

$\bar{\chi}_{\text{eff}}^2 = 7089.50$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.58$ ;  $R - 1 = 0.00995$



### 3.29 base\_Alens\_CamSpecHM\_TT\_lowE/base\_Alens\_plikHM\_TT\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02251 \pm 0.00030$	$r_{\text{drag}} h$	$100.8 \pm 2.2$	$H(0.15)$	$73.5 \pm 1.1$
$\Omega_c h^2$	$0.1178 \pm 0.0027$	$\langle d^2 \rangle^{1/2}$	$2.629 \pm 0.078$	$D_{\text{M}}(0.15)$	$635 \pm 11$
$100\theta_{MC}$	$1.04125 \pm 0.00055$	$z_{\text{re}}$	$7.17^{+0.90}_{-0.74}$	$H(0.38)$	$83.49 \pm 0.83$
$\tau$	$0.0502 \pm 0.0085$	$10^9 A_s$	$2.070 \pm 0.037$	$D_{\text{M}}(0.38)$	$1517 \pm 22$
$A_L$	$1.209^{+0.093}_{-0.10}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.016$	$H(0.51)$	$90.12 \pm 0.66$
$\ln(10^{10} A_s)$	$3.030^{+0.018}_{-0.016}$	$D_{40}$	$1217 \pm 19$	$D_{\text{M}}(0.51)$	$1966 \pm 26$
$n_s$	$0.9705 \pm 0.0080$	$D_{220}$	$5734 \pm 42$	$H(0.61)$	$95.66^{+0.50}_{-0.57}$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{810}$	$2527 \pm 14$	$D_{\text{M}}(0.61)$	$2289 \pm 28$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$813.5 \pm 5.2$	$H(2.33)$	$235.3 \pm 1.6$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.6 \pm 2.2$	$D_{\text{M}}(2.33)$	$5748 \pm 24$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$n_{s,0.002}$	$0.9705 \pm 0.0080$	$f\sigma_8(0.15)$	$0.445 \pm 0.017$
$A_{100}^{PS}$	$243 \pm 30$	$Y_P$	$0.24545 \pm 0.00012$	$\sigma_8(0.15)$	$0.7395 \pm 0.0096$
$A_{143}^{PS}$	$39 \pm 10$	$Y_P^{\text{BBN}}$	$0.24677 \pm 0.00012$	$f\sigma_8(0.38)$	$0.465 \pm 0.013$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.561 \pm 0.055$	$\sigma_8(0.38)$	$0.6565 \pm 0.0073$
$A^{kSZ}$	$< 4.61$	Age/Gyr	$13.764 \pm 0.052$	$f\sigma_8(0.51)$	$0.464 \pm 0.011$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1089.56 \pm 0.57$	$\sigma_8(0.51)$	$0.6148 \pm 0.0064$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	$r_*$	$144.89 \pm 0.57$	$f\sigma_8(0.61)$	$0.460 \pm 0.010$
$H_0$	$68.4 \pm 1.3$	$100\theta_*$	$1.04142 \pm 0.00053$	$\sigma_8(0.61)$	$0.5853 \pm 0.0059$
$\Omega_\Lambda$	$0.698^{+0.018}_{-0.016}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.912 \pm 0.051$	$f\sigma_8(2.33)$	$0.2955 \pm 0.0028$
$\Omega_m$	$0.302^{+0.016}_{-0.018}$	$z_{\text{drag}}$	$1060.11 \pm 0.57$	$\sigma_8(2.33)$	$0.3051 \pm 0.0028$
$\Omega_m h^2$	$0.1410 \pm 0.0025$	$r_{\text{drag}}$	$147.51 \pm 0.54$	$f_{2000}^{143}$	$27 \pm 4$
$\Omega_m h^3$	$0.09636 \pm 0.00050$	$k_{\text{D}}$	$0.14053 \pm 0.00053$	$f_{2000}^{143 \times 217}$	$30.4 \pm 2.6$
$\sigma_8$	$0.799 \pm 0.012$	$100\theta_{\text{D}}$	$0.16069 \pm 0.00031$	$f_{2000}^{217}$	$105.3 \pm 2.4$
$S_8$	$0.802 \pm 0.032$	$z_{\text{eq}}$	$3354 \pm 60$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.439 \pm 0.018$	$k_{\text{eq}}$	$0.01024 \pm 0.00018$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8 \Omega_m^{0.25}$	$0.593 \pm 0.016$	$100\theta_{\text{eq}}$	$0.823 \pm 0.012$	$\chi_{\text{CMB}}^2$	$4310 \pm 3000$
$\sigma_8/h^{0.5}$	$0.967 \pm 0.022$	$100\theta_{\text{s,eq}}$	$0.4543 \pm 0.0060$		

Best-fit  $\chi_{\text{eff}}^2 = 7442.68$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.39$ ;  $\bar{\chi}_{\text{eff}}^2 = 7463.85$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.77$ ;  $R - 1 = 0.00741$   
 $\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.67 ( $\Delta$  0.01) CamSpec like\_10.7HM: 7045.62



### 3.30 base\_Alens\_CamSpecHM\_TTTEEE/base\_Alens\_plikHM\_TTTEEE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02252 \pm 0.00019$	$\sigma_8/h^{0.5}$	$1.020^{+0.038}_{-0.075}$	$100\theta_{\text{eq}}$	$0.8205 \pm 0.0070$
$\Omega_c h^2$	$0.1183 \pm 0.0016$	$r_{\text{drag}} h$	$100.4 \pm 1.3$	$100\theta_{\text{s,eq}}$	$0.4530 \pm 0.0036$
$100\theta_{MC}$	$1.04108 \pm 0.00033$	$\langle d^2 \rangle^{1/2}$	$2.576^{+0.069}_{-0.062}$	$H(0.15)$	$73.34 \pm 0.64$
$\tau$	$< 0.122$	$z_{\text{re}}$	$11.2 \pm 4.7$	$D_{\text{M}}(0.15)$	$636.9 \pm 6.3$
$A_L$	$1.05 \pm 0.13$	$10^9 A_s$	$2.29^{+0.13}_{-0.36}$	$H(0.38)$	$83.34 \pm 0.47$
$\ln(10^{10} A_s)$	$3.127^{+0.064}_{-0.16}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.013$	$D_{\text{M}}(0.38)$	$1521 \pm 13$
$n_s$	$0.9706 \pm 0.0057$	$D_{40}$	$1243^{+18}_{-36}$	$H(0.51)$	$90.00 \pm 0.38$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{220}$	$5729 \pm 41$	$D_{\text{M}}(0.51)$	$1971 \pm 15$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2530 \pm 14$	$H(0.61)$	$95.57 \pm 0.31$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$D_{1420}$	$815.0 \pm 4.8$	$D_{\text{M}}(0.61)$	$2294 \pm 16$
$A_{100}^{PS}$	$241 \pm 30$	$D_{2000}$	$231.8 \pm 1.8$	$H(2.33)$	$235.61 \pm 0.95$
$A_{143}^{PS}$	$39 \pm 9$	$n_{s,0.002}$	$0.9706 \pm 0.0057$	$D_{\text{M}}(2.33)$	$5751 \pm 14$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$Y_P$	$0.245449 \pm 0.000073$	$f\sigma_8(0.15)$	$0.470^{+0.021}_{-0.033}$
$A^{kSZ}$	$< 4.29$	$Y_P^{\text{BBN}}$	$0.246776 \pm 0.000074$	$\sigma_8(0.15)$	$0.779^{+0.025}_{-0.060}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$10^5 D/H$	$2.560 \pm 0.034$	$f\sigma_8(0.38)$	$0.491^{+0.020}_{-0.035}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0023}$	Age/Gyr	$13.771 \pm 0.030$	$\sigma_8(0.38)$	$0.691^{+0.022}_{-0.054}$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$z_*$	$1089.59 \pm 0.34$	$f\sigma_8(0.51)$	$0.490^{+0.019}_{-0.036}$
$H_0$	$68.12 \pm 0.75$	$r_*$	$144.76 \pm 0.35$	$\sigma_8(0.51)$	$0.647^{+0.020}_{-0.051}$
$\Omega_\Lambda$	$0.6950 \pm 0.0098$	$100\theta_*$	$1.04125 \pm 0.00032$	$f\sigma_8(0.61)$	$0.485^{+0.018}_{-0.036}$
$\Omega_m$	$0.3050 \pm 0.0098$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.902 \pm 0.032$	$\sigma_8(0.61)$	$0.616^{+0.019}_{-0.049}$
$\Omega_m h^2$	$0.1415 \pm 0.0015$	$z_{\text{drag}}$	$1060.15 \pm 0.38$	$f\sigma_8(2.33)$	$0.3107^{+0.0093}_{-0.025}$
$\Omega_m h^3$	$0.09637 \pm 0.00034$	$r_{\text{drag}}$	$147.38 \pm 0.34$	$\sigma_8(2.33)$	$0.3207^{+0.0094}_{-0.026}$
$\sigma_8$	$0.842^{+0.028}_{-0.064}$	$k_{\text{D}}$	$0.14068 \pm 0.00036$	$f_{2000}^{143}$	$27 \pm 3$
$S_8$	$0.849^{+0.038}_{-0.060}$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00021$	$f_{2000}^{143 \times 217}$	$30.1 \pm 2.2$
$\sigma_8 \Omega_m^{0.5}$	$0.465^{+0.021}_{-0.033}$	$z_{\text{eq}}$	$3366 \pm 36$	$f_{2000}^{217}$	$105.1 \pm 2.1$
$\sigma_8 \Omega_m^{0.25}$	$0.626^{+0.025}_{-0.045}$	$k_{\text{eq}}$	$0.01027 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.3$

Best-fit  $\chi_{\text{eff}}^2 = 11497.50$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.61$ ;  $\bar{\chi}_{\text{eff}}^2 = 11520.05$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.66$ ;  $R - 1 = 0.00760$   
 $\chi_{\text{eff}}^2$ : CMB - CamSpec like\_10.7HM\_1400\_unified: 11495.71



### 3.31 base\_Alens\_CamSpecHM\_TTTEEE\_post\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02252 \pm 0.00019$	$\sigma_8/h^{0.5}$	$1.036^{+0.032}_{-0.065}$	$100\theta_{\text{eq}}$	$0.8208 \pm 0.0070$
$\Omega_c h^2$	$0.1183 \pm 0.0016$	$r_{\text{drag}} h$	$100.4 \pm 1.3$	$100\theta_{\text{s,eq}}$	$0.4532 \pm 0.0036$
$100\theta_{MC}$	$1.04108 \pm 0.00033$	$\langle d^2 \rangle^{1/2}$	$2.576^{+0.069}_{-0.062}$	$H(0.15)$	$73.36 \pm 0.65$
$\tau$	$0.115^{+0.023}_{-0.068}$	$z_{\text{re}}$	$12.7^{+2.1}_{-5.9}$	$D_{\text{M}}(0.15)$	$636.7 \pm 6.3$
$A_L$	$1.02 \pm 0.11$	$10^9 A_s$	$2.37^{+0.11}_{-0.31}$	$H(0.38)$	$83.36 \pm 0.48$
$\ln(10^{10} A_s)$	$3.159^{+0.051}_{-0.13}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.013$	$D_{\text{M}}(0.38)$	$1520 \pm 13$
$n_s$	$0.9711 \pm 0.0058$	$D_{40}$	$1249^{+19}_{-35}$	$H(0.51)$	$90.01 \pm 0.38$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{220}$	$5728 \pm 41$	$D_{\text{M}}(0.51)$	$1970 \pm 15$
$\xi^{tSZ-CIB}$	—	$D_{810}$	$2530 \pm 14$	$H(0.61)$	$95.58 \pm 0.31$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$D_{1420}$	$815.1 \pm 4.8$	$D_{\text{M}}(0.61)$	$2294 \pm 16$
$A_{100}^{PS}$	$241 \pm 30$	$D_{2000}$	$231.9 \pm 1.8$	$H(2.33)$	$235.58 \pm 0.95$
$A_{143}^{PS}$	$39 \pm 9$	$n_{s,0.002}$	$0.9711 \pm 0.0058$	$D_{\text{M}}(2.33)$	$5751 \pm 14$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$Y_P$	$0.245450 \pm 0.000073$	$f\sigma_8(0.15)$	$0.477^{+0.018}_{-0.029}$
$A^{kSZ}$	$< 4.23$	$Y_P^{\text{BBN}}$	$0.246777 \pm 0.000073$	$\sigma_8(0.15)$	$0.791^{+0.021}_{-0.051}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$10^5 D/H$	$2.559 \pm 0.034$	$f\sigma_8(0.38)$	$0.498^{+0.017}_{-0.031}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0023}$	Age/Gyr	$13.770 \pm 0.030$	$\sigma_8(0.38)$	$0.702^{+0.018}_{-0.046}$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$z_*$	$1089.58 \pm 0.34$	$f\sigma_8(0.51)$	$0.498^{+0.016}_{-0.031}$
$H_0$	$68.15 \pm 0.75$	$r_*$	$144.77 \pm 0.35$	$\sigma_8(0.51)$	$0.657^{+0.017}_{-0.043}$
$\Omega_\Lambda$	$0.6953 \pm 0.0099$	$100\theta_*$	$1.04125 \pm 0.00032$	$f\sigma_8(0.61)$	$0.493^{+0.015}_{-0.031}$
$\Omega_m$	$0.3047 \pm 0.0099$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.903 \pm 0.032$	$\sigma_8(0.61)$	$0.626^{+0.016}_{-0.041}$
$\Omega_m h^2$	$0.1414 \pm 0.0015$	$z_{\text{drag}}$	$1060.15 \pm 0.37$	$f\sigma_8(2.33)$	$0.3158^{+0.0077}_{-0.021}$
$\Omega_m h^3$	$0.09637 \pm 0.00034$	$r_{\text{drag}}$	$147.39 \pm 0.34$	$\sigma_8(2.33)$	$0.3259^{+0.0078}_{-0.022}$
$\sigma_8$	$0.855^{+0.023}_{-0.055}$	$k_{\text{D}}$	$0.14066 \pm 0.00036$	$f_{2000}^{143}$	$27 \pm 3$
$S_8$	$0.862^{+0.033}_{-0.052}$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00021$	$f_{2000}^{143 \times 217}$	$30.0 \pm 2.2$
$\sigma_8 \Omega_m^{0.5}$	$0.472^{+0.018}_{-0.029}$	$z_{\text{eq}}$	$3364 \pm 36$	$f_{2000}^{217}$	$105.0 \pm 2.1$
$\sigma_8 \Omega_m^{0.25}$	$0.635^{+0.021}_{-0.039}$	$k_{\text{eq}}$	$0.01027 \pm 0.00011$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.3$

$\bar{\chi}^2_{\text{eff}} = 11520.01$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9154.57$ ;  $R - 1 = 0.00786$



### 3.32 base\_Alens\_CamSpecHM\_TTTEEE\_lowl/base\_Alens\_plikHM\_TTTEEE\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02255 \pm 0.00019$	$r_{\text{drag}} h$	$100.7 \pm 1.2$	$H(0.15)$	$73.50 \pm 0.62$
$\Omega_c h^2$	$0.1179 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.581 \pm 0.066$	$D_{\text{M}}(0.15)$	$635.3 \pm 6.1$
$100\theta_{MC}$	$1.04111 \pm 0.00033$	$z_{\text{re}}$	$7.4^{+2.0}_{-4.8}$	$H(0.38)$	$83.46 \pm 0.46$
$\tau$	$< 0.0683$	$10^9 A_s$	$2.096^{+0.064}_{-0.18}$	$D_{\text{M}}(0.38)$	$1517 \pm 12$
$A_L$	$1.155 \pm 0.097$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$H(0.51)$	$90.09 \pm 0.37$
$\ln(10^{10} A_s)$	$3.041^{+0.034}_{-0.087}$	$D_{40}$	$1218^{+15}_{-18}$	$D_{\text{M}}(0.51)$	$1967 \pm 14$
$n_s$	$0.9715 \pm 0.0051$	$D_{220}$	$5730 \pm 40$	$H(0.61)$	$95.64 \pm 0.30$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2530 \pm 14$	$D_{\text{M}}(0.61)$	$2290 \pm 16$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$815.2 \pm 4.8$	$H(2.33)$	$235.39 \pm 0.91$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.9 \pm 1.7$	$D_{\text{M}}(2.33)$	$5748 \pm 13$
$A_{143}^{tSZ}$	$4.9^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9715 \pm 0.0051$	$f\sigma_8(0.15)$	$0.448^{+0.013}_{-0.019}$
$A_{100}^{PS}$	$240 \pm 30$	$Y_P$	$0.245463 \pm 0.000071$	$\sigma_8(0.15)$	$0.744^{+0.014}_{-0.032}$
$A_{143}^{PS}$	$38 \pm 9$	$Y_P^{\text{BBN}}$	$0.246790 \pm 0.000072$	$f\sigma_8(0.38)$	$0.468^{+0.012}_{-0.020}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.553 \pm 0.033$	$\sigma_8(0.38)$	$0.661^{+0.012}_{-0.029}$
$A^{kSZ}$	$< 4.13$	Age/Gyr	$13.764 \pm 0.030$	$f\sigma_8(0.51)$	$0.467^{+0.011}_{-0.020}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.51 \pm 0.33$	$\sigma_8(0.51)$	$0.619^{+0.011}_{-0.027}$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.83 \pm 0.34$	$f\sigma_8(0.61)$	$0.463^{+0.011}_{-0.020}$
$H_0$	$68.31 \pm 0.72$	$100\theta_*$	$1.04128 \pm 0.00033$	$\sigma_8(0.61)$	$0.589^{+0.010}_{-0.026}$
$\Omega_\Lambda$	$0.6974 \pm 0.0094$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.909 \pm 0.031$	$f\sigma_8(2.33)$	$0.2973^{+0.0049}_{-0.013}$
$\Omega_m$	$0.3026 \pm 0.0094$	$z_{\text{drag}}$	$1060.21 \pm 0.37$	$\sigma_8(2.33)$	$0.3069^{+0.0050}_{-0.013}$
$\Omega_m h^2$	$0.1411 \pm 0.0015$	$r_{\text{drag}}$	$147.44 \pm 0.33$	$f_{2000}^{143}$	$27 \pm 3$
$\Omega_m h^3$	$0.09639 \pm 0.00034$	$k_{\text{D}}$	$0.14063 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$29.9 \pm 2.1$
$\sigma_8$	$0.804^{+0.016}_{-0.034}$	$100\theta_{\text{D}}$	$0.16061 \pm 0.00021$	$f_{2000}^{217}$	$105.0 \pm 2.0$
$S_8$	$0.808^{+0.025}_{-0.036}$	$z_{\text{eq}}$	$3357 \pm 35$	$\chi_{\text{lowl}}^2$	$22.6 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.442^{+0.014}_{-0.019}$	$k_{\text{eq}}$	$0.01025 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.597^{+0.015}_{-0.025}$	$100\theta_{\text{eq}}$	$0.8222 \pm 0.0068$	$\chi_{\text{CMB}}^2$	$6956 \pm 5000$
$\sigma_8/h^{0.5}$	$0.973^{+0.023}_{-0.041}$	$100\theta_{\text{s,eq}}$	$0.4539 \pm 0.0035$		

Best-fit  $\chi_{\text{eff}}^2 = 11519.71$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.69$ ;  $\bar{\chi}_{\text{eff}}^2 = 11542.67$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.94$ ;  $R - 1 = 0.01017$

$\chi_{\text{eff}}^2$ : CMB - commander\_dx12\_v3\_2\_29: 21.34 ( $\Delta$  -0.09) CamSpec like\_10.7HM\_1400\_unified: 11496.50



### 3.33 base\_Alens\_CamSpecHM\_TTTEEE\_lowl\_post\_zre6p5/base\_Alens\_plikHM\_TTTEEE\_lowl\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02256 \pm 0.00019$	$r_{\text{drag}} h$	$100.8 \pm 1.3$	$H(0.15)$	$73.54 \pm 0.63$
$\Omega_c h^2$	$0.1178 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.581^{+0.068}_{-0.061}$	$D_{\text{M}}(0.15)$	$634.9 \pm 6.1$
$100\theta_{MC}$	$1.04112 \pm 0.00033$	$z_{\text{re}}$	$< 10.7$	$H(0.38)$	$83.49 \pm 0.47$
$\tau$	$0.078^{+0.010}_{-0.034}$	$10^9 A_s$	$2.191^{+0.052}_{-0.14}$	$D_{\text{M}}(0.38)$	$1517 \pm 12$
$A_L$	$1.106 \pm 0.083$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.012$	$H(0.51)$	$90.11 \pm 0.37$
$\ln(10^{10} A_s)$	$3.085^{+0.026}_{-0.066}$	$D_{40}$	$1224^{+15}_{-18}$	$D_{\text{M}}(0.51)$	$1966 \pm 15$
$n_s$	$0.9722 \pm 0.0052$	$D_{220}$	$5728 \pm 39$	$H(0.61)$	$95.66 \pm 0.30$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2529 \pm 14$	$D_{\text{M}}(0.61)$	$2289 \pm 16$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$815.4 \pm 4.8$	$H(2.33)$	$235.32 \pm 0.92$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.1 \pm 1.7$	$D_{\text{M}}(2.33)$	$5747 \pm 14$
$A_{143}^{tSZ}$	$5.0^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9722 \pm 0.0052$	$f\sigma_8(0.15)$	$0.457^{+0.012}_{-0.016}$
$A_{100}^{PS}$	$239 \pm 30$	$Y_P$	$0.245466 \pm 0.000072$	$\sigma_8(0.15)$	$0.761^{+0.011}_{-0.025}$
$A_{143}^{PS}$	$38 \pm 9$	$Y_P^{\text{BBN}}$	$0.246793 \pm 0.000072$	$f\sigma_8(0.38)$	$0.478^{+0.010}_{-0.016}$
$A_{217}^{PS}$	$111^{+10}_{-10}$	$10^5 D/H$	$2.552 \pm 0.034$	$\sigma_8(0.38)$	$0.6754^{+0.0093}_{-0.022}$
$A^{kSZ}$	$< 4.03$	Age/Gyr	$13.763 \pm 0.030$	$f\sigma_8(0.51)$	$0.4776^{+0.0096}_{-0.016}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1089.49 \pm 0.33$	$\sigma_8(0.51)$	$0.6325^{+0.0085}_{-0.021}$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$r_*$	$144.86 \pm 0.34$	$f\sigma_8(0.61)$	$0.4734^{+0.0089}_{-0.016}$
$H_0$	$68.36 \pm 0.73$	$100\theta_*$	$1.04129 \pm 0.00033$	$\sigma_8(0.61)$	$0.6021^{+0.0079}_{-0.020}$
$\Omega_\Lambda$	$0.6981 \pm 0.0095$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.911 \pm 0.032$	$f\sigma_8(2.33)$	$0.3040^{+0.0038}_{-0.010}$
$\Omega_m$	$0.3019 \pm 0.0095$	$z_{\text{drag}}$	$1060.22 \pm 0.37$	$\sigma_8(2.33)$	$0.3139^{+0.0039}_{-0.010}$
$\Omega_m h^2$	$0.1410 \pm 0.0015$	$r_{\text{drag}}$	$147.46 \pm 0.33$	$f_{2000}^{143}$	$27 \pm 3$
$\Omega_m h^3$	$0.09639 \pm 0.00034$	$k_{\text{D}}$	$0.14062 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$29.7 \pm 2.1$
$\sigma_8$	$0.822^{+0.013}_{-0.027}$	$100\theta_{\text{D}}$	$0.16060 \pm 0.00021$	$f_{2000}^{217}$	$104.8 \pm 2.0$
$S_8$	$0.825^{+0.023}_{-0.030}$	$z_{\text{eq}}$	$3354 \pm 35$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.452^{+0.012}_{-0.016}$	$k_{\text{eq}}$	$0.01024 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.609^{+0.013}_{-0.020}$	$100\theta_{\text{eq}}$	$0.8227 \pm 0.0068$	$\chi_{\text{CMB}}^2$	$6956 \pm 5000$
$\sigma_8/h^{0.5}$	$0.994^{+0.019}_{-0.033}$	$100\theta_{\text{s,eq}}$	$0.4542 \pm 0.0035$		

$$\bar{\chi}_{\text{eff}}^2 = 11543.27; \Delta\bar{\chi}_{\text{eff}}^2 = 9154.98; R - 1 = 0.01232$$



### 3.34 base\_Alens\_CamSpecHM\_TTTEEE\_lowE/base\_Alens\_plikHM\_TTTEEE\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02251 \pm 0.00019$	$r_{\text{drag}} h$	$100.2 \pm 1.3$	$H(0.15)$	$73.27 \pm 0.64$
$\Omega_c h^2$	$0.1185 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.576 \pm 0.066$	$D_{\text{M}}(0.15)$	$637.6 \pm 6.2$
$100\theta_{MC}$	$1.04106 \pm 0.00033$	$z_{\text{re}}$	$7.12^{+0.91}_{-0.73}$	$H(0.38)$	$83.29 \pm 0.47$
$\tau$	$0.0497^{+0.0084}_{-0.0075}$	$10^9 A_s$	$2.071 \pm 0.037$	$D_{\text{M}}(0.38)$	$1522 \pm 13$
$A_L$	$1.149 \pm 0.071$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.013$	$H(0.51)$	$89.96 \pm 0.37$
$\ln(10^{10} A_s)$	$3.031 \pm 0.018$	$D_{40}$	$1221 \pm 15$	$D_{\text{M}}(0.51)$	$1972 \pm 15$
$n_s$	$0.9688 \pm 0.0052$	$D_{220}$	$5736 \pm 40$	$H(0.61)$	$95.54 \pm 0.30$
$y_{\text{cal}}$	$1.0001 \pm 0.0025$	$D_{810}$	$2531 \pm 14$	$D_{\text{M}}(0.61)$	$2296 \pm 16$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$814.7 \pm 4.8$	$H(2.33)$	$235.74 \pm 0.93$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.5 \pm 1.7$	$D_{\text{M}}(2.33)$	$5752 \pm 14$
$A_{143}^{tSZ}$	$4.8^{+2.4}_{-2.1}$	$n_{s,0.002}$	$0.9688 \pm 0.0052$	$f\sigma_8(0.15)$	$0.448 \pm 0.010$
$A_{100}^{PS}$	$243 \pm 30$	$Y_P$	$0.245446 \pm 0.000073$	$\sigma_8(0.15)$	$0.7410 \pm 0.0078$
$A_{143}^{PS}$	$40 \pm 9$	$Y_P^{\text{BBN}}$	$0.246773 \pm 0.000073$	$f\sigma_8(0.38)$	$0.4677 \pm 0.0084$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.561 \pm 0.034$	$\sigma_8(0.38)$	$0.6574 \pm 0.0064$
$A^{kSZ}$	$< 4.46$	Age/Gyr	$13.773 \pm 0.030$	$f\sigma_8(0.51)$	$0.4669 \pm 0.0074$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.62 \pm 0.34$	$\sigma_8(0.51)$	$0.6155 \pm 0.0059$
$c_{217}$	$0.9995^{+0.0020}_{-0.0023}$	$r_*$	$144.71 \pm 0.34$	$f\sigma_8(0.61)$	$0.4624 \pm 0.0068$
$H_0$	$68.04 \pm 0.74$	$100\theta_*$	$1.04123 \pm 0.00033$	$\sigma_8(0.61)$	$0.5858 \pm 0.0055$
$\Omega_\Lambda$	$0.694^{+0.010}_{-0.0093}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.898 \pm 0.031$	$f\sigma_8(2.33)$	$0.2956 \pm 0.0027$
$\Omega_m$	$0.3062 \pm 0.0097$	$z_{\text{drag}}$	$1060.15 \pm 0.37$	$\sigma_8(2.33)$	$0.3050 \pm 0.0027$
$\Omega_m h^2$	$0.1417 \pm 0.0015$	$r_{\text{drag}}$	$147.33 \pm 0.33$	$f_{2000}^{143}$	$27.5 \pm 3.0$
$\Omega_m h^3$	$0.09639 \pm 0.00034$	$k_{\text{D}}$	$0.14072 \pm 0.00035$	$f_{2000}^{143 \times 217}$	$30.5 \pm 2.2$
$\sigma_8$	$0.8014 \pm 0.0090$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00021$	$f_{2000}^{217}$	$105.4 \pm 2.0$
$S_8$	$0.810 \pm 0.020$	$z_{\text{eq}}$	$3370 \pm 35$	$\chi_{\text{small}}^2$	$396.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.443 \pm 0.011$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8 \Omega_m^{0.25}$	$0.596 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8196 \pm 0.0069$	$\chi_{\text{CMB}}^2$	$7330 \pm 5000$
$\sigma_8/h^{0.5}$	$0.972 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4526 \pm 0.0035$		

Best-fit  $\chi_{\text{eff}}^2 = 11893.69$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.64$ ;  $\bar{\chi}_{\text{eff}}^2 = 11916.80$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.73$ ;  $R - 1 = 0.00486$   
 $\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.68 ( $\Delta$  -0.03) CamSpec like\_10.7HM\_1400\_unified: 11496.17







## 5 alpha1

### 5.1 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE/base\_alpha1\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00023$	$r_{\text{drag}} h$	$98.0 \pm 1.7$	$H(0.15)$	$72.08 \pm 0.82$
$\Omega_c h^2$	$0.1212 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.461 \pm 0.040$	$D_{\text{M}}(0.15)$	$649.5 \pm 8.4$
$100\theta_{MC}$	$1.04054 \pm 0.00056$	$z_{\text{re}}$	$7.66 \pm 0.85$	$H(0.38)$	$82.41 \pm 0.58$
$\tau$	$0.0537 \pm 0.0083$	$10^9 A_s$	$2.104 \pm 0.038$	$D_{\text{M}}(0.38)$	$1546 \pm 17$
$\alpha_{-1}$	$-0.0013^{+0.0017}_{-0.0011}$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.015$	$H(0.51)$	$89.25 \pm 0.45$
$\ln(10^{10} A_s)$	$3.046 \pm 0.018$	$D_{40}$	$1217^{+18}_{-23}$	$D_{\text{M}}(0.51)$	$2000 \pm 19$
$n_s$	$0.9585^{+0.0069}_{-0.0082}$	$D_{220}$	$5714 \pm 42$	$H(0.61)$	$94.97^{+0.33}_{-0.37}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(0.61)$	$2326 \pm 21$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$814.0 \pm 5.2$	$H(2.33)$	$237.2 \pm 1.4$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.4 \pm 1.8$	$D_{\text{M}}(2.33)$	$5779 \pm 16$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.9585^{+0.0069}_{-0.0082}$	$f\sigma_8(0.15)$	$0.466 \pm 0.013$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P$	$0.24532^{+0.00011}_{-0.000085}$	$\sigma_8(0.15)$	$0.7489 \pm 0.0075$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00011}_{-0.000085}$	$f\sigma_8(0.38)$	$0.4812 \pm 0.0098$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.619 \pm 0.044$	$\sigma_8(0.38)$	$0.6625 \pm 0.0061$
$A^{kSZ}$	$< 6.04$	Age/Gyr	$13.831 \pm 0.037$	$f\sigma_8(0.51)$	$0.4783 \pm 0.0083$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1090.25 \pm 0.41$	$\sigma_8(0.51)$	$0.6194 \pm 0.0055$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.26 \pm 0.54$	$f\sigma_8(0.61)$	$0.4723 \pm 0.0073$
$H_0$	$66.67 \pm 0.96$	$100\theta_*$	$1.04074 \pm 0.00056$	$\sigma_8(0.61)$	$0.5890 \pm 0.0052$
$\Omega_\Lambda$	$0.676 \pm 0.014$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.861 \pm 0.048$	$f\sigma_8(2.33)$	$0.2965 \pm 0.0026$
$\Omega_m$	$0.324 \pm 0.014$	$z_{\text{drag}}$	$1059.61 \pm 0.50$	$\sigma_8(2.33)$	$0.3052 \pm 0.0028$
$\Omega_m h^2$	$0.1441 \pm 0.0022$	$r_{\text{drag}}$	$146.97 \pm 0.55$	$f_{2000}^{143}$	$31.3 \pm 3.0$
$\Omega_m h^3$	$0.09602 \pm 0.00047$	$k_{\text{D}}$	$0.14086^{+0.00065}_{-0.00059}$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.1$
$\sigma_8$	$0.8118 \pm 0.0090$	$100\theta_{\text{D}}$	$0.16091^{+0.00029}_{-0.00033}$	$f_{2000}^{217}$	$108.0 \pm 2.0$
$S_8$	$0.844 \pm 0.025$	$z_{\text{eq}}$	$3427 \pm 52$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.462 \pm 0.014$	$k_{\text{eq}}$	$0.01046 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$22.2 \pm 2.3$
$\sigma_8 \Omega_m^{0.25}$	$0.613 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8083 \pm 0.0095$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4469 \pm 0.0049$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7471.39$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.24$ ;  $\bar{\chi}_{\text{eff}}^2 = 7492.71$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.16$ ;  $R - 1 = 0.00444$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.89 ( $\Delta$  0.00) commander\_dx12\_v3.2\_29: 22.30 ( $\Delta$  0.12) CamSpec like\_10.7HM: 7050.85



## 5.2 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02228 \pm 0.00023$	$z_{\text{re}}$	$7.74 \pm 0.84$	$H(0.51)$	$89.68 \pm 0.29$
$\Omega_c h^2$	$0.1190 \pm 0.0012$	$10^9 A_s$	$2.098 \pm 0.038$	$D_{\text{M}}(0.51)$	$1981 \pm 11$
$100\theta_{MC}$	$1.04091 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.013$	$H(0.61)$	$95.29 \pm 0.25$
$\tau$	$0.0551 \pm 0.0084$	$D_{40}$	$1215^{+20}_{-27}$	$D_{\text{M}}(0.61)$	$2306 \pm 12$
$\alpha_{-1}$	$-0.0008^{+0.0015}_{-0.0012}$	$D_{220}$	$5720 \pm 42$	$H(2.33)$	$235.82 \pm 0.81$
$\ln(10^{10} A_s)$	$3.043 \pm 0.018$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 12$
$n_s$	$0.9649^{+0.0055}_{-0.0064}$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4540 \pm 0.0077$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.9 \pm 1.8$	$\sigma_8(0.15)$	$0.7453 \pm 0.0069$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9649^{+0.0055}_{-0.0064}$	$f\sigma_8(0.38)$	$0.4725 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24535^{+0.00010}_{-0.000082}$	$\sigma_8(0.38)$	$0.6608 \pm 0.0059$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24668^{+0.00010}_{-0.000082}$	$f\sigma_8(0.51)$	$0.4712 \pm 0.0058$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.604 \pm 0.043$	$\sigma_8(0.51)$	$0.6184 \pm 0.0055$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.803 \pm 0.028$	$f\sigma_8(0.61)$	$0.4663 \pm 0.0054$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_*$	$1089.95 \pm 0.32$	$\sigma_8(0.61)$	$0.5885 \pm 0.0052$
$A^{kSZ}$	$< 5.96$	$r_*$	$144.76 \pm 0.35$	$f\sigma_8(2.33)$	$0.2967 \pm 0.0026$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04110 \pm 0.00048$	$\sigma_8(2.33)$	$0.3060 \pm 0.0027$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.032$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$67.62 \pm 0.55$	$z_{\text{drag}}$	$1059.65 \pm 0.53$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_{\Lambda}$	$0.6895 \pm 0.0074$	$r_{\text{drag}}$	$147.46 \pm 0.39$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3105 \pm 0.0074$	$k_{\text{D}}$	$0.14041 \pm 0.00053$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16092^{+0.00031}_{-0.00035}$	$\chi_{\text{lowl}}^2$	$22 \pm 3$
$\Omega_m h^3$	$0.09598 \pm 0.00047$	$z_{\text{eq}}$	$3377 \pm 29$	$\chi_{6\text{DF}}^2$	$0.064 \pm 0.082$
$\sigma_8$	$0.8064 \pm 0.0078$	$k_{\text{eq}}$	$0.010306 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.32 \pm 0.53$
$S_8$	$0.820 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8177 \pm 0.0054$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4494 \pm 0.0081$	$100\theta_{\text{s,eq}}$	$0.4517 \pm 0.0028$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6020 \pm 0.0080$	$H(0.15)$	$72.89 \pm 0.47$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.012$	$D_{\text{M}}(0.15)$	$641.2 \pm 4.7$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$r_{\text{drag}} h$	$99.71 \pm 0.96$	$H(0.38)$	$82.98 \pm 0.35$		
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.028$	$D_{\text{M}}(0.38)$	$1529.5 \pm 9.4$		

$$\bar{\chi}_{\text{eff}}^2 = 7499.33; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.09; R - 1 = 0.01534$$



### 5.3 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.025$	$H(0.38)$	$82.56 \pm 0.46$
$\Omega_c h^2$	$0.1206 \pm 0.0016$	$z_{\text{re}}$	$7.64 \pm 0.81$	$D_{\text{M}}(0.38)$	$1542 \pm 13$
$100\theta_{MC}$	$1.04060 \pm 0.00052$	$10^9 A_s$	$2.101 \pm 0.034$	$H(0.51)$	$89.36 \pm 0.37$
$\tau$	$0.0537 \pm 0.0081$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.013$	$D_{\text{M}}(0.51)$	$1995 \pm 15$
$\alpha_{-1}$	$-0.0013^{+0.0016}_{-0.0011}$	$D_{40}$	$1216^{+16}_{-24}$	$H(0.61)$	$95.05 \pm 0.30$
$\ln(10^{10} A_s)$	$3.045 \pm 0.016$	$D_{220}$	$5717 \pm 42$	$D_{\text{M}}(0.61)$	$2321 \pm 16$
$n_s$	$0.9598^{+0.0059}_{-0.0071}$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.8 \pm 1.0$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.1 \pm 5.2$	$D_{\text{M}}(2.33)$	$5775 \pm 14$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.4 \pm 1.8$	$f\sigma_8(0.15)$	$0.4623 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9598^{+0.0059}_{-0.0071}$	$\sigma_8(0.15)$	$0.7474 \pm 0.0056$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$Y_P$	$0.24533^{+0.00010}_{-0.000082}$	$f\sigma_8(0.38)$	$0.4786 \pm 0.0063$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P^{\text{BBN}}$	$0.24666^{+0.00010}_{-0.000083}$	$\sigma_8(0.38)$	$0.6615 \pm 0.0050$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.614 \pm 0.043$	$f\sigma_8(0.51)$	$0.4761 \pm 0.0054$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$13.824 \pm 0.033$	$\sigma_8(0.51)$	$0.6187 \pm 0.0048$
$A^{kSZ}$	$< 6.11$	$z_*$	$1090.16 \pm 0.36$	$f\sigma_8(0.61)$	$0.4704 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.38 \pm 0.41$	$\sigma_8(0.61)$	$0.5885 \pm 0.0046$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04080 \pm 0.00052$	$f\sigma_8(2.33)$	$0.2964 \pm 0.0025$
$H_0$	$66.92 \pm 0.74$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.873 \pm 0.037$	$\sigma_8(2.33)$	$0.3052 \pm 0.0027$
$\Omega_\Lambda$	$0.679 \pm 0.010$	$z_{\text{drag}}$	$1059.64 \pm 0.50$	$f_{2000}^{143}$	$31.3 \pm 3.0$
$\Omega_m$	$0.321 \pm 0.010$	$r_{\text{drag}}$	$147.09 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.1$
$\Omega_m h^2$	$0.1435 \pm 0.0016$	$k_{\text{D}}$	$0.14075 \pm 0.00054$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m h^3$	$0.09601 \pm 0.00046$	$100\theta_{\text{D}}$	$0.16090^{+0.00029}_{-0.00033}$	$\chi^2_{\text{lensing}}$	$9.52 \pm 0.95$
$\sigma_8$	$0.8098 \pm 0.0063$	$z_{\text{eq}}$	$3414 \pm 38$	$\chi^2_{\text{simall}}$	$397.0 \pm 1.6$
$S_8$	$0.837 \pm 0.017$	$k_{\text{eq}}$	$0.01042 \pm 0.00012$	$\chi^2_{\text{lowl}}$	$22.1 \pm 2.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4585 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8107 \pm 0.0071$	$\chi^2_{\text{prior}}$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6093 \pm 0.0077$	$100\theta_{\text{s,eq}}$	$0.4481 \pm 0.0037$	$\chi^2_{\text{CMB}}$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.010$	$H(0.15)$	$72.29 \pm 0.63$		
$r_{\text{drag}} h$	$98.4 \pm 1.3$	$D_{\text{M}}(0.15)$	$647.3 \pm 6.4$		

$\bar{\chi}^2_{\text{eff}} = 7501.64$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.11$ ;  $R - 1 = 0.00636$



## 5.4 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02229 \pm 0.00023$	$z_{\text{re}}$	$7.90 \pm 0.77$	$H(0.51)$	$89.65 \pm 0.27$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$10^9 A_s$	$2.106 \pm 0.034$	$D_{\text{M}}(0.51)$	$1983 \pm 10$
$100\theta_{MC}$	$1.04088 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$H(0.61)$	$95.27 \pm 0.24$
$\tau$	$0.0566 \pm 0.0079$	$D_{40}$	$1216^{+18}_{-27}$	$D_{\text{M}}(0.61)$	$2307 \pm 11$
$\alpha_{-1}$	$-0.0008^{+0.0015}_{-0.0011}$	$D_{220}$	$5725 \pm 41$	$H(2.33)$	$235.94 \pm 0.73$
$\ln(10^{10} A_s)$	$3.047 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5766 \pm 12$
$n_s$	$0.9642^{+0.0052}_{-0.0063}$	$D_{1420}$	$815.5 \pm 5.1$	$f\sigma_8(0.15)$	$0.4557 \pm 0.0061$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.7470 \pm 0.0057$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9642^{+0.0052}_{-0.0063}$	$f\sigma_8(0.38)$	$0.4740 \pm 0.0051$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24536^{+0.00010}_{-0.000082}$	$\sigma_8(0.38)$	$0.6621 \pm 0.0050$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24668^{+0.00010}_{-0.000082}$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.602 \pm 0.042$	$\sigma_8(0.51)$	$0.6196 \pm 0.0047$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.804 \pm 0.028$	$f\sigma_8(0.61)$	$0.4676 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.96 \pm 0.31$	$\sigma_8(0.61)$	$0.5896 \pm 0.0045$
$A^{kSZ}$	$< 5.92$	$r_*$	$144.70 \pm 0.31$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04107 \pm 0.00047$	$\sigma_8(2.33)$	$0.3065 \pm 0.0025$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.899 \pm 0.030$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.55 \pm 0.50$	$z_{\text{drag}}$	$1059.68 \pm 0.52$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.6885 \pm 0.0067$	$r_{\text{drag}}$	$147.40 \pm 0.36$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3115 \pm 0.0067$	$k_{\text{D}}$	$0.14048 \pm 0.00050$	$\chi_{\text{lensing}}^2$	$9.30 \pm 0.76$
$\Omega_m h^2$	$0.1421 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16090 \pm 0.00032$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\Omega_m h^3$	$0.09601 \pm 0.00047$	$z_{\text{eq}}$	$3381 \pm 26$	$\chi_{\text{lowl}}^2$	$22 \pm 3$
$\sigma_8$	$0.8083 \pm 0.0063$	$k_{\text{eq}}$	$0.010319 \pm 0.000080$	$\chi_{6\text{DF}}^2$	$0.066 \pm 0.079$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0048$	$\chi_{\text{MGS}}^2$	$1.24 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0025$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6039 \pm 0.0062$	$H(0.15)$	$72.83 \pm 0.43$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9835 \pm 0.0090$	$D_{\text{M}}(0.15)$	$641.8 \pm 4.3$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$r_{\text{drag}} h$	$99.57 \pm 0.86$	$H(0.38)$	$82.94 \pm 0.33$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.4$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.022$	$D_{\text{M}}(0.38)$	$1530.6 \pm 8.7$		

$\bar{\chi}_{\text{eff}}^2 = 7508.28$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.19$ ;  $R - 1 = 0.01595$



## 5.5 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00023$	$r_{\text{drag}} h$	$98.0 \pm 1.7$	$H(0.15)$	$72.10 \pm 0.81$
$\Omega_c h^2$	$0.1212 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.463 \pm 0.039$	$D_{\text{M}}(0.15)$	$649.3 \pm 8.3$
$100\theta_{MC}$	$1.04054 \pm 0.00056$	$z_{\text{re}}$	$7.80^{+0.59}_{-0.84}$	$H(0.38)$	$82.43 \pm 0.58$
$\tau$	$0.0551^{+0.0053}_{-0.0088}$	$10^9 A_s$	$2.110^{+0.029}_{-0.038}$	$D_{\text{M}}(0.38)$	$1545 \pm 17$
$\alpha_{-1}$	$-0.0014^{+0.0017}_{-0.0011}$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.015$	$H(0.51)$	$89.27^{+0.42}_{-0.47}$
$\ln(10^{10} A_s)$	$3.049^{+0.014}_{-0.018}$	$D_{40}$	$1217^{+18}_{-23}$	$D_{\text{M}}(0.51)$	$2000 \pm 19$
$n_s$	$0.9586^{+0.0068}_{-0.0081}$	$D_{220}$	$5714 \pm 42$	$H(0.61)$	$94.98^{+0.33}_{-0.37}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(0.61)$	$2326 \pm 21$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$814.0 \pm 5.2$	$H(2.33)$	$237.1 \pm 1.4$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.4 \pm 1.8$	$D_{\text{M}}(2.33)$	$5778 \pm 16$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.9586^{+0.0068}_{-0.0081}$	$f\sigma_8(0.15)$	$0.466 \pm 0.013$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P$	$0.24532^{+0.00011}_{-0.000084}$	$\sigma_8(0.15)$	$0.7497 \pm 0.0071$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24665^{+0.00011}_{-0.000085}$	$f\sigma_8(0.38)$	$0.4816 \pm 0.0097$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.618 \pm 0.043$	$\sigma_8(0.38)$	$0.6632^{+0.0053}_{-0.0059}$
$A^{kSZ}$	$< 6.01$	Age/Gyr	$13.830 \pm 0.037$	$f\sigma_8(0.51)$	$0.4788 \pm 0.0082$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1090.24 \pm 0.40$	$\sigma_8(0.51)$	$0.6201^{+0.0047}_{-0.0054}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.26 \pm 0.53$	$f\sigma_8(0.61)$	$0.4728 \pm 0.0072$
$H_0$	$66.69 \pm 0.96$	$100\theta_*$	$1.04074 \pm 0.00055$	$\sigma_8(0.61)$	$0.5897^{+0.0043}_{-0.0051}$
$\Omega_\Lambda$	$0.676 \pm 0.014$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.861 \pm 0.048$	$f\sigma_8(2.33)$	$0.2969^{+0.0021}_{-0.0026}$
$\Omega_m$	$0.324 \pm 0.014$	$z_{\text{drag}}$	$1059.63 \pm 0.50$	$\sigma_8(2.33)$	$0.3056^{+0.0023}_{-0.0028}$
$\Omega_m h^2$	$0.1440 \pm 0.0021$	$r_{\text{drag}}$	$146.97 \pm 0.55$	$f_{2000}^{143}$	$31.2 \pm 3.0$
$\Omega_m h^3$	$0.09603 \pm 0.00047$	$k_{\text{D}}$	$0.14086^{+0.00065}_{-0.00059}$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.1$
$\sigma_8$	$0.8127 \pm 0.0086$	$100\theta_{\text{D}}$	$0.16090 \pm 0.00031$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$S_8$	$0.845 \pm 0.025$	$z_{\text{eq}}$	$3426 \pm 51$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.463 \pm 0.014$	$k_{\text{eq}}$	$0.01046 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$22.1 \pm 2.2$
$\sigma_8 \Omega_m^{0.25}$	$0.613 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8084 \pm 0.0094$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.995 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4469 \pm 0.0049$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7492.46$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.16$ ;  $R - 1 = 0.00453$



## 5.6 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02229 \pm 0.00023$	$z_{\text{re}}$	$7.86^{+0.62}_{-0.85}$	$H(0.51)$	$89.69 \pm 0.29$
$\Omega_c h^2$	$0.1190 \pm 0.0012$	$10^9 A_s$	$2.103^{+0.029}_{-0.039}$	$D_{\text{M}}(0.51)$	$1981 \pm 11$
$100\theta_{MC}$	$1.04090 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.013$	$H(0.61)$	$95.29 \pm 0.25$
$\tau$	$0.0562^{+0.0058}_{-0.0088}$	$D_{40}$	$1214^{+19}_{-27}$	$D_{\text{M}}(0.61)$	$2306 \pm 12$
$\alpha_{-1}$	$-0.0008^{+0.0015}_{-0.0012}$	$D_{220}$	$5720 \pm 42$	$H(2.33)$	$235.82 \pm 0.81$
$\ln(10^{10} A_s)$	$3.046^{+0.014}_{-0.018}$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 12$
$n_s$	$0.9648^{+0.0054}_{-0.0064}$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4544 \pm 0.0076$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.9 \pm 1.8$	$\sigma_8(0.15)$	$0.7460 \pm 0.0065$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9648^{+0.0054}_{-0.0064}$	$f\sigma_8(0.38)$	$0.4729 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24536^{+0.00010}_{-0.000081}$	$\sigma_8(0.38)$	$0.6614^{+0.0052}_{-0.0058}$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24668^{+0.00010}_{-0.000082}$	$f\sigma_8(0.51)$	$0.4716 \pm 0.0056$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.602 \pm 0.042$	$\sigma_8(0.51)$	$0.6190^{+0.0048}_{-0.0054}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.802 \pm 0.028$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0052$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_*$	$1089.94 \pm 0.32$	$\sigma_8(0.61)$	$0.5890^{+0.0045}_{-0.0051}$
$A^{kSZ}$	$< 5.95$	$r_*$	$144.75 \pm 0.35$	$f\sigma_8(2.33)$	$0.2970^{+0.0022}_{-0.0026}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04109 \pm 0.00048$	$\sigma_8(2.33)$	$0.3063^{+0.0023}_{-0.0027}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.032$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$67.63 \pm 0.55$	$z_{\text{drag}}$	$1059.67 \pm 0.52$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_{\Lambda}$	$0.6896 \pm 0.0074$	$r_{\text{drag}}$	$147.45 \pm 0.39$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3104 \pm 0.0074$	$k_{\text{D}}$	$0.14043 \pm 0.00052$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16091^{+0.00031}_{-0.00034}$	$\chi_{\text{lowl}}^2$	$22 \pm 3$
$\Omega_m h^3$	$0.09599 \pm 0.00047$	$z_{\text{eq}}$	$3377 \pm 29$	$\chi_{6\text{DF}}^2$	$0.063 \pm 0.082$
$\sigma_8$	$0.8072 \pm 0.0073$	$k_{\text{eq}}$	$0.010306 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.33 \pm 0.53$
$S_8$	$0.821 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8177 \pm 0.0054$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0081$	$100\theta_{\text{s,eq}}$	$0.4517 \pm 0.0028$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6025 \pm 0.0078$	$H(0.15)$	$72.90 \pm 0.47$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$641.1 \pm 4.7$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$r_{\text{drag}} h$	$99.72 \pm 0.96$	$H(0.38)$	$82.98 \pm 0.35$		
$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.027$	$D_{\text{M}}(0.38)$	$1529.3 \pm 9.4$		

$$\bar{\chi}_{\text{eff}}^2 = 7499.10; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.05; R - 1 = 0.01710$$



## 5.7 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.025$	$H(0.38)$	$82.59 \pm 0.45$
$\Omega_c h^2$	$0.1205 \pm 0.0016$	$z_{\text{re}}$	$7.78^{+0.59}_{-0.81}$	$D_{\text{M}}(0.38)$	$1541 \pm 12$
$100\theta_{MC}$	$1.04061 \pm 0.00052$	$10^9 A_s$	$2.105^{+0.025}_{-0.034}$	$H(0.51)$	$89.38 \pm 0.36$
$\tau$	$0.0550^{+0.0054}_{-0.0085}$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.013$	$D_{\text{M}}(0.51)$	$1994 \pm 15$
$\alpha_{-1}$	$-0.0013^{+0.0017}_{-0.0011}$	$D_{40}$	$1215^{+16}_{-23}$	$H(0.61)$	$95.06 \pm 0.30$
$\ln(10^{10} A_s)$	$3.047^{+0.012}_{-0.016}$	$D_{220}$	$5717 \pm 42$	$D_{\text{M}}(0.61)$	$2320 \pm 16$
$n_s$	$0.9601^{+0.0058}_{-0.0070}$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.7 \pm 1.0$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.1 \pm 5.2$	$D_{\text{M}}(2.33)$	$5774 \pm 14$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.4 \pm 1.8$	$f\sigma_8(0.15)$	$0.4622 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9601^{+0.0058}_{-0.0070}$	$\sigma_8(0.15)$	$0.7480 \pm 0.0053$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$Y_P$	$0.24534^{+0.00010}_{-0.000082}$	$f\sigma_8(0.38)$	$0.4786 \pm 0.0063$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P^{\text{BBN}}$	$0.24666^{+0.00010}_{-0.000082}$	$\sigma_8(0.38)$	$0.6622 \pm 0.0046$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.612 \pm 0.042$	$f\sigma_8(0.51)$	$0.4762 \pm 0.0053$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$13.822 \pm 0.032$	$\sigma_8(0.51)$	$0.6193^{+0.0041}_{-0.0046}$
$A^{kSZ}$	$< 6.10$	$z_*$	$1090.14 \pm 0.35$	$f\sigma_8(0.61)$	$0.4706 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.40 \pm 0.40$	$\sigma_8(0.61)$	$0.5890^{+0.0039}_{-0.0045}$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04081 \pm 0.00051$	$f\sigma_8(2.33)$	$0.2967^{+0.0020}_{-0.0024}$
$H_0$	$66.96 \pm 0.72$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.874 \pm 0.037$	$\sigma_8(2.33)$	$0.3055^{+0.0023}_{-0.0027}$
$\Omega_\Lambda$	$0.680 \pm 0.010$	$z_{\text{drag}}$	$1059.66 \pm 0.50$	$f_{2000}^{143}$	$31.2 \pm 3.0$
$\Omega_m$	$0.320 \pm 0.010$	$r_{\text{drag}}$	$147.11 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_m h^2$	$0.1434 \pm 0.0016$	$k_{\text{D}}$	$0.14074 \pm 0.00053$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m h^3$	$0.09601 \pm 0.00046$	$100\theta_{\text{D}}$	$0.16089 \pm 0.00031$	$\chi_{\text{lensing}}^2$	$9.50 \pm 0.95$
$\sigma_8$	$0.8104 \pm 0.0060$	$z_{\text{eq}}$	$3411 \pm 37$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.6$
$S_8$	$0.837 \pm 0.017$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi_{\text{lowl}}^2$	$22.1 \pm 2.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4584 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8111 \pm 0.0069$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6094 \pm 0.0077$	$100\theta_{\text{s,eq}}$	$0.4483 \pm 0.0036$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.010$	$H(0.15)$	$72.33 \pm 0.62$		
$r_{\text{drag}} h$	$98.5 \pm 1.3$	$D_{\text{M}}(0.15)$	$646.9 \pm 6.3$		

$\bar{\chi}_{\text{eff}}^2 = 7501.39$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.10$ ;  $R - 1 = 0.00867$



5.8 base\_alpha1\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_alpha1\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02229 \pm 0.00022$	$z_{\text{re}}$	$7.97^{+0.66}_{-0.78}$	$H(0.51)$	$89.66 \pm 0.27$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$10^9 A_s$	$2.109^{+0.029}_{-0.035}$	$D_{\text{M}}(0.51)$	$1983 \pm 10$
$100\theta_{MC}$	$1.04088 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.28 \pm 0.24$
$\tau$	$0.0573^{+0.0062}_{-0.0083}$	$D_{40}$	$1216^{+18}_{-27}$	$D_{\text{M}}(0.61)$	$2307 \pm 11$
$\alpha_{-1}$	$-0.0009^{+0.0015}_{-0.0011}$	$D_{220}$	$5725 \pm 41$	$H(2.33)$	$235.93 \pm 0.73$
$\ln(10^{10} A_s)$	$3.049^{+0.014}_{-0.017}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5766 \pm 12$
$n_s$	$0.9642^{+0.0052}_{-0.0063}$	$D_{1420}$	$815.5 \pm 5.0$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0061$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.7473 \pm 0.0055$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9642^{+0.0052}_{-0.0063}$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245359^{+0.000099}_{-0.000082}$	$\sigma_8(0.38)$	$0.6624 \pm 0.0048$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246686^{+0.000099}_{-0.000082}$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.601 \pm 0.042$	$\sigma_8(0.51)$	$0.6199 \pm 0.0045$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.803 \pm 0.028$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0041$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.95 \pm 0.31$	$\sigma_8(0.61)$	$0.5899 \pm 0.0043$
$A^{kSZ}$	$< 5.93$	$r_*$	$144.71 \pm 0.31$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04107 \pm 0.00047$	$\sigma_8(2.33)$	$0.3066^{+0.0023}_{-0.0025}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.030$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.57 \pm 0.50$	$z_{\text{drag}}$	$1059.69 \pm 0.52$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.6886 \pm 0.0067$	$r_{\text{drag}}$	$147.40 \pm 0.36$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3114 \pm 0.0067$	$k_{\text{D}}$	$0.14048 \pm 0.00050$	$\chi_{\text{lensing}}^2$	$9.27 \pm 0.72$
$\Omega_m h^2$	$0.1421 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16089 \pm 0.00032$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\Omega_m h^3$	$0.09601 \pm 0.00047$	$z_{\text{eq}}$	$3381 \pm 26$	$\chi_{\text{lowl}}^2$	$22 \pm 3$
$\sigma_8$	$0.8087 \pm 0.0061$	$k_{\text{eq}}$	$0.010318 \pm 0.000080$	$\chi_{6\text{DF}}^2$	$0.065 \pm 0.077$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0048$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0025$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6041 \pm 0.0062$	$H(0.15)$	$72.84 \pm 0.43$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9838 \pm 0.0089$	$D_{\text{M}}(0.15)$	$641.7 \pm 4.3$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$r_{\text{drag}} h$	$99.59 \pm 0.86$	$H(0.38)$	$82.95 \pm 0.33$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.4$
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.021$	$D_{\text{M}}(0.38)$	$1530.4 \pm 8.6$		

$$\bar{\chi}_{\text{eff}}^2 = 7508.12; \Delta\bar{\chi}_{\text{eff}}^2 = 6292.15; R - 1 = 0.01736$$



## 6 mnu

### 6.1 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE/base\_mnu\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02205 \pm 0.00025$	$r_{\text{drag}} h$	$96.7^{+3.7}_{-1.8}$	$D_{\text{M}}(0.15)$	$658.6^{+8.3}_{-22}$
$\Omega_c h^2$	$0.1210 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.038$	$H(0.38)$	$81.7^{+1.6}_{-0.66}$
$100\theta_{MC}$	$1.04067 \pm 0.00051$	$z_{\text{re}}$	$7.49 \pm 0.83$	$D_{\text{M}}(0.38)$	$1564^{+17}_{-44}$
$\tau$	$0.0517 \pm 0.0080$	$10^9 A_s$	$2.090 \pm 0.034$	$H(0.51)$	$88.7^{+1.3}_{-0.53}$
$\Sigma m_\nu$	$< 0.198$	$10^9 A_s e^{-2\tau}$	$1.884 \pm 0.014$	$D_{\text{M}}(0.51)$	$2022^{+20}_{-52}$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$D_{40}$	$1232 \pm 15$	$H(0.61)$	$94.5^{+1.1}_{-0.44}$
$n_s$	$0.9617 \pm 0.0063$	$D_{220}$	$5707 \pm 42$	$D_{\text{M}}(0.61)$	$2350^{+22}_{-56}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$237.6^{+1.3}_{-2.1}$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$814.2 \pm 5.2$	$D_{\text{M}}(2.33)$	$5806^{+19}_{-55}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.2 \pm 1.9$	$f\sigma_8(0.15)$	$0.460 \pm 0.013$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.9617 \pm 0.0063$	$\sigma_8(0.15)$	$0.726^{+0.040}_{-0.010}$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P$	$0.24526^{+0.00013}_{-0.000094}$	$f\sigma_8(0.38)$	$0.473^{+0.016}_{-0.0096}$
$A_{143}^{PS}$	$46 \pm 9$	$Y_P^{\text{BBN}}$	$0.24658^{+0.00013}_{-0.000094}$	$\sigma_8(0.38)$	$0.642^{+0.037}_{-0.0087}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.647^{+0.044}_{-0.049}$	$f\sigma_8(0.51)$	$0.469^{+0.017}_{-0.0081}$
$A^{kSZ}$	$< 6.02$	Age/Gyr	$13.896^{+0.042}_{-0.13}$	$\sigma_8(0.51)$	$0.600^{+0.035}_{-0.0082}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$z_*$	$1090.44^{+0.42}_{-0.51}$	$f\sigma_8(0.61)$	$0.462^{+0.018}_{-0.0071}$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$r_*$	$144.39 \pm 0.50$	$\sigma_8(0.61)$	$0.570^{+0.034}_{-0.0078}$
$H_0$	$65.7^{+2.4}_{-1.0}$	$100\theta_*$	$1.04094 \pm 0.00047$	$f\sigma_8(2.33)$	$0.288^{+0.015}_{-0.0034}$
$\Omega_\Lambda$	$0.663^{+0.034}_{-0.012}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.871 \pm 0.046$	$\sigma_8(2.33)$	$0.295^{+0.018}_{-0.0041}$
$\Omega_m$	$0.337^{+0.012}_{-0.034}$	$z_{\text{drag}}$	$1059.28 \pm 0.49$	$f_{2000}^{143}$	$31.6 \pm 3.1$
$\Omega_m h^2$	$0.1450^{+0.0021}_{-0.0036}$	$r_{\text{drag}}$	$147.15 \pm 0.49$	$f_{2000}^{143 \times 217}$	$33.8 \pm 2.2$
$\Omega_\nu h^2$	$< 0.00212$	$k_{\text{D}}$	$0.14057 \pm 0.00052$	$f_{2000}^{217}$	$108.3 \pm 2.1$
$\Omega_m h^3$	$0.0952^{+0.0014}_{-0.00050}$	$100\theta_{\text{D}}$	$0.16112 \pm 0.00027$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$\sigma_8$	$0.788^{+0.041}_{-0.011}$	$z_{\text{eq}}$	$3419 \pm 50$	$\chi_{\text{lowl}}^2$	$23.8 \pm 1.3$
$S_8$	$0.833 \pm 0.025$	$k_{\text{eq}}$	$0.01044 \pm 0.00015$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8096 \pm 0.0092$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8 \Omega_m^{0.25}$	$0.600^{+0.023}_{-0.012}$	$100\theta_{\text{s,eq}}$	$0.4477 \pm 0.0047$		
$\sigma_8/h^{0.5}$	$0.972^{+0.040}_{-0.017}$	$H(0.15)$	$71.2^{+2.1}_{-0.89}$		

Best-fit  $\chi_{\text{eff}}^2 = 7471.23$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.27$ ;  $\bar{\chi}_{\text{eff}}^2 = 7492.77$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.03$ ;  $R - 1 = 0.00611$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.71 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 23.54 ( $\Delta$  -0.12) CamSpec like\_10.7HM: 7049.70



## 6.2 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_mnu\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02206 \pm 0.00025$	$r_{\text{drag}} h$	$96.8^{+3.8}_{-1.8}$	$D_{\text{M}}(0.15)$	$658.2^{+8.4}_{-22}$
$\Omega_c h^2$	$0.1209 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.038$	$H(0.38)$	$81.8^{+1.6}_{-0.67}$
$100\theta_{MC}$	$1.04068 \pm 0.00051$	$z_{\text{re}}$	$7.67^{+0.52}_{-0.83}$	$D_{\text{M}}(0.38)$	$1564^{+17}_{-44}$
$\tau$	$0.0533^{+0.0046}_{-0.0082}$	$10^9 A_s$	$2.096^{+0.024}_{-0.034}$	$H(0.51)$	$88.7^{+1.3}_{-0.54}$
$\Sigma m_\nu$	$< 0.199$	$10^9 A_s e^{-2\tau}$	$1.884 \pm 0.014$	$D_{\text{M}}(0.51)$	$2022^{+20}_{-52}$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.016}$	$D_{40}$	$1232 \pm 15$	$H(0.61)$	$94.5^{+1.1}_{-0.44}$
$n_s$	$0.9620 \pm 0.0062$	$D_{220}$	$5707 \pm 42$	$D_{\text{M}}(0.61)$	$2349^{+22}_{-56}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$237.5^{+1.3}_{-2.1}$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$814.2 \pm 5.2$	$D_{\text{M}}(2.33)$	$5806^{+19}_{-56}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.2 \pm 1.9$	$f\sigma_8(0.15)$	$0.460 \pm 0.013$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.9620 \pm 0.0062$	$\sigma_8(0.15)$	$0.727^{+0.040}_{-0.0099}$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P$	$0.24526^{+0.00013}_{-0.000093}$	$f\sigma_8(0.38)$	$0.473^{+0.016}_{-0.0096}$
$A_{143}^{PS}$	$46 \pm 9$	$Y_P^{\text{BBN}}$	$0.24658^{+0.00013}_{-0.000094}$	$\sigma_8(0.38)$	$0.642^{+0.036}_{-0.0086}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.645^{+0.044}_{-0.050}$	$f\sigma_8(0.51)$	$0.469^{+0.017}_{-0.0081}$
$A^{kSZ}$	$< 5.97$	Age/Gyr	$13.895^{+0.042}_{-0.13}$	$\sigma_8(0.51)$	$0.600^{+0.035}_{-0.0081}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$z_*$	$1090.42^{+0.42}_{-0.51}$	$f\sigma_8(0.61)$	$0.463^{+0.018}_{-0.0071}$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$r_*$	$144.40 \pm 0.50$	$\sigma_8(0.61)$	$0.571^{+0.033}_{-0.0077}$
$H_0$	$65.7^{+2.4}_{-1.0}$	$100\theta_*$	$1.04095 \pm 0.00047$	$f\sigma_8(2.33)$	$0.289^{+0.015}_{-0.0033}$
$\Omega_\Lambda$	$0.663^{+0.034}_{-0.013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.872 \pm 0.046$	$\sigma_8(2.33)$	$0.296^{+0.018}_{-0.0040}$
$\Omega_m$	$0.337^{+0.013}_{-0.034}$	$z_{\text{drag}}$	$1059.29 \pm 0.49$	$f_{2000}^{143}$	$31.5 \pm 3.1$
$\Omega_m h^2$	$0.1449^{+0.0021}_{-0.0036}$	$r_{\text{drag}}$	$147.17 \pm 0.49$	$f_{2000}^{143 \times 217}$	$33.7 \pm 2.2$
$\Omega_\nu h^2$	$< 0.00214$	$k_{\text{D}}$	$0.14056 \pm 0.00052$	$f_{2000}^{217}$	$108.3 \pm 2.1$
$\Omega_m h^3$	$0.0952^{+0.0014}_{-0.00050}$	$100\theta_{\text{D}}$	$0.16112 \pm 0.00027$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\sigma_8$	$0.789^{+0.041}_{-0.011}$	$z_{\text{eq}}$	$3417 \pm 50$	$\chi_{\text{lowl}}^2$	$23.7 \pm 1.3$
$S_8$	$0.834 \pm 0.025$	$k_{\text{eq}}$	$0.01043 \pm 0.00015$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8100 \pm 0.0092$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8 \Omega_m^{0.25}$	$0.600^{+0.023}_{-0.012}$	$100\theta_{\text{s,eq}}$	$0.4479 \pm 0.0047$		
$\sigma_8/h^{0.5}$	$0.973^{+0.040}_{-0.017}$	$H(0.15)$	$71.3^{+2.1}_{-0.89}$		

$$\bar{\chi}_{\text{eff}}^2 = 7492.51; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.02; R - 1 = 0.00841$$



### 6.3 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00017$	$r_{\text{drag}} h$	$98.5^{+2.1}_{-1.2}$	$D_{\text{M}}(0.15)$	$647.5^{+5.7}_{-12}$
$\Omega_c h^2$	$0.1200 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.030$	$H(0.38)$	$82.55^{+0.92}_{-0.44}$
$100\theta_{MC}$	$1.04086 \pm 0.00033$	$z_{\text{re}}$	$7.61 \pm 0.81$	$D_{\text{M}}(0.38)$	$1542^{+12}_{-25}$
$\tau$	$0.0536 \pm 0.0079$	$10^9 A_s$	$2.095 \pm 0.034$	$H(0.51)$	$89.35^{+0.77}_{-0.36}$
$\Sigma m_\nu$	$< 0.126$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.51)$	$1996^{+14}_{-29}$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{40}$	$1230 \pm 13$	$H(0.61)$	$95.04^{+0.65}_{-0.29}$
$n_s$	$0.9649 \pm 0.0045$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(0.61)$	$2321^{+15}_{-32}$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$236.76^{+0.90}_{-1.2}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.6 \pm 4.8$	$D_{\text{M}}(2.33)$	$5776^{+13}_{-32}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.5 \pm 1.7$	$f\sigma_8(0.15)$	$0.4576 \pm 0.0093$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9649 \pm 0.0045$	$\sigma_8(0.15)$	$0.739^{+0.025}_{-0.0084}$
$A_{100}^{PS}$	$250 \pm 27$	$Y_P$	$0.245368^{+0.000071}_{-0.000060}$	$f\sigma_8(0.38)$	$0.474^{+0.010}_{-0.0072}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246694^{+0.000072}_{-0.000061}$	$\sigma_8(0.38)$	$0.654^{+0.023}_{-0.0073}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.598 \pm 0.031$	$f\sigma_8(0.51)$	$0.471^{+0.011}_{-0.0064}$
$A^{kSZ}$	$< 5.35$	Age/Gyr	$13.827^{+0.029}_{-0.074}$	$\sigma_8(0.51)$	$0.612^{+0.022}_{-0.0068}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1090.00 \pm 0.30$	$f\sigma_8(0.61)$	$0.466^{+0.012}_{-0.0058}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.48 \pm 0.33$	$\sigma_8(0.61)$	$0.582^{+0.021}_{-0.0064}$
$H_0$	$66.9^{+1.4}_{-0.70}$	$100\theta_*$	$1.04107 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2940^{+0.0096}_{-0.0029}$
$\Omega_\Lambda$	$0.679^{+0.018}_{-0.0088}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.031$	$\sigma_8(2.33)$	$0.302^{+0.011}_{-0.0033}$
$\Omega_m$	$0.3210^{+0.0088}_{-0.018}$	$z_{\text{drag}}$	$1059.79 \pm 0.34$	$f_{2000}^{143}$	$29.9 \pm 2.8$
$\Omega_m h^2$	$0.1435^{+0.0014}_{-0.0021}$	$r_{\text{drag}}$	$147.16 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.4 \pm 2.0$
$\Omega_\nu h^2$	$< 0.00136$	$k_{\text{D}}$	$0.14075 \pm 0.00037$	$f_{2000}^{217}$	$107.1 \pm 1.9$
$\Omega_m h^3$	$0.09597^{+0.00085}_{-0.00035}$	$100\theta_{\text{D}}$	$0.16084 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\sigma_8$	$0.801^{+0.026}_{-0.0093}$	$z_{\text{eq}}$	$3400 \pm 32$	$\chi_{\text{lowl}}^2$	$23.35 \pm 0.98$
$S_8$	$0.828 \pm 0.018$	$k_{\text{eq}}$	$0.010378 \pm 0.000099$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4533 \pm 0.0098$	$100\theta_{\text{eq}}$	$0.8135 \pm 0.0060$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.602^{+0.015}_{-0.0091}$	$100\theta_{\text{s,eq}}$	$0.4495 \pm 0.0031$		
$\sigma_8/h^{0.5}$	$0.979^{+0.026}_{-0.013}$	$H(0.15)$	$72.3^{+1.2}_{-0.60}$		

Best-fit  $\chi_{\text{eff}}^2 = 11920.07$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.33$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.39$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.98$ ;  $R - 1 = 0.01661$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.78 ( $\Delta$  -0.42) commander\_dx12\_v3\_2\_29: 23.03 ( $\Delta$  -0.21) CamSpec like\_10.7HM\_1400\_unified: 11499.19



## 6.4 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00015$	$r_{\text{drag}} h$	$100.8^{+1.2}_{-1.0}$	$D_{\text{M}}(0.15)$	$634.9^{+4.9}_{-5.9}$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.422 \pm 0.029$	$H(0.38)$	$83.50^{+0.45}_{-0.38}$
$100\theta_{MC}$	$1.04112 \pm 0.00031$	$z_{\text{re}}$	$7.79 \pm 0.80$	$D_{\text{M}}(0.38)$	$1516.4^{+9.8}_{-12}$
$\tau$	$0.0560 \pm 0.0080$	$10^9 A_s$	$2.098 \pm 0.035$	$H(0.51)$	$90.13^{+0.36}_{-0.30}$
$\Sigma m_\nu$	$< 0.0421$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$D_{\text{M}}(0.51)$	$1966^{+12}_{-14}$
$\ln(10^{10} A_s)$	$3.043 \pm 0.017$	$D_{40}$	$1223 \pm 13$	$H(0.61)$	$95.68^{+0.30}_{-0.25}$
$n_s$	$0.9691 \pm 0.0043$	$D_{220}$	$5736 \pm 40$	$D_{\text{M}}(0.61)$	$2289^{+13}_{-15}$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$235.41 \pm 0.81$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.6 \pm 4.8$	$D_{\text{M}}(2.33)$	$5746^{+11}_{-14}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.2 \pm 1.6$	$f\sigma_8(0.15)$	$0.4518 \pm 0.0080$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9691 \pm 0.0043$	$\sigma_8(0.15)$	$0.752^{+0.010}_{-0.0075}$
$A_{100}^{PS}$	$248 \pm 27$	$Y_P$	$0.245429^{+0.000061}_{-0.000056}$	$f\sigma_8(0.38)$	$0.4722 \pm 0.0070$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.246756^{+0.000062}_{-0.000056}$	$\sigma_8(0.38)$	$0.6675^{+0.0090}_{-0.0063}$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$10^5 D/H$	$2.569 \pm 0.028$	$f\sigma_8(0.51)$	$0.4719 \pm 0.0064$
$A^{kSZ}$	$< 5.18$	Age/Gyr	$13.760^{+0.025}_{-0.031}$	$\sigma_8(0.51)$	$0.6250^{+0.0085}_{-0.0059}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.65 \pm 0.26$	$f\sigma_8(0.61)$	$0.4676 \pm 0.0061$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$144.81 \pm 0.30$	$\sigma_8(0.61)$	$0.5950^{+0.0081}_{-0.0055}$
$H_0$	$68.36^{+0.69}_{-0.59}$	$100\theta_*$	$1.04129 \pm 0.00030$	$f\sigma_8(2.33)$	$0.3000^{+0.0037}_{-0.0027}$
$\Omega_\Lambda$	$0.6978^{+0.0090}_{-0.0075}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.907 \pm 0.029$	$\sigma_8(2.33)$	$0.3099^{+0.0042}_{-0.0029}$
$\Omega_m$	$0.3022^{+0.0075}_{-0.0090}$	$z_{\text{drag}}$	$1060.02 \pm 0.33$	$f_{2000}^{143}$	$29.0 \pm 2.7$
$\Omega_m h^2$	$0.1411 \pm 0.0013$	$r_{\text{drag}}$	$147.45 \pm 0.31$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000452$	$k_{\text{D}}$	$0.14056 \pm 0.00036$	$f_{2000}^{217}$	$106.5 \pm 1.8$
$\Omega_m h^3$	$0.09648 \pm 0.00038$	$100\theta_{\text{D}}$	$0.16072 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.3 \pm 2.0$
$\sigma_8$	$0.813^{+0.011}_{-0.0084}$	$z_{\text{eq}}$	$3364 \pm 29$	$\chi_{\text{lowl}}^2$	$22.77 \pm 0.88$
$S_8$	$0.816 \pm 0.015$	$k_{\text{eq}}$	$0.010266 \pm 0.000090$	$\chi_{\text{H073p45}}^2$	$9.5 \pm 2.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4467 \pm 0.0085$	$100\theta_{\text{eq}}$	$0.8207 \pm 0.0056$	$\chi_{\text{prior}}^2$	$9.4 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6025 \pm 0.0088$	$100\theta_{s,\text{eq}}$	$0.4532 \pm 0.0029$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.013$	$H(0.15)$	$73.55^{+0.60}_{-0.51}$		

$\bar{\chi}_{\text{eff}}^2 = 11952.66$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.83$ ;  $R - 1 = 0.05737$



6.5 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00017$	$r_{\text{drag}} h$	$98.5^{+2.2}_{-1.2}$	$D_{\text{M}}(0.15)$	$647.4^{+5.7}_{-12}$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.029$	$H(0.38)$	$82.56^{+0.93}_{-0.44}$
$100\theta_{MC}$	$1.04086 \pm 0.00033$	$z_{\text{re}}$	$7.75^{+0.56}_{-0.81}$	$D_{\text{M}}(0.38)$	$1542^{+12}_{-25}$
$\tau$	$0.0549^{+0.0050}_{-0.0083}$	$10^9 A_s$	$2.100^{+0.025}_{-0.035}$	$H(0.51)$	$89.36^{+0.77}_{-0.36}$
$\Sigma m_\nu$	$< 0.127$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.51)$	$1996^{+14}_{-29}$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.016}$	$D_{40}$	$1230 \pm 13$	$H(0.61)$	$95.04^{+0.66}_{-0.29}$
$n_s$	$0.9651 \pm 0.0045$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(0.61)$	$2321^{+15}_{-32}$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$236.74^{+0.90}_{-1.2}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 4.8$	$D_{\text{M}}(2.33)$	$5776^{+13}_{-33}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.5 \pm 1.7$	$f\sigma_8(0.15)$	$0.4579 \pm 0.0092$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9651 \pm 0.0045$	$\sigma_8(0.15)$	$0.740^{+0.025}_{-0.0081}$
$A_{100}^{PS}$	$250 \pm 27$	$Y_P$	$0.245370^{+0.000071}_{-0.000060}$	$f\sigma_8(0.38)$	$0.474^{+0.010}_{-0.0071}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246696^{+0.000071}_{-0.000060}$	$\sigma_8(0.38)$	$0.655^{+0.023}_{-0.0070}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.597 \pm 0.031$	$f\sigma_8(0.51)$	$0.472^{+0.011}_{-0.0062}$
$A^{kSZ}$	$< 5.31$	Age/Gyr	$13.826^{+0.029}_{-0.075}$	$\sigma_8(0.51)$	$0.613^{+0.022}_{-0.0066}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1090.00 \pm 0.30$	$f\sigma_8(0.61)$	$0.466^{+0.011}_{-0.0056}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.48 \pm 0.33$	$\sigma_8(0.61)$	$0.583^{+0.021}_{-0.0062}$
$H_0$	$66.9^{+1.4}_{-0.70}$	$100\theta_*$	$1.04108 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2943^{+0.0095}_{-0.0028}$
$\Omega_\Lambda$	$0.679^{+0.018}_{-0.0088}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.031$	$\sigma_8(2.33)$	$0.303^{+0.011}_{-0.0032}$
$\Omega_m$	$0.3208^{+0.0088}_{-0.018}$	$z_{\text{drag}}$	$1059.80 \pm 0.34$	$f_{2000}^{143}$	$29.8 \pm 2.8$
$\Omega_m h^2$	$0.1434^{+0.0014}_{-0.0021}$	$r_{\text{drag}}$	$147.17 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.3 \pm 1.9$
$\Omega_\nu h^2$	$< 0.00137$	$k_{\text{D}}$	$0.14075 \pm 0.00037$	$f_{2000}^{217}$	$107.1 \pm 1.9$
$\Omega_m h^3$	$0.09597^{+0.00085}_{-0.00035}$	$100\theta_{\text{D}}$	$0.16083 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\sigma_8$	$0.801^{+0.026}_{-0.0090}$	$z_{\text{eq}}$	$3399 \pm 32$	$\chi_{\text{lowl}}^2$	$23.36 \pm 0.98$
$S_8$	$0.828 \pm 0.018$	$k_{\text{eq}}$	$0.010376 \pm 0.000099$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4535 \pm 0.0098$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0060$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.015}_{-0.0090}$	$100\theta_{\text{s,eq}}$	$0.4496 \pm 0.0031$		
$\sigma_8/h^{0.5}$	$0.980^{+0.026}_{-0.013}$	$H(0.15)$	$72.3^{+1.2}_{-0.60}$		

$\bar{\chi}_{\text{eff}}^2 = 11943.12$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.92$ ;  $R - 1 = 0.01799$



6.6 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00015$	$r_{\text{drag}} h$	$100.8^{+1.2}_{-1.0}$	$D_{\text{M}}(0.15)$	$634.8^{+4.8}_{-5.9}$
$\Omega_c h^2$	$0.1183 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.028$	$H(0.38)$	$83.51^{+0.45}_{-0.38}$
$100\theta_{MC}$	$1.04113 \pm 0.00031$	$z_{\text{re}}$	$7.88^{+0.63}_{-0.80}$	$D_{\text{M}}(0.38)$	$1516.2^{+9.8}_{-12}$
$\tau$	$0.0570^{+0.0061}_{-0.0081}$	$10^9 A_s$	$2.102^{+0.027}_{-0.036}$	$H(0.51)$	$90.14^{+0.36}_{-0.30}$
$\Sigma m_\nu$	$< 0.0422$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.011$	$D_{\text{M}}(0.51)$	$1966^{+12}_{-14}$
$\ln(10^{10} A_s)$	$3.045^{+0.013}_{-0.017}$	$D_{40}$	$1223 \pm 13$	$H(0.61)$	$95.68^{+0.30}_{-0.25}$
$n_s$	$0.9692 \pm 0.0043$	$D_{220}$	$5736 \pm 40$	$D_{\text{M}}(0.61)$	$2288^{+13}_{-15}$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$235.39 \pm 0.81$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.6 \pm 4.8$	$D_{\text{M}}(2.33)$	$5746^{+11}_{-14}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.2 \pm 1.6$	$f\sigma_8(0.15)$	$0.4520 \pm 0.0079$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$n_{s,0.002}$	$0.9692 \pm 0.0043$	$\sigma_8(0.15)$	$0.7525^{+0.0096}_{-0.0072}$
$A_{100}^{PS}$	$248 \pm 27$	$Y_P$	$0.245430 \pm 0.000059$	$f\sigma_8(0.38)$	$0.4725 \pm 0.0068$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.246757 \pm 0.000059$	$\sigma_8(0.38)$	$0.6680^{+0.0085}_{-0.0061}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.568 \pm 0.028$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0063$
$A^{kSZ}$	$< 5.13$	Age/Gyr	$13.759^{+0.025}_{-0.031}$	$\sigma_8(0.51)$	$0.6256^{+0.0080}_{-0.0056}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.65 \pm 0.26$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0059$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$r_*$	$144.81 \pm 0.30$	$\sigma_8(0.61)$	$0.5955^{+0.0077}_{-0.0053}$
$H_0$	$68.38^{+0.69}_{-0.59}$	$100\theta_*$	$1.04129 \pm 0.00030$	$f\sigma_8(2.33)$	$0.3003^{+0.0034}_{-0.0026}$
$\Omega_\Lambda$	$0.6980^{+0.0090}_{-0.0074}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.907 \pm 0.029$	$\sigma_8(2.33)$	$0.3102^{+0.0040}_{-0.0028}$
$\Omega_m$	$0.3020^{+0.0074}_{-0.0090}$	$z_{\text{drag}}$	$1060.03 \pm 0.33$	$f_{2000}^{143}$	$29.0 \pm 2.7$
$\Omega_m h^2$	$0.1411 \pm 0.0013$	$r_{\text{drag}}$	$147.45 \pm 0.31$	$f_{2000}^{143 \times 217}$	$31.7 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000454$	$k_{\text{D}}$	$0.14056 \pm 0.00036$	$f_{2000}^{217}$	$106.5 \pm 1.8$
$\Omega_m h^3$	$0.09649 \pm 0.00038$	$100\theta_{\text{D}}$	$0.16072 \pm 0.00019$	$\chi_{\text{small}}^2$	$397.3 \pm 2.0$
$\sigma_8$	$0.813^{+0.010}_{-0.0082}$	$z_{\text{eq}}$	$3363 \pm 29$	$\chi_{\text{lowl}}^2$	$22.78 \pm 0.88$
$S_8$	$0.816 \pm 0.015$	$k_{\text{eq}}$	$0.010264 \pm 0.000089$	$\chi_{\text{H073p45}}^2$	$9.5 \pm 2.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4469 \pm 0.0084$	$100\theta_{\text{eq}}$	$0.8208 \pm 0.0055$	$\chi_{\text{prior}}^2$	$9.4 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6029 \pm 0.0087$	$100\theta_{s,\text{eq}}$	$0.4532 \pm 0.0028$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.984 \pm 0.013$	$H(0.15)$	$73.56^{+0.60}_{-0.51}$		

$\bar{\chi}_{\text{eff}}^2 = 11952.44$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.81$ ;  $R - 1 = 0.06967$



## 6.7 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00016$	$r_{\text{drag}} h$	$98.6^{+2.0}_{-1.2}$	$D_{\text{M}}(0.15)$	$646.4^{+5.8}_{-11}$
$\Omega_c h^2$	$0.1200 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.022$	$H(0.38)$	$82.63^{+0.85}_{-0.45}$
$100\theta_{MC}$	$1.04085 \pm 0.00032$	$z_{\text{re}}$	$7.69 \pm 0.77$	$D_{\text{M}}(0.38)$	$1540^{+12}_{-23}$
$\tau$	$0.0544 \pm 0.0076$	$10^9 A_s$	$2.099 \pm 0.032$	$H(0.51)$	$89.43^{+0.70}_{-0.37}$
$\Sigma m_\nu$	$< 0.116$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.011$	$D_{\text{M}}(0.51)$	$1993^{+14}_{-27}$
$\ln(10^{10} A_s)$	$3.044 \pm 0.015$	$D_{40}$	$1231 \pm 12$	$H(0.61)$	$95.10^{+0.59}_{-0.30}$
$n_s$	$0.9649 \pm 0.0043$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(0.61)$	$2318^{+15}_{-29}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$236.70^{+0.85}_{-1.1}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5773^{+14}_{-29}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.6$	$f\sigma_8(0.15)$	$0.4588 \pm 0.0065$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9649 \pm 0.0043$	$\sigma_8(0.15)$	$0.743^{+0.019}_{-0.0078}$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P$	$0.245372^{+0.000070}_{-0.000060}$	$f\sigma_8(0.38)$	$0.4754^{+0.0065}_{-0.0055}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246699^{+0.000070}_{-0.000061}$	$\sigma_8(0.38)$	$0.658^{+0.018}_{-0.0071}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.596 \pm 0.031$	$f\sigma_8(0.51)$	$0.4731^{+0.0071}_{-0.0050}$
$A^{kSZ}$	$< 5.35$	Age/Gyr	$13.819^{+0.031}_{-0.066}$	$\sigma_8(0.51)$	$0.615^{+0.017}_{-0.0067}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.99 \pm 0.29$	$f\sigma_8(0.61)$	$0.4676^{+0.0075}_{-0.0046}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.47 \pm 0.30$	$\sigma_8(0.61)$	$0.585^{+0.017}_{-0.0065}$
$H_0$	$67.0^{+1.3}_{-0.69}$	$100\theta_*$	$1.04106 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2954^{+0.0076}_{-0.0030}$
$\Omega_\Lambda$	$0.681^{+0.017}_{-0.0087}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.877 \pm 0.028$	$\sigma_8(2.33)$	$0.3039^{+0.0092}_{-0.0035}$
$\Omega_m$	$0.3194^{+0.0087}_{-0.017}$	$z_{\text{drag}}$	$1059.82 \pm 0.34$	$f_{2000}^{143}$	$29.8 \pm 2.8$
$\Omega_m h^2$	$0.1433^{+0.0014}_{-0.0020}$	$r_{\text{drag}}$	$147.15 \pm 0.30$	$f_{2000}^{143 \times 217}$	$32.3 \pm 2.0$
$\Omega_\nu h^2$	$< 0.00125$	$k_{\text{D}}$	$0.14077 \pm 0.00035$	$f_{2000}^{217}$	$107.1 \pm 1.9$
$\Omega_m h^3$	$0.09607^{+0.00070}_{-0.00038}$	$100\theta_{\text{D}}$	$0.16082 \pm 0.00020$	$\chi_{\text{lensing}}^2$	$9.36 \pm 0.81$
$\sigma_8$	$0.804^{+0.020}_{-0.0083}$	$z_{\text{eq}}$	$3401 \pm 30$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010380 \pm 0.000091$	$\chi_{\text{lowl}}^2$	$23.42 \pm 0.88$
$\sigma_8 \Omega_m^{0.5}$	$0.4544 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8134 \pm 0.0056$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6046^{+0.0097}_{-0.0071}$	$100\theta_{s,\text{eq}}$	$0.4495 \pm 0.0028$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.983^{+0.017}_{-0.010}$	$H(0.15)$	$72.4^{+1.1}_{-0.60}$		

Best-fit  $\chi_{\text{eff}}^2 = 11929.03$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.18$ ;  $\bar{\chi}_{\text{eff}}^2 = 11952.30$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.95$ ;  $R - 1 = 0.01307$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.92 ( $\Delta$  -0.10) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  0.01) commander\_dx12\_v3\_2\_29: 22.93 ( $\Delta$  -0.34) CamSpec like\_10.7HM\_1400\_unified: 11499.28



6.8 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00016$	$r_{\text{drag}} h$	$98.7^{+2.0}_{-1.2}$	$D_{\text{M}}(0.15)$	$646.3^{+5.7}_{-11}$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.022$	$H(0.38)$	$82.64^{+0.86}_{-0.45}$
$100\theta_{MC}$	$1.04086 \pm 0.00032$	$z_{\text{re}}$	$7.79^{+0.59}_{-0.78}$	$D_{\text{M}}(0.38)$	$1539^{+12}_{-23}$
$\tau$	$0.0554^{+0.0054}_{-0.0081}$	$10^9 A_s$	$2.103^{+0.024}_{-0.033}$	$H(0.51)$	$89.43^{+0.71}_{-0.37}$
$\Sigma m_\nu$	$< 0.118$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.011$	$D_{\text{M}}(0.51)$	$1993^{+14}_{-27}$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$D_{40}$	$1231 \pm 12$	$H(0.61)$	$95.10^{+0.60}_{-0.30}$
$n_s$	$0.9650 \pm 0.0043$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2318^{+15}_{-30}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$236.67^{+0.85}_{-1.2}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.7 \pm 4.9$	$D_{\text{M}}(2.33)$	$5773^{+14}_{-29}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.6 \pm 1.6$	$f\sigma_8(0.15)$	$0.4588 \pm 0.0065$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9650 \pm 0.0043$	$\sigma_8(0.15)$	$0.743^{+0.019}_{-0.0077}$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P$	$0.245374^{+0.000070}_{-0.000060}$	$f\sigma_8(0.38)$	$0.4755^{+0.0066}_{-0.0054}$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.246700^{+0.000070}_{-0.000060}$	$\sigma_8(0.38)$	$0.658^{+0.018}_{-0.0070}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.595 \pm 0.031$	$f\sigma_8(0.51)$	$0.4732^{+0.0071}_{-0.0049}$
$A^{kSZ}$	$< 5.33$	Age/Gyr	$13.819^{+0.031}_{-0.067}$	$\sigma_8(0.51)$	$0.615^{+0.018}_{-0.0067}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1089.98 \pm 0.29$	$f\sigma_8(0.61)$	$0.4678^{+0.0076}_{-0.0046}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$r_*$	$144.48 \pm 0.30$	$\sigma_8(0.61)$	$0.585^{+0.017}_{-0.0064}$
$H_0$	$67.0^{+1.3}_{-0.69}$	$100\theta_*$	$1.04107 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2955^{+0.0076}_{-0.0030}$
$\Omega_\Lambda$	$0.681^{+0.017}_{-0.0087}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.028$	$\sigma_8(2.33)$	$0.3040^{+0.0092}_{-0.0035}$
$\Omega_m$	$0.3193^{+0.0087}_{-0.017}$	$z_{\text{drag}}$	$1059.82 \pm 0.34$	$f_{2000}^{143}$	$29.7 \pm 2.8$
$\Omega_m h^2$	$0.1433^{+0.0014}_{-0.0020}$	$r_{\text{drag}}$	$147.16 \pm 0.30$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.0$
$\Omega_\nu h^2$	$< 0.00127$	$k_{\text{D}}$	$0.14076^{+0.00036}_{-0.00032}$	$f_{2000}^{217}$	$107.0 \pm 1.9$
$\Omega_m h^3$	$0.09606^{+0.00071}_{-0.00038}$	$100\theta_{\text{D}}$	$0.16082 \pm 0.00020$	$\chi_{\text{lensing}}^2$	$9.34 \pm 0.79$
$\sigma_8$	$0.805^{+0.020}_{-0.0083}$	$z_{\text{eq}}$	$3400 \pm 30$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010376 \pm 0.000090$	$\chi_{\text{lowl}}^2$	$23.41 \pm 0.88$
$\sigma_8 \Omega_m^{0.5}$	$0.4544 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0055$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6046^{+0.0098}_{-0.0071}$	$100\theta_{\text{s,eq}}$	$0.4496 \pm 0.0028$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.983^{+0.017}_{-0.010}$	$H(0.15)$	$72.4^{+1.1}_{-0.60}$		

$$\bar{\chi}_{\text{eff}}^2 = 11952.13; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.95; R - 1 = 0.01210$$



## 6.9 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO/base\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.426^{+0.032}_{-0.029}$	$D_M(0.38)$	$1529 \pm 10$
$\Omega_c h^2$	$0.1190 \pm 0.0013$	$z_{\text{re}}$	$7.60 \pm 0.81$	$H(0.51)$	$89.71 \pm 0.33$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$10^9 A_s$	$2.089 \pm 0.035$	$D_M(0.51)$	$1980 \pm 12$
$\tau$	$0.0535 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$H(0.61)$	$95.31 \pm 0.29$
$\Sigma m_\nu$	$< 0.0734$	$D_{40}$	$1224 \pm 13$	$D_M(0.61)$	$2305 \pm 13$
$\ln(10^{10} A_s)$	$3.039 \pm 0.017$	$D_{220}$	$5714 \pm 41$	$H(2.33)$	$235.74 \pm 0.78$
$n_s$	$0.9669 \pm 0.0044$	$D_{810}$	$2534 \pm 14$	$D_M(2.33)$	$5765^{+13}_{-15}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4547^{+0.0093}_{-0.0082}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.9 \pm 1.8$	$\sigma_8(0.15)$	$0.747^{+0.015}_{-0.0081}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9669 \pm 0.0044$	$f\sigma_8(0.38)$	$0.4733^{+0.0090}_{-0.0070}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245331^{+0.000086}_{-0.000073}$	$\sigma_8(0.38)$	$0.663^{+0.013}_{-0.0070}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246658^{+0.000086}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4722^{+0.0087}_{-0.0063}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.036$	$\sigma_8(0.51)$	$0.620^{+0.012}_{-0.0065}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.801^{+0.030}_{-0.036}$	$f\sigma_8(0.61)$	$0.4673^{+0.0085}_{-0.0059}$
$A^{kSZ}$	$< 5.77$	$z_*$	$1090.02 \pm 0.29$	$\sigma_8(0.61)$	$0.590^{+0.012}_{-0.0062}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.82 \pm 0.33$	$f\sigma_8(2.33)$	$0.2977^{+0.0052}_{-0.0030}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04123 \pm 0.00042$	$\sigma_8(2.33)$	$0.3069^{+0.0059}_{-0.0032}$
$H_0$	$67.68 \pm 0.59$	$D_M(z_*)/\text{Gpc}$	$13.908 \pm 0.032$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_\Lambda$	$0.6902 \pm 0.0076$	$z_{\text{drag}}$	$1059.51 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_m$	$0.3098 \pm 0.0076$	$r_{\text{drag}}$	$147.54 \pm 0.36$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_D$	$0.14028 \pm 0.00045$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000790$	$100\theta_D$	$0.16102 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$22.98 \pm 0.94$
$\Omega_m h^3$	$0.09599^{+0.00057}_{-0.00048}$	$z_{\text{eq}}$	$3374 \pm 30$	$\chi_{6\text{DF}}^2$	$0.057 \pm 0.077$
$\sigma_8$	$0.808^{+0.016}_{-0.0091}$	$k_{\text{eq}}$	$0.010298 \pm 0.000093$	$\chi_{\text{MGS}}^2$	$1.40 \pm 0.55$
$S_8$	$0.821^{+0.018}_{-0.016}$	$100\theta_{\text{eq}}$	$0.8180 \pm 0.0057$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4499^{+0.0099}_{-0.0087}$	$100\theta_{s,\text{eq}}$	$0.4520 \pm 0.0029$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.012}_{-0.0088}$	$H(0.15)$	$72.94 \pm 0.51$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.983^{+0.019}_{-0.013}$	$D_M(0.15)$	$640.7 \pm 5.1$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$99.85 \pm 0.98$	$H(0.38)$	$83.01 \pm 0.40$		

Best-fit  $\chi_{\text{eff}}^2 = 7476.59$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.20$ ;  $\bar{\chi}_{\text{eff}}^2 = 7497.48$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.87$ ;  $R - 1 = 0.00749$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.54 ( $\Delta$  0.13) DR12BAO: 3.66 ( $\Delta$  -0.24) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  0.00) commander\_dx12\_v3\_2\_29: 22.93 ( $\Delta$  -0.33) CamSpec like\_10.7HM: 7050.52



6.10 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18/base\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.424^{+0.031}_{-0.028}$	$D_M(0.38)$	$1527.0 \pm 9.7$
$\Omega_c h^2$	$0.1188 \pm 0.0013$	$z_{\text{re}}$	$7.61 \pm 0.81$	$H(0.51)$	$89.75 \pm 0.32$
$100\theta_{MC}$	$1.04104 \pm 0.00042$	$10^9 A_s$	$2.089 \pm 0.035$	$D_M(0.51)$	$1979 \pm 12$
$\tau$	$0.0537 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$H(0.61)$	$95.34 \pm 0.28$
$\Sigma m_\nu$	$< 0.0701$	$D_{40}$	$1223 \pm 13$	$D_M(0.61)$	$2303 \pm 13$
$\ln(10^{10} A_s)$	$3.039 \pm 0.017$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.64 \pm 0.75$
$n_s$	$0.9673 \pm 0.0043$	$D_{810}$	$2534 \pm 14$	$D_M(2.33)$	$5763^{+13}_{-15}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.3 \pm 5.1$	$f\sigma_8(0.15)$	$0.4540^{+0.0090}_{-0.0078}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.747^{+0.014}_{-0.0082}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9673 \pm 0.0043$	$f\sigma_8(0.38)$	$0.4729^{+0.0087}_{-0.0067}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245336^{+0.000085}_{-0.000072}$	$\sigma_8(0.38)$	$0.663^{+0.013}_{-0.0071}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246662^{+0.000085}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4718^{+0.0084}_{-0.0062}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.612 \pm 0.036$	$\sigma_8(0.51)$	$0.620^{+0.012}_{-0.0066}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.798^{+0.030}_{-0.034}$	$f\sigma_8(0.61)$	$0.4671^{+0.0082}_{-0.0058}$
$A^{kSZ}$	$< 5.74$	$z_*$	$1089.99 \pm 0.29$	$\sigma_8(0.61)$	$0.590^{+0.011}_{-0.0063}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.85 \pm 0.32$	$f\sigma_8(2.33)$	$0.2979^{+0.0050}_{-0.0030}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04124 \pm 0.00042$	$\sigma_8(2.33)$	$0.3072^{+0.0056}_{-0.0032}$
$H_0$	$67.77 \pm 0.56$	$D_M(z_*)/\text{Gpc}$	$13.911 \pm 0.031$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_\Lambda$	$0.6914 \pm 0.0072$	$z_{\text{drag}}$	$1059.53 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m$	$0.3086 \pm 0.0072$	$r_{\text{drag}}$	$147.56 \pm 0.35$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^2$	$0.1417 \pm 0.0011$	$k_D$	$0.14026 \pm 0.00045$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000754$	$100\theta_D$	$0.16101 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$22.92 \pm 0.92$
$\Omega_m h^3$	$0.09601^{+0.00056}_{-0.00048}$	$z_{\text{eq}}$	$3371 \pm 29$	$\chi_{\text{JLA}}^2$	$1035.03 \pm 0.32$
$\sigma_8$	$0.809^{+0.016}_{-0.0091}$	$k_{\text{eq}}$	$0.010288 \pm 0.000090$	$\chi_{6\text{DF}}^2$	$0.045 \pm 0.063$
$S_8$	$0.820^{+0.017}_{-0.015}$	$100\theta_{\text{eq}}$	$0.8187 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$1.48 \pm 0.53$
$\sigma_8 \Omega_m^{0.5}$	$0.4491^{+0.0096}_{-0.0083}$	$100\theta_{s,\text{eq}}$	$0.4523 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.012}_{-0.0086}$	$H(0.15)$	$73.01 \pm 0.49$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.982^{+0.019}_{-0.013}$	$D_M(0.15)$	$640.0 \pm 4.8$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$99.999 \pm 0.92$	$H(0.38)$	$83.07 \pm 0.38$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8511.39$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.10$ ;  $\bar{\chi}_{\text{eff}}^2 = 8532.36$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.82$ ;  $R - 1 = 0.00853$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.54 ( $\Delta$  0.07) DR12BAO: 3.66 ( $\Delta$  -0.11) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.76 ( $\Delta$  -0.12) commander\_dx12\_v3\_2\_29: 23.01 ( $\Delta$  -0.20) CamSpec like\_10.7HM: 7050.38 SN - JLA Pantheon18: 1034.85 ( $\Delta$  -0.03)



6.11 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_zre6p5/base\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.030$	$D_M(0.38)$	$1528 \pm 10$
$\Omega_c h^2$	$0.1189 \pm 0.0013$	$z_{\text{re}}$	$7.74^{+0.56}_{-0.81}$	$H(0.51)$	$89.71 \pm 0.33$
$100\theta_{MC}$	$1.04103 \pm 0.00042$	$10^9 A_s$	$2.094^{+0.025}_{-0.035}$	$D_M(0.51)$	$1980 \pm 12$
$\tau$	$0.0549^{+0.0050}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$H(0.61)$	$95.31 \pm 0.29$
$\Sigma m_\nu$	$< 0.0742$	$D_{40}$	$1224 \pm 13$	$D_M(0.61)$	$2304 \pm 13$
$\ln(10^{10} A_s)$	$3.041^{+0.012}_{-0.016}$	$D_{220}$	$5714 \pm 41$	$H(2.33)$	$235.73 \pm 0.78$
$n_s$	$0.9670 \pm 0.0044$	$D_{810}$	$2534 \pm 14$	$D_M(2.33)$	$5764^{+13}_{-15}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4551^{+0.0092}_{-0.0081}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.748^{+0.015}_{-0.0078}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9670 \pm 0.0044$	$f\sigma_8(0.38)$	$0.4738^{+0.0089}_{-0.0068}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245333^{+0.000086}_{-0.000073}$	$\sigma_8(0.38)$	$0.663^{+0.013}_{-0.0067}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246659^{+0.000086}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4726^{+0.0086}_{-0.0062}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.036$	$\sigma_8(0.51)$	$0.621^{+0.012}_{-0.0062}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.801^{+0.030}_{-0.036}$	$f\sigma_8(0.61)$	$0.4678^{+0.0084}_{-0.0057}$
$A^{kSZ}$	$< 5.74$	$z_*$	$1090.01 \pm 0.30$	$\sigma_8(0.61)$	$0.591^{+0.012}_{-0.0059}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.82 \pm 0.33$	$f\sigma_8(2.33)$	$0.2980^{+0.0050}_{-0.0028}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04123 \pm 0.00042$	$\sigma_8(2.33)$	$0.3072^{+0.0058}_{-0.0030}$
$H_0$	$67.69 \pm 0.59$	$D_M(z_*)/\text{Gpc}$	$13.909 \pm 0.032$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_\Lambda$	$0.6903 \pm 0.0076$	$z_{\text{drag}}$	$1059.52 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m$	$0.3097 \pm 0.0076$	$r_{\text{drag}}$	$147.54 \pm 0.36$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_D$	$0.14028 \pm 0.00045$	$\chi_{\text{small}}^2$	$396.9 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000798$	$100\theta_D$	$0.16102 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$22.99 \pm 0.94$
$\Omega_m h^3$	$0.09599^{+0.00057}_{-0.00048}$	$z_{\text{eq}}$	$3374 \pm 30$	$\chi_{6\text{DF}}^2$	$0.056 \pm 0.076$
$\sigma_8$	$0.809^{+0.016}_{-0.0087}$	$k_{\text{eq}}$	$0.010296 \pm 0.000092$	$\chi_{\text{MGS}}^2$	$1.41 \pm 0.55$
$S_8$	$0.822^{+0.018}_{-0.016}$	$100\theta_{\text{eq}}$	$0.8182 \pm 0.0057$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4503^{+0.0099}_{-0.0086}$	$100\theta_{s,\text{eq}}$	$0.4520 \pm 0.0029$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.012}_{-0.0086}$	$H(0.15)$	$72.94 \pm 0.52$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.984^{+0.019}_{-0.012}$	$D_M(0.15)$	$640.7 \pm 5.1$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$99.87 \pm 0.98$	$H(0.38)$	$83.02 \pm 0.40$		

$\bar{\chi}_{\text{eff}}^2 = 7497.29$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6291.93$ ;  $R - 1 = 0.00759$



6.12 base\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5/base\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.427^{+0.030}_{-0.027}$	$D_M(0.38)$	$1526.9 \pm 9.7$
$\Omega_c h^2$	$0.1188 \pm 0.0013$	$z_{\text{re}}$	$7.75^{+0.56}_{-0.82}$	$H(0.51)$	$89.75 \pm 0.32$
$100\theta_{MC}$	$1.04105 \pm 0.00042$	$10^9 A_s$	$2.094^{+0.025}_{-0.035}$	$D_M(0.51)$	$1978 \pm 12$
$\tau$	$0.0550^{+0.0050}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.012$	$H(0.61)$	$95.35 \pm 0.28$
$\Sigma m_\nu$	$< 0.0707$	$D_{40}$	$1223 \pm 13$	$D_M(0.61)$	$2303 \pm 13$
$\ln(10^{10} A_s)$	$3.041^{+0.012}_{-0.016}$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.63 \pm 0.75$
$n_s$	$0.9674 \pm 0.0043$	$D_{810}$	$2534 \pm 14$	$D_M(2.33)$	$5763^{+13}_{-15}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.3 \pm 5.1$	$f\sigma_8(0.15)$	$0.4544^{+0.0089}_{-0.0077}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.748^{+0.014}_{-0.0078}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9674 \pm 0.0043$	$f\sigma_8(0.38)$	$0.4733^{+0.0085}_{-0.0066}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245337^{+0.000084}_{-0.000072}$	$\sigma_8(0.38)$	$0.664^{+0.013}_{-0.0067}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246664^{+0.000085}_{-0.000073}$	$f\sigma_8(0.51)$	$0.4723^{+0.0083}_{-0.0060}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.612 \pm 0.036$	$\sigma_8(0.51)$	$0.621^{+0.012}_{-0.0063}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.798^{+0.030}_{-0.034}$	$f\sigma_8(0.61)$	$0.4676^{+0.0081}_{-0.0056}$
$A^{kSZ}$	$< 5.70$	$z_*$	$1089.99 \pm 0.29$	$\sigma_8(0.61)$	$0.591^{+0.011}_{-0.0059}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.85 \pm 0.32$	$f\sigma_8(2.33)$	$0.2982^{+0.0048}_{-0.0028}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04124 \pm 0.00042$	$\sigma_8(2.33)$	$0.3075^{+0.0055}_{-0.0030}$
$H_0$	$67.78 \pm 0.56$	$D_M(z_*)/\text{Gpc}$	$13.911 \pm 0.031$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_\Lambda$	$0.6915 \pm 0.0072$	$z_{\text{drag}}$	$1059.53 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m$	$0.3085 \pm 0.0072$	$r_{\text{drag}}$	$147.57 \pm 0.35$	$f_{2000}^{217}$	$107.5 \pm 2.0$
$\Omega_m h^2$	$0.1417 \pm 0.0011$	$k_D$	$0.14026 \pm 0.00045$	$\chi_{\text{small}}^2$	$396.9 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000760$	$100\theta_D$	$0.16101 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$22.94 \pm 0.92$
$\Omega_m h^3$	$0.09601^{+0.00056}_{-0.00048}$	$z_{\text{eq}}$	$3370 \pm 29$	$\chi_{\text{JLA}}^2$	$1035.02 \pm 0.32$
$\sigma_8$	$0.809^{+0.016}_{-0.0087}$	$k_{\text{eq}}$	$0.010287 \pm 0.000089$	$\chi_{6\text{DF}}^2$	$0.045 \pm 0.062$
$S_8$	$0.821^{+0.017}_{-0.015}$	$100\theta_{\text{eq}}$	$0.8188 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$1.49 \pm 0.53$
$\sigma_8 \Omega_m^{0.5}$	$0.4495^{+0.0095}_{-0.0083}$	$100\theta_{s,\text{eq}}$	$0.4523 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.012}_{-0.0084}$	$H(0.15)$	$73.02 \pm 0.49$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.983^{+0.018}_{-0.012}$	$D_M(0.15)$	$639.9 \pm 4.8$	$\chi_{\text{BAO}}^2$	$5.9 \pm 1.1$
$r_{\text{drag}} h$	$100.01 \pm 0.92$	$H(0.38)$	$83.07 \pm 0.38$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 8532.17; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.88; R - 1 = 0.00943$$



### 6.13 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.028$	$D_M(0.38)$	$1526.7^{+8.2}_{-9.6}$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$z_{\text{re}}$	$7.63 \pm 0.79$	$H(0.51)$	$89.81^{+0.31}_{-0.26}$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s$	$2.094 \pm 0.035$	$D_M(0.51)$	$1978.1^{+9.7}_{-11}$
$\tau$	$0.0542 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.42^{+0.27}_{-0.22}$
$\Sigma m_\nu$	$< 0.0663$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2302^{+10}_{-12}$
$\ln(10^{10} A_s)$	$3.041 \pm 0.017$	$D_{220}$	$5729 \pm 39$	$H(2.33)$	$236.00 \pm 0.65$
$n_s$	$0.9671 \pm 0.0039$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5758^{+10}_{-14}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.9$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0076$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.749^{+0.014}_{-0.0080}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9671 \pm 0.0039$	$f\sigma_8(0.38)$	$0.4746^{+0.0076}_{-0.0064}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245395^{+0.000061}_{-0.000052}$	$\sigma_8(0.38)$	$0.664^{+0.012}_{-0.0070}$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246721^{+0.000061}_{-0.000052}$	$f\sigma_8(0.51)$	$0.4734^{+0.0075}_{-0.0059}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.585^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.622^{+0.011}_{-0.0065}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.786^{+0.023}_{-0.032}$	$f\sigma_8(0.61)$	$0.4686^{+0.0074}_{-0.0056}$
$A^{kSZ}$	$< 5.25$	$z_*$	$1089.84 \pm 0.23$	$\sigma_8(0.61)$	$0.592^{+0.011}_{-0.0062}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.64^{+0.25}_{-0.28}$	$f\sigma_8(2.33)$	$0.2984^{+0.0048}_{-0.0030}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3077^{+0.0055}_{-0.0032}$
$H_0$	$67.76^{+0.55}_{-0.48}$	$D_M(z_*)/\text{Gpc}$	$13.892^{+0.024}_{-0.027}$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6903^{+0.0070}_{-0.0063}$	$z_{\text{drag}}$	$1059.88 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m$	$0.3097^{+0.0063}_{-0.0070}$	$r_{\text{drag}}$	$147.31^{+0.26}_{-0.30}$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$k_D$	$0.14064^{+0.00036}_{-0.00032}$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000713$	$100\theta_D$	$0.16079 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.05 \pm 0.86$
$\Omega_m h^3$	$0.09632^{+0.00046}_{-0.00035}$	$z_{\text{eq}}$	$3383 \pm 25$	$\chi_{6\text{DF}}^2$	$0.050 \pm 0.069$
$\sigma_8$	$0.811^{+0.015}_{-0.0089}$	$k_{\text{eq}}$	$0.010325 \pm 0.000076$	$\chi_{\text{MGS}}^2$	$1.37 \pm 0.48$
$S_8$	$0.824 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0046$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0081$	$100\theta_{s,\text{eq}}$	$0.4512^{+0.0022}_{-0.0025}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.605^{+0.011}_{-0.0081}$	$H(0.15)$	$73.02^{+0.48}_{-0.42}$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.985^{+0.017}_{-0.012}$	$D_M(0.15)$	$640.0^{+4.1}_{-4.7}$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.81 \pm 0.87$	$H(0.38)$	$83.11^{+0.37}_{-0.31}$		

Best-fit  $\chi_{\text{eff}}^2 = 11925.28$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.19$ ;  $\bar{\chi}_{\text{eff}}^2 = 11948.38$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.06$ ;  $R - 1 = 0.01113$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.61 ( $\Delta$  0.14) DR12BAO: 3.59 ( $\Delta$  -0.22) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  -0.23) commander\_dx12\_v3\_2\_29: 22.91 ( $\Delta$  -0.30) CamSpec like\_10.7HM\_1400\_unified: 11499.17



6.14 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.028$	$D_M(0.38)$	$1525.5^{+7.9}_{-9.0}$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$z_{\text{re}}$	$7.64 \pm 0.79$	$H(0.51)$	$89.85^{+0.29}_{-0.25}$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$10^9 A_s$	$2.094 \pm 0.035$	$D_M(0.51)$	$1976.6^{+9.3}_{-11}$
$\tau$	$0.0543 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$H(0.61)$	$95.45^{+0.26}_{-0.21}$
$\Sigma m_\nu$	$< 0.0626$	$D_{40}$	$1225 \pm 12$	$D_M(0.61)$	$2300^{+10}_{-12}$
$\ln(10^{10} A_s)$	$3.042 \pm 0.017$	$D_{220}$	$5729 \pm 39$	$H(2.33)$	$235.93 \pm 0.63$
$n_s$	$0.9673 \pm 0.0038$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5756.6^{+9.9}_{-13}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.9$	$f\sigma_8(0.15)$	$0.4554 \pm 0.0074$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.750^{+0.013}_{-0.0080}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9673 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4744^{+0.0074}_{-0.0063}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245398^{+0.000060}_{-0.000051}$	$\sigma_8(0.38)$	$0.665^{+0.012}_{-0.0069}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246724^{+0.000060}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4733^{+0.0072}_{-0.0059}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.584^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.622^{+0.011}_{-0.0064}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.783^{+0.023}_{-0.030}$	$f\sigma_8(0.61)$	$0.4685^{+0.0071}_{-0.0055}$
$A^{kSZ}$	$< 5.28$	$z_*$	$1089.82 \pm 0.22$	$\sigma_8(0.61)$	$0.592^{+0.010}_{-0.0061}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$r_*$	$144.66^{+0.24}_{-0.27}$	$f\sigma_8(2.33)$	$0.2986^{+0.0045}_{-0.0029}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04117 \pm 0.00029$	$\sigma_8(2.33)$	$0.3080^{+0.0052}_{-0.0031}$
$H_0$	$67.83^{+0.51}_{-0.46}$	$D_M(z_*)/\text{Gpc}$	$13.894^{+0.023}_{-0.026}$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6912 \pm 0.0064$	$z_{\text{drag}}$	$1059.89 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m$	$0.3088 \pm 0.0064$	$r_{\text{drag}}$	$147.32^{+0.26}_{-0.29}$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.14203 \pm 0.00097$	$k_D$	$0.14063^{+0.00036}_{-0.00032}$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000673$	$100\theta_D$	$0.16079 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.01 \pm 0.85$
$\Omega_m h^3$	$0.09634^{+0.00045}_{-0.00035}$	$z_{\text{eq}}$	$3381^{+25}_{-23}$	$\chi_{\text{JLA}}^2$	$1035.01 \pm 0.29$
$\sigma_8$	$0.811^{+0.014}_{-0.0088}$	$k_{\text{eq}}$	$0.010318^{+0.000077}_{-0.000069}$	$\chi_{6\text{DF}}^2$	$0.041 \pm 0.057$
$S_8$	$0.823 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8172^{+0.0042}_{-0.0047}$	$\chi_{\text{MGS}}^2$	$1.43 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0079$	$100\theta_{s,\text{eq}}$	$0.4514^{+0.0022}_{-0.0024}$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.605^{+0.010}_{-0.0080}$	$H(0.15)$	$73.09^{+0.45}_{-0.40}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.985^{+0.016}_{-0.012}$	$D_M(0.15)$	$639.4^{+3.9}_{-4.4}$	$\chi_{\text{BAO}}^2$	$5.91 \pm 0.98$
$r_{\text{drag}} h$	$99.93 \pm 0.82$	$H(0.38)$	$83.15^{+0.35}_{-0.30}$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 12960.09$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.15$ ;  $\bar{\chi}_{\text{eff}}^2 = 12983.16$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.01$ ;  $R - 1 = 0.01385$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.61 ( $\Delta$  0.07) DR12BAO: 3.60 ( $\Delta$  -0.11) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  -0.36) commander\_dx12\_v3\_2\_29: 22.93 ( $\Delta$  -0.15) CamSpec like\_10.7HM\_1400\_unified: 11499.25 SN - JLA Pantheon18: 1034.82 ( $\Delta$  -0.02)



6.15 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.027$	$D_M(0.38)$	$1526.6^{+8.3}_{-9.6}$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$z_{\text{re}}$	$7.76^{+0.57}_{-0.82}$	$H(0.51)$	$89.81^{+0.31}_{-0.26}$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s$	$2.099^{+0.025}_{-0.036}$	$D_M(0.51)$	$1977.9^{+9.8}_{-11}$
$\tau$	$0.0553^{+0.0051}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.42^{+0.27}_{-0.22}$
$\Sigma m_\nu$	$< 0.0671$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2302^{+11}_{-12}$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.017}$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.99 \pm 0.65$
$n_s$	$0.9672 \pm 0.0038$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5758^{+10}_{-14}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.9$	$f\sigma_8(0.15)$	$0.4562 \pm 0.0075$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.750^{+0.013}_{-0.0076}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9672 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4750^{+0.0076}_{-0.0062}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245396^{+0.000061}_{-0.000052}$	$\sigma_8(0.38)$	$0.665^{+0.012}_{-0.0066}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246722^{+0.000061}_{-0.000052}$	$f\sigma_8(0.51)$	$0.4738^{+0.0074}_{-0.0057}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.585^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.622^{+0.011}_{-0.0061}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.786^{+0.023}_{-0.032}$	$f\sigma_8(0.61)$	$0.4690^{+0.0073}_{-0.0054}$
$A^{kSZ}$	$< 5.22$	$z_*$	$1089.84 \pm 0.23$	$\sigma_8(0.61)$	$0.592^{+0.011}_{-0.0058}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.65^{+0.25}_{-0.28}$	$f\sigma_8(2.33)$	$0.2987^{+0.0047}_{-0.0028}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3080^{+0.0054}_{-0.0030}$
$H_0$	$67.77^{+0.55}_{-0.49}$	$D_M(z_*)/\text{Gpc}$	$13.893^{+0.024}_{-0.027}$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6904^{+0.0070}_{-0.0063}$	$z_{\text{drag}}$	$1059.89^{+0.34}_{-0.30}$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m$	$0.3096 \pm 0.0068$	$r_{\text{drag}}$	$147.31^{+0.26}_{-0.30}$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$k_D$	$0.14064^{+0.00036}_{-0.00032}$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000722$	$100\theta_D$	$0.16079 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.06 \pm 0.86$
$\Omega_m h^3$	$0.09632^{+0.00047}_{-0.00035}$	$z_{\text{eq}}$	$3382 \pm 25$	$\chi_{6\text{DF}}^2$	$0.050 \pm 0.069$
$\sigma_8$	$0.811^{+0.014}_{-0.0084}$	$k_{\text{eq}}$	$0.010323 \pm 0.000076$	$\chi_{\text{MGS}}^2$	$1.38 \pm 0.48$
$S_8$	$0.824 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0046$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0080$	$100\theta_{s,\text{eq}}$	$0.4513 \pm 0.0024$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.605^{+0.010}_{-0.0079}$	$H(0.15)$	$73.03^{+0.48}_{-0.42}$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.986^{+0.017}_{-0.012}$	$D_M(0.15)$	$639.9^{+4.1}_{-4.7}$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.83 \pm 0.87$	$H(0.38)$	$83.11^{+0.37}_{-0.32}$		

$$\bar{\chi}_{\text{eff}}^2 = 11948.19; \Delta\bar{\chi}_{\text{eff}}^2 = 9151.06; R - 1 = 0.01072$$



6.16 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pan

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00014$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.027$	$D_M(0.38)$	$1525.4^{+7.9}_{-9.0}$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$z_{\text{re}}$	$7.77^{+0.57}_{-0.82}$	$H(0.51)$	$89.85^{+0.29}_{-0.25}$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$10^9 A_s$	$2.099^{+0.026}_{-0.036}$	$D_M(0.51)$	$1976.4^{+9.3}_{-11}$
$\tau$	$0.0555^{+0.0051}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$H(0.61)$	$95.45^{+0.26}_{-0.21}$
$\Sigma m_\nu$	$< 0.0636$	$D_{40}$	$1226 \pm 12$	$D_M(0.61)$	$2300^{+10}_{-12}$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.017}$	$D_{220}$	$5729 \pm 39$	$H(2.33)$	$235.92 \pm 0.63$
$n_s$	$0.9674 \pm 0.0038$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5757^{+10}_{-13}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.9$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0073$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.751^{+0.013}_{-0.0075}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9674 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4748^{+0.0073}_{-0.0062}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245399^{+0.000060}_{-0.000051}$	$\sigma_8(0.38)$	$0.666^{+0.011}_{-0.0065}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246725^{+0.000060}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4737^{+0.0071}_{-0.0057}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.584^{+0.025}_{-0.028}$	$\sigma_8(0.51)$	$0.623^{+0.011}_{-0.0061}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.782^{+0.023}_{-0.030}$	$f\sigma_8(0.61)$	$0.4690^{+0.0070}_{-0.0053}$
$A^{kSZ}$	$< 5.24$	$z_*$	$1089.82 \pm 0.22$	$\sigma_8(0.61)$	$0.593^{+0.010}_{-0.0057}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.67^{+0.24}_{-0.27}$	$f\sigma_8(2.33)$	$0.2990^{+0.0044}_{-0.0027}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04117 \pm 0.00029$	$\sigma_8(2.33)$	$0.3083^{+0.0051}_{-0.0029}$
$H_0$	$67.84 \pm 0.50$	$D_M(z_*)/\text{Gpc}$	$13.895^{+0.023}_{-0.026}$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$\Omega_\Lambda$	$0.6913 \pm 0.0064$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$\Omega_m$	$0.3087 \pm 0.0064$	$r_{\text{drag}}$	$147.33^{+0.26}_{-0.29}$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.14202 \pm 0.00097$	$k_D$	$0.14062^{+0.00036}_{-0.00032}$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000683$	$100\theta_D$	$0.16079 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.02 \pm 0.85$
$\Omega_m h^3$	$0.09634^{+0.00045}_{-0.00035}$	$z_{\text{eq}}$	$3380^{+25}_{-23}$	$\chi_{\text{JLA}}^2$	$1035.01 \pm 0.29$
$\sigma_8$	$0.812^{+0.014}_{-0.0084}$	$k_{\text{eq}}$	$0.010317^{+0.000077}_{-0.000069}$	$\chi_{6\text{DF}}^2$	$0.040 \pm 0.056$
$S_8$	$0.823 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8173^{+0.0042}_{-0.0047}$	$\chi_{\text{MGS}}^2$	$1.44 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4510 \pm 0.0078$	$100\theta_{s,\text{eq}}$	$0.4515^{+0.0022}_{-0.0024}$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.605^{+0.010}_{-0.0078}$	$H(0.15)$	$73.09^{+0.45}_{-0.40}$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.986^{+0.016}_{-0.012}$	$D_M(0.15)$	$639.3^{+3.9}_{-4.4}$	$\chi_{\text{BAO}}^2$	$5.90 \pm 0.97$
$r_{\text{drag}} h$	$99.94 \pm 0.82$	$H(0.38)$	$83.16^{+0.35}_{-0.30}$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 12982.95; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.98; R - 1 = 0.01405$$



# 6.17 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.021$	$D_M(0.38)$	$1526.0^{+7.8}_{-9.7}$
$\Omega_c h^2$	$0.11922 \pm 0.00094$	$z_{\text{re}}$	$7.71 \pm 0.74$	$H(0.51)$	$89.83^{+0.31}_{-0.25}$
$100\theta_{MC}$	$1.04097 \pm 0.00030$	$10^9 A_s$	$2.097 \pm 0.031$	$D_M(0.51)$	$1977.2^{+9.2}_{-11}$
$\tau$	$0.0549 \pm 0.0073$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.44^{+0.27}_{-0.21}$
$\Sigma m_\nu$	$< 0.0608$	$D_{40}$	$1227 \pm 11$	$D_M(0.61)$	$2301^{+10}_{-12}$
$\ln(10^{10} A_s)$	$3.043 \pm 0.015$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$235.99 \pm 0.60$
$n_s$	$0.9668 \pm 0.0037$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5757^{+10}_{-13}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.9 \pm 4.8$	$f\sigma_8(0.15)$	$0.4566 \pm 0.0057$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.751^{+0.010}_{-0.0065}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9668 \pm 0.0037$	$f\sigma_8(0.38)$	$0.4754 \pm 0.0052$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245396^{+0.000062}_{-0.000052}$	$\sigma_8(0.38)$	$0.6660^{+0.0095}_{-0.0057}$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246723^{+0.000063}_{-0.000052}$	$f\sigma_8(0.51)$	$0.4743^{+0.0053}_{-0.0045}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.585^{+0.026}_{-0.029}$	$\sigma_8(0.51)$	$0.6234^{+0.0089}_{-0.0054}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.783^{+0.023}_{-0.030}$	$f\sigma_8(0.61)$	$0.4695^{+0.0052}_{-0.0042}$
$A^{kSZ}$	$< 5.20$	$z_*$	$1089.84 \pm 0.22$	$\sigma_8(0.61)$	$0.5932^{+0.0086}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.63 \pm 0.23$	$f\sigma_8(2.33)$	$0.2991^{+0.0038}_{-0.0025}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04115 \pm 0.00029$	$\sigma_8(2.33)$	$0.3085^{+0.0044}_{-0.0027}$
$H_0$	$67.80^{+0.55}_{-0.46}$	$D_M(z_*)/\text{Gpc}$	$13.892 \pm 0.022$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6907^{+0.0070}_{-0.0058}$	$z_{\text{drag}}$	$1059.89 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m$	$0.3093^{+0.0058}_{-0.0070}$	$r_{\text{drag}}$	$147.29 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.14213 \pm 0.00095$	$k_D$	$0.14065 \pm 0.00032$	$\chi^2_{\text{lensing}}$	$9.32 \pm 0.72$
$\Omega_\nu h^2$	$< 0.000653$	$100\theta_D$	$0.16079 \pm 0.00019$	$\chi^2_{\text{simall}}$	$397.0 \pm 1.7$
$\Omega_m h^3$	$0.09636^{+0.00042}_{-0.00034}$	$z_{\text{eq}}$	$3384 \pm 22$	$\chi^2_{\text{lowl}}$	$23.14 \pm 0.80$
$\sigma_8$	$0.813^{+0.011}_{-0.0070}$	$k_{\text{eq}}$	$0.010327 \pm 0.000066$	$\chi^2_{6\text{DF}}$	$0.046 \pm 0.065$
$S_8$	$0.825 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0040$	$\chi^2_{\text{MGS}}$	$1.39 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4519 \pm 0.0060$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0021$	$\chi^2_{\text{DR12BAO}}$	$4.5 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6060^{+0.0074}_{-0.0062}$	$H(0.15)$	$73.06^{+0.48}_{-0.40}$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.987^{+0.012}_{-0.0093}$	$D_M(0.15)$	$639.6^{+3.8}_{-4.7}$	$\chi^2_{\text{CMB}}$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.86^{+0.87}_{-0.77}$	$H(0.38)$	$83.14^{+0.37}_{-0.30}$	$\chi^2_{\text{BAO}}$	$6.0 \pm 1.1$

Best-fit  $\chi^2_{\text{eff}} = 11934.26$ ;  $\Delta\chi^2_{\text{eff}} = 9155.13$ ;  $\bar{\chi}^2_{\text{eff}} = 11957.14$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.70$ ;  $R - 1 = 0.00745$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.61 ( $\Delta$  0.07) DR12BAO: 3.60 ( $\Delta$  -0.11) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.89 ( $\Delta$  -0.08) simall\_100x143\_offlike5\_EE\_Aplanc  
395.87 ( $\Delta$  -0.02) commander\_dx12\_v3.2\_29: 22.96 ( $\Delta$  -0.12) CamSpec like\_10.7HM\_1400\_unified: 11499.19



6.18 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$z_{\text{re}}$	$7.72 \pm 0.74$	$D_{\text{M}}(0.51)$	$1975.8^{+8.9}_{-11}$
$\Omega_c h^2$	$0.11913 \pm 0.00091$	$10^9 A_s$	$2.098 \pm 0.031$	$H(0.61)$	$95.47^{+0.25}_{-0.20}$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.010$	$D_{\text{M}}(0.61)$	$2299.5^{+9.7}_{-11}$
$\tau$	$0.0551 \pm 0.0073$	$D_{40}$	$1227 \pm 11$	$H(2.33)$	$235.92 \pm 0.58$
$\Sigma m_\nu$	$< 0.0567$	$D_{220}$	$5731 \pm 39$	$D_{\text{M}}(2.33)$	$5755.5^{+9.9}_{-12}$
$\ln(10^{10} A_s)$	$3.043 \pm 0.015$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4562 \pm 0.0056$
$n_s$	$0.9670 \pm 0.0037$	$D_{1420}$	$817.0 \pm 4.8$	$\sigma_8(0.15)$	$0.7516^{+0.0099}_{-0.0063}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.38)$	$0.4753 \pm 0.0051$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9670 \pm 0.0037$	$\sigma_8(0.38)$	$0.6666^{+0.0089}_{-0.0056}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245399^{+0.000062}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4742^{+0.0051}_{-0.0044}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246726^{+0.000062}_{-0.000052}$	$\sigma_8(0.51)$	$0.6239^{+0.0084}_{-0.0053}$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.583^{+0.025}_{-0.029}$	$f\sigma_8(0.61)$	$0.4695^{+0.0051}_{-0.0042}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.780^{+0.023}_{-0.029}$	$\sigma_8(0.61)$	$0.5938^{+0.0081}_{-0.0051}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.82 \pm 0.22$	$f\sigma_8(2.33)$	$0.2993^{+0.0036}_{-0.0025}$
$A^{kSZ}$	$< 5.15$	$r_*$	$144.65 \pm 0.23$	$\sigma_8(2.33)$	$0.3088^{+0.0042}_{-0.0027}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04116 \pm 0.00030$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.022$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$H_0$	$67.87^{+0.51}_{-0.44}$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_\Lambda$	$0.6916^{+0.0065}_{-0.0056}$	$r_{\text{drag}}$	$147.31 \pm 0.25$	$\chi_{\text{lensing}}^2$	$9.30 \pm 0.71$
$\Omega_m$	$0.3084^{+0.0056}_{-0.0065}$	$k_{\text{D}}$	$0.14064 \pm 0.00032$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.14201 \pm 0.00091$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.10 \pm 0.78$
$\Omega_\nu h^2$	$< 0.000610$	$z_{\text{eq}}$	$3382 \pm 21$	$\chi_{\text{JLA}}^2$	$1034.99 \pm 0.28$
$\Omega_m h^3$	$0.09638^{+0.00041}_{-0.00034}$	$k_{\text{eq}}$	$0.010322 \pm 0.000064$	$\chi_{6\text{DF}}^2$	$0.037 \pm 0.054$
$\sigma_8$	$0.813^{+0.011}_{-0.0069}$	$100\theta_{\text{eq}}$	$0.8170 \pm 0.0039$	$\chi_{\text{MGS}}^2$	$1.45 \pm 0.45$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0020$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0059$	$H(0.15)$	$73.12^{+0.45}_{-0.39}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6059^{+0.0073}_{-0.0061}$	$D_{\text{M}}(0.15)$	$639.1^{+3.7}_{-4.4}$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987^{+0.012}_{-0.0091}$	$H(0.38)$	$83.18^{+0.34}_{-0.29}$	$\chi_{\text{BAO}}^2$	$5.85 \pm 0.93$
$r_{\text{drag}} h$	$99.97 \pm 0.79$	$D_{\text{M}}(0.38)$	$1524.8^{+7.6}_{-8.9}$		
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$H(0.51)$	$89.87^{+0.29}_{-0.24}$		

Best-fit  $\chi_{\text{eff}}^2 = 12968.97$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.00$ ;  $\bar{\chi}_{\text{eff}}^2 = 12991.94$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.74$ ;  $R - 1 = 0.00817$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.68 ( $\Delta$  0.14) DR12BAO: 3.52 ( $\Delta$  -0.18) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.88 ( $\Delta$  -0.08) small\_100x143\_offlike5\_EE\_Aplanc  
395.86 ( $\Delta$  -0.02) commander\_dx12\_v3.2\_29: 22.90 ( $\Delta$  -0.15) CamSpec like\_10.7HM\_1400\_unified: 11499.28 SN - JLA Pantheon18: 1034.80 ( $\Delta$  -0.04)



6.19 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_z

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.020$	$D_M(0.38)$	$1525.9^{+7.8}_{-9.6}$
$\Omega_c h^2$	$0.11919 \pm 0.00093$	$z_{\text{re}}$	$7.80^{+0.59}_{-0.74}$	$H(0.51)$	$89.84^{+0.31}_{-0.25}$
$100\theta_{MC}$	$1.04097 \pm 0.00030$	$10^9 A_s$	$2.101^{+0.024}_{-0.031}$	$D_M(0.51)$	$1977.0^{+9.2}_{-11}$
$\tau$	$0.0557^{+0.0055}_{-0.0076}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.44^{+0.27}_{-0.21}$
$\Sigma m_\nu$	$< 0.0614$	$D_{40}$	$1227 \pm 11$	$D_M(0.61)$	$2301^{+10}_{-12}$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$235.98 \pm 0.60$
$n_s$	$0.9669 \pm 0.0037$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5757^{+10}_{-13}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.9 \pm 4.8$	$f\sigma_8(0.15)$	$0.4567 \pm 0.0056$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.752^{+0.010}_{-0.0062}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9669 \pm 0.0037$	$f\sigma_8(0.38)$	$0.4756 \pm 0.0052$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245397^{+0.000062}_{-0.000052}$	$\sigma_8(0.38)$	$0.6664^{+0.0094}_{-0.0055}$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.246724^{+0.000062}_{-0.000052}$	$f\sigma_8(0.51)$	$0.4745^{+0.0052}_{-0.0044}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.584^{+0.026}_{-0.029}$	$\sigma_8(0.51)$	$0.6237^{+0.0089}_{-0.0052}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.783^{+0.023}_{-0.030}$	$f\sigma_8(0.61)$	$0.4697^{+0.0051}_{-0.0042}$
$A^{kSZ}$	$< 5.19$	$z_*$	$1089.84 \pm 0.22$	$\sigma_8(0.61)$	$0.5935^{+0.0085}_{-0.0050}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.64 \pm 0.23$	$f\sigma_8(2.33)$	$0.2992^{+0.0037}_{-0.0024}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04115 \pm 0.00029$	$\sigma_8(2.33)$	$0.3086^{+0.0044}_{-0.0026}$
$H_0$	$67.81^{+0.55}_{-0.46}$	$D_M(z_*)/\text{Gpc}$	$13.892 \pm 0.022$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6908^{+0.0069}_{-0.0058}$	$z_{\text{drag}}$	$1059.90^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$\Omega_m$	$0.3092^{+0.0058}_{-0.0069}$	$r_{\text{drag}}$	$147.30 \pm 0.25$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m h^2$	$0.14211 \pm 0.00094$	$k_D$	$0.14065 \pm 0.00032$	$\chi_{\text{lensing}}^2$	$9.28 \pm 0.67$
$\Omega_\nu h^2$	$< 0.000660$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^3$	$0.09635^{+0.00042}_{-0.00034}$	$z_{\text{eq}}$	$3383 \pm 21$	$\chi_{\text{lowl}}^2$	$23.14 \pm 0.80$
$\sigma_8$	$0.813^{+0.011}_{-0.0068}$	$k_{\text{eq}}$	$0.010325 \pm 0.000065$	$\chi_{6\text{DF}}^2$	$0.045 \pm 0.064$
$S_8$	$0.825 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0040$	$\chi_{\text{MGS}}^2$	$1.40 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4520 \pm 0.0060$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0021$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6062^{+0.0074}_{-0.0062}$	$H(0.15)$	$73.06^{+0.48}_{-0.40}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.987^{+0.012}_{-0.0092}$	$D_M(0.15)$	$639.6^{+3.8}_{-4.7}$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.88^{+0.87}_{-0.77}$	$H(0.38)$	$83.14^{+0.37}_{-0.30}$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$

$$\bar{\chi}_{\text{eff}}^2 = 11956.94; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.67; R - 1 = 0.00819$$



6.20 base\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18\_zre6p5/base\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00015$	$z_{\text{re}}$	$7.80^{+0.59}_{-0.75}$	$D_{\text{M}}(0.51)$	$1975.7^{+8.9}_{-11}$
$\Omega_c h^2$	$0.11911 \pm 0.00091$	$10^9 A_s$	$2.101^{+0.024}_{-0.031}$	$H(0.61)$	$95.47^{+0.25}_{-0.20}$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.010$	$D_{\text{M}}(0.61)$	$2299.4^{+9.7}_{-11}$
$\tau$	$0.0558^{+0.0055}_{-0.0077}$	$D_{40}$	$1227 \pm 11$	$H(2.33)$	$235.91 \pm 0.58$
$\Sigma m_\nu$	$< 0.0573$	$D_{220}$	$5731 \pm 39$	$D_{\text{M}}(2.33)$	$5755.4^{+9.9}_{-12}$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4564 \pm 0.0055$
$n_s$	$0.9671 \pm 0.0037$	$D_{1420}$	$816.9 \pm 4.8$	$\sigma_8(0.15)$	$0.7520^{+0.0098}_{-0.0061}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.38)$	$0.4755 \pm 0.0051$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9671 \pm 0.0037$	$\sigma_8(0.38)$	$0.6669^{+0.0089}_{-0.0054}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245400^{+0.000061}_{-0.000051}$	$f\sigma_8(0.51)$	$0.4745^{+0.0050}_{-0.0044}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246727^{+0.000061}_{-0.000051}$	$\sigma_8(0.51)$	$0.6243^{+0.0084}_{-0.0051}$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.583^{+0.025}_{-0.028}$	$f\sigma_8(0.61)$	$0.4697^{+0.0050}_{-0.0041}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.780^{+0.023}_{-0.029}$	$\sigma_8(0.61)$	$0.5941^{+0.0080}_{-0.0048}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.82 \pm 0.22$	$f\sigma_8(2.33)$	$0.2995^{+0.0035}_{-0.0024}$
$A^{kSZ}$	$< 5.14$	$r_*$	$144.65 \pm 0.23$	$\sigma_8(2.33)$	$0.3090^{+0.0041}_{-0.0026}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04116 \pm 0.00029$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.022$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$H_0$	$67.87^{+0.51}_{-0.44}$	$z_{\text{drag}}$	$1059.91 \pm 0.32$	$f_{2000}^{217}$	$106.7 \pm 1.8$
$\Omega_\Lambda$	$0.6917^{+0.0064}_{-0.0056}$	$r_{\text{drag}}$	$147.31 \pm 0.25$	$\chi_{\text{lensing}}^2$	$9.27 \pm 0.66$
$\Omega_m$	$0.3083^{+0.0056}_{-0.0064}$	$k_{\text{D}}$	$0.14064^{+0.00033}_{-0.00030}$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.14200 \pm 0.00091$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.11 \pm 0.78$
$\Omega_\nu h^2$	$< 0.000616$	$z_{\text{eq}}$	$3381 \pm 21$	$\chi_{\text{JLA}}^2$	$1034.99 \pm 0.27$
$\Omega_m h^3$	$0.09637^{+0.00041}_{-0.00034}$	$k_{\text{eq}}$	$0.010320 \pm 0.000064$	$\chi_{6\text{DF}}^2$	$0.036 \pm 0.053$
$\sigma_8$	$0.814^{+0.010}_{-0.0067}$	$100\theta_{\text{eq}}$	$0.8171 \pm 0.0039$	$\chi_{\text{MGS}}^2$	$1.46 \pm 0.45$
$S_8$	$0.825 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4514 \pm 0.0020$	$\chi_{\text{DR12BAO}}^2$	$4.3 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4517 \pm 0.0059$	$H(0.15)$	$73.12^{+0.44}_{-0.39}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6061^{+0.0072}_{-0.0061}$	$D_{\text{M}}(0.15)$	$639.0^{+3.7}_{-4.4}$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0090}$	$H(0.38)$	$83.19^{+0.34}_{-0.29}$	$\chi_{\text{BAO}}^2$	$5.83 \pm 0.91$
$r_{\text{drag}} h$	$99.99 \pm 0.79$	$D_{\text{M}}(0.38)$	$1524.7^{+7.6}_{-8.9}$		
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.020$	$H(0.51)$	$89.87^{+0.29}_{-0.24}$		
$\bar{\chi}_{\text{eff}}^2 = 12991.75$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.73$ ; $R - 1 = 0.00951$					



## 7 nnu

### 7.1 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE/base\_nnu\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02206 \pm 0.00031$	$r_{\text{drag}} h$	$98.1 \pm 2.2$	$H(0.15)$	$71.7 \pm 2.3$
$\Omega_c h^2$	$0.1196 \pm 0.0041$	$\langle d^2 \rangle^{1/2}$	$2.457 \pm 0.046$	$D_{\text{M}}(0.15)$	$653 \pm 22$
$100\theta_{MC}$	$1.04092 \pm 0.00059$	$z_{\text{re}}$	$7.41 \pm 0.85$	$H(0.38)$	$82.0 \pm 2.2$
$\tau$	$0.0514 \pm 0.0081$	$10^9 A_s$	$2.081 \pm 0.043$	$D_{\text{M}}(0.38)$	$1555 \pm 49$
$N_{\text{eff}}$	$2.97 \pm 0.29$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.023$	$H(0.51)$	$88.8 \pm 2.2$
$\ln(10^{10} A_s)$	$3.035 \pm 0.021$	$D_{40}$	$1236 \pm 22$	$D_{\text{M}}(0.51)$	$2012 \pm 60$
$n_s$	$0.960 \pm 0.013$	$D_{220}$	$5707 \pm 42$	$H(0.61)$	$94.5 \pm 2.2$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2534 \pm 14$	$D_{\text{M}}(0.61)$	$2340 \pm 68$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.7 \pm 5.2$	$H(2.33)$	$235.7 \pm 3.7$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.0 \pm 2.3$	$D_{\text{M}}(2.33)$	$5814 \pm 130$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$n_{s,0.002}$	$0.960 \pm 0.013$	$f\sigma_8(0.15)$	$0.463 \pm 0.012$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.2442 \pm 0.0040$	$\sigma_8(0.15)$	$0.746 \pm 0.013$
$A_{143}^{PS}$	$44 \pm 10$	$Y_P^{\text{BBN}}$	$0.2455 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4788 \pm 0.0096$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.618 \pm 0.070$	$\sigma_8(0.38)$	$0.660 \pm 0.013$
$A^{kSZ}$	$< 5.64$	Age/Gyr	$13.92 \pm 0.30$	$f\sigma_8(0.51)$	$0.4760 \pm 0.0085$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$z_*$	$1090.20 \pm 0.50$	$\sigma_8(0.51)$	$0.617 \pm 0.012$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$145.2 \pm 2.6$	$f\sigma_8(0.61)$	$0.4701 \pm 0.0080$
$H_0$	$66.3 \pm 2.4$	$100\theta_*$	$1.04119 \pm 0.00073$	$\sigma_8(0.61)$	$0.587 \pm 0.012$
$\Omega_\Lambda$	$0.676^{+0.019}_{-0.017}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.24$	$f\sigma_8(2.33)$	$0.2953 \pm 0.0064$
$\Omega_m$	$0.324^{+0.017}_{-0.019}$	$z_{\text{drag}}$	$1059.1 \pm 1.1$	$\sigma_8(2.33)$	$0.3040 \pm 0.0071$
$\Omega_m h^2$	$0.1423 \pm 0.0042$	$r_{\text{drag}}$	$148.0 \pm 2.7$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m h^3$	$0.0945^{+0.0053}_{-0.0059}$	$k_{\text{D}}$	$0.1400 \pm 0.0019$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.7$
$\sigma_8$	$0.808 \pm 0.014$	$100\theta_{\text{D}}$	$0.16091 \pm 0.00067$	$f_{2000}^{217}$	$107.5 \pm 2.5$
$S_8$	$0.840 \pm 0.025$	$z_{\text{eq}}$	$3422 \pm 65$	$\chi_{\text{small}}^2$	$396.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.014$	$k_{\text{eq}}$	$0.01039 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$24.4 \pm 2.3$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.012$	$100\theta_{\text{eq}}$	$0.809 \pm 0.012$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4474 \pm 0.0062$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7471.42$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.16$ ;  $\bar{\chi}_{\text{eff}}^2 = 7492.17$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.99$ ;  $R - 1 = 0.00609$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.70 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 24.43 ( $\Delta$  -0.06) CamSpec like\_10.7HM: 7049.22



## 7.2 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_nnu\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02204 \pm 0.00030$	$\langle d^2 \rangle^{1/2}$	$2.455 \pm 0.032$	$H(0.38)$	$81.7 \pm 2.1$
$\Omega_c h^2$	$0.1186 \pm 0.0039$	$z_{\text{re}}$	$7.38 \pm 0.83$	$D_{\text{M}}(0.38)$	$1560 \pm 45$
$100\theta_{MC}$	$1.04102 \pm 0.00059$	$10^9 A_s$	$2.075 \pm 0.043$	$H(0.51)$	$88.5 \pm 2.1$
$\tau$	$0.0513 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.022$	$D_{\text{M}}(0.51)$	$2019 \pm 56$
$N_{\text{eff}}$	$2.92 \pm 0.28$	$D_{40}$	$1237 \pm 19$	$H(0.61)$	$94.1 \pm 2.1$
$\ln(10^{10} A_s)$	$3.032 \pm 0.021$	$D_{220}$	$5710 \pm 42$	$D_{\text{M}}(0.61)$	$2348 \pm 64$
$n_s$	$0.958 \pm 0.012$	$D_{810}$	$2533 \pm 14$	$H(2.33)$	$234.9 \pm 3.6$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.0 \pm 5.2$	$D_{\text{M}}(2.33)$	$5834 \pm 120$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.3 \pm 2.3$	$f\sigma_8(0.15)$	$0.4613 \pm 0.0082$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.958 \pm 0.012$	$\sigma_8(0.15)$	$0.743 \pm 0.013$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2435 \pm 0.0039$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0067$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.2448 \pm 0.0039$	$\sigma_8(0.38)$	$0.657 \pm 0.012$
$A_{143}^{PS}$	$44 \pm 10$	$10^5 D/H$	$2.602 \pm 0.069$	$f\sigma_8(0.51)$	$0.4740 \pm 0.0064$
$A_{217}^{PS}$	$108_{-10}^{+10}$	Age/Gyr	$13.96 \pm 0.29$	$\sigma_8(0.51)$	$0.614 \pm 0.012$
$A^{kSZ}$	$< 5.51$	$z_*$	$1090.08 \pm 0.47$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0064$
$c_{100}$	$0.9985_{-0.0012}^{+0.0017}$	$r_*$	$145.8 \pm 2.6$	$\sigma_8(0.61)$	$0.584 \pm 0.012$
$c_{217}$	$0.9997_{-0.0023}^{+0.0021}$	$100\theta_*$	$1.04132 \pm 0.00073$	$f\sigma_8(2.33)$	$0.2942 \pm 0.0063$
$H_0$	$66.1 \pm 2.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.00 \pm 0.24$	$\sigma_8(2.33)$	$0.3028 \pm 0.0070$
$\Omega_\Lambda$	$0.676 \pm 0.015$	$z_{\text{drag}}$	$1059.0 \pm 1.1$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m$	$0.324 \pm 0.015$	$r_{\text{drag}}$	$148.6 \pm 2.7$	$f_{2000}^{143 \times 217}$	$32.5 \pm 2.7$
$\Omega_m h^2$	$0.1413 \pm 0.0041$	$k_{\text{D}}$	$0.1396 \pm 0.0019$	$f_{2000}^{217}$	$107.2 \pm 2.4$
$\Omega_m h^3$	$0.0935 \pm 0.0054$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00065$	$\chi_{\text{lensing}}^2$	$9.35 \pm 0.99$
$\sigma_8$	$0.805 \pm 0.013$	$z_{\text{eq}}$	$3420 \pm 52$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$S_8$	$0.836 \pm 0.017$	$k_{\text{eq}}$	$0.01035 \pm 0.00014$	$\chi_{\text{lowl}}^2$	$24.5 \pm 2.0$
$\sigma_8 \Omega_m^{0.5}$	$0.4578 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8093 \pm 0.0098$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6070 \pm 0.0084$	$100\theta_{\text{s,eq}}$	$0.4475 \pm 0.0050$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$H(0.15)$	$71.5 \pm 2.1$		
$r_{\text{drag}} h$	$98.2 \pm 1.8$	$D_{\text{M}}(0.15)$	$655 \pm 20$		

$\bar{\chi}_{\text{eff}}^2 = 7500.99$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.01$ ;  $R - 1 = 0.00870$



### 7.3 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_Cooke17\_Aver15/base\_nnu\_plikHM\_TT\_lowl\_lowE\_post\_Cooke17\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02204 \pm 0.00027$	$\langle d^2 \rangle^{1/2}$	$2.459 \pm 0.042$	$H(0.38)$	$81.8 \pm 1.6$
$\Omega_c h^2$	$0.1194 \pm 0.0030$	$z_{\text{re}}$	$7.39 \pm 0.82$	$D_{\text{M}}(0.38)$	$1558 \pm 35$
$100\theta_{MC}$	$1.04093 \pm 0.00051$	$10^9 A_s$	$2.079 \pm 0.038$	$H(0.51)$	$88.6 \pm 1.5$
$\tau$	$0.0512 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.018$	$D_{\text{M}}(0.51)$	$2016 \pm 44$
$N_{\text{eff}}$	$2.95 \pm 0.19$	$D_{40}$	$1237 \pm 19$	$H(0.61)$	$94.3 \pm 1.5$
$\ln(10^{10} A_s)$	$3.034 \pm 0.018$	$D_{220}$	$5707 \pm 41$	$D_{\text{M}}(0.61)$	$2344 \pm 49$
$n_s$	$0.959 \pm 0.010$	$D_{810}$	$2534 \pm 14$	$H(2.33)$	$235.5 \pm 2.5$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.8 \pm 5.0$	$D_{\text{M}}(2.33)$	$5821 \pm 87$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.9$	$f\sigma_8(0.15)$	$0.464 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.959 \pm 0.010$	$\sigma_8(0.15)$	$0.745 \pm 0.010$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0026$	$f\sigma_8(0.38)$	$0.4789 \pm 0.0094$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0026$	$\sigma_8(0.38)$	$0.6590 \pm 0.0093$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.049$	$f\sigma_8(0.51)$	$0.4760 \pm 0.0081$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.93 \pm 0.21$	$\sigma_8(0.51)$	$0.6161 \pm 0.0089$
$A^{kSZ}$	$< 5.51$	$z_*$	$1090.19 \pm 0.40$	$f\sigma_8(0.61)$	$0.4700 \pm 0.0073$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$r_*$	$145.4 \pm 1.7$	$\sigma_8(0.61)$	$0.5859 \pm 0.0087$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04121 \pm 0.00058$	$f\sigma_8(2.33)$	$0.2949 \pm 0.0046$
$H_0$	$66.2 \pm 1.8$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.16$	$\sigma_8(2.33)$	$0.3035 \pm 0.0051$
$\Omega_\Lambda$	$0.675 \pm 0.016$	$z_{\text{drag}}$	$1059.04 \pm 0.84$	$f_{2000}^{143}$	$30.3 \pm 3.2$
$\Omega_m$	$0.325 \pm 0.016$	$r_{\text{drag}}$	$148.1 \pm 1.8$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$\Omega_m h^2$	$0.1421 \pm 0.0030$	$k_{\text{D}}$	$0.1399 \pm 0.0013$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$\Omega_m h^3$	$0.0940 \pm 0.0037$	$100\theta_{\text{D}}$	$0.16087 \pm 0.00044$	$\chi_{\text{small}}^2$	$396.8 \pm 1.6$
$\sigma_8$	$0.808 \pm 0.011$	$z_{\text{eq}}$	$3425 \pm 57$	$\chi_{\text{lowl}}^2$	$24.4 \pm 1.9$
$S_8$	$0.840 \pm 0.024$	$k_{\text{eq}}$	$0.01038 \pm 0.00015$	$\chi_{\text{Aver15}}^2$	$0.44 \pm 0.62$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.013$	$100\theta_{\text{eq}}$	$0.808 \pm 0.011$	$\chi_{\text{Cooke17}}^2$	$0.28 \pm 0.39$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4470 \pm 0.0054$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$H(0.15)$	$71.6 \pm 1.7$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$98.0 \pm 1.9$	$D_{\text{M}}(0.15)$	$655 \pm 16$	$\chi_{\text{Abund}}^2$	$0.72 \pm 0.85$

$$\bar{\chi}_{\text{eff}}^2 = 7492.26; \Delta\bar{\chi}_{\text{eff}}^2 = 6292.06; R - 1 = 0.00836$$



## 7.4 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_nnu\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02208 \pm 0.00031$	$r_{\text{drag}} h$	$98.3 \pm 2.2$	$H(0.15)$	$71.9 \pm 2.3$
$\Omega_c h^2$	$0.1197 \pm 0.0040$	$\langle d^2 \rangle^{1/2}$	$2.459 \pm 0.045$	$D_{\text{M}}(0.15)$	$652 \pm 22$
$100\theta_{MC}$	$1.04091 \pm 0.00059$	$z_{\text{re}}$	$7.62^{+0.48}_{-0.86}$	$H(0.38)$	$82.1 \pm 2.2$
$\tau$	$0.0534^{+0.0043}_{-0.0084}$	$10^9 A_s$	$2.090^{+0.033}_{-0.041}$	$D_{\text{M}}(0.38)$	$1551 \pm 48$
$N_{\text{eff}}$	$2.99 \pm 0.28$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.023$	$H(0.51)$	$88.9 \pm 2.2$
$\ln(10^{10} A_s)$	$3.040^{+0.016}_{-0.020}$	$D_{40}$	$1235 \pm 22$	$D_{\text{M}}(0.51)$	$2008 \pm 59$
$n_s$	$0.961 \pm 0.013$	$D_{220}$	$5708 \pm 42$	$H(0.61)$	$94.6 \pm 2.2$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2534 \pm 14$	$D_{\text{M}}(0.61)$	$2335 \pm 67$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.7 \pm 5.2$	$H(2.33)$	$235.9 \pm 3.7$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.9 \pm 2.3$	$D_{\text{M}}(2.33)$	$5805 \pm 130$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$n_{s,0.002}$	$0.961 \pm 0.013$	$f\sigma_8(0.15)$	$0.464 \pm 0.012$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.2444 \pm 0.0039$	$\sigma_8(0.15)$	$0.747 \pm 0.013$
$A_{143}^{PS}$	$44 \pm 10$	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0040$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0096$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.620 \pm 0.070$	$\sigma_8(0.38)$	$0.661 \pm 0.012$
$A^{kSZ}$	$< 5.64$	Age/Gyr	$13.90 \pm 0.30$	$f\sigma_8(0.51)$	$0.4767 \pm 0.0084$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$z_*$	$1090.20 \pm 0.50$	$\sigma_8(0.51)$	$0.619 \pm 0.012$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$145.1 \pm 2.6$	$f\sigma_8(0.61)$	$0.4708 \pm 0.0078$
$H_0$	$66.5 \pm 2.3$	$100\theta_*$	$1.04116 \pm 0.00073$	$\sigma_8(0.61)$	$0.588 \pm 0.011$
$\Omega_\Lambda$	$0.677^{+0.019}_{-0.017}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.93 \pm 0.24$	$f\sigma_8(2.33)$	$0.2962 \pm 0.0060$
$\Omega_m$	$0.323 \pm 0.018$	$z_{\text{drag}}$	$1059.2 \pm 1.1$	$\sigma_8(2.33)$	$0.3050 \pm 0.0067$
$\Omega_m h^2$	$0.1425 \pm 0.0042$	$r_{\text{drag}}$	$147.8 \pm 2.7$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m h^3$	$0.0948^{+0.0052}_{-0.0058}$	$k_{\text{D}}$	$0.1401 \pm 0.0019$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.7$
$\sigma_8$	$0.810 \pm 0.013$	$100\theta_{\text{D}}$	$0.16094 \pm 0.00067$	$f_{2000}^{217}$	$107.5 \pm 2.5$
$S_8$	$0.840 \pm 0.025$	$z_{\text{eq}}$	$3417 \pm 64$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.014$	$k_{\text{eq}}$	$0.01038 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$24.3 \pm 2.2$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.012$	$100\theta_{\text{eq}}$	$0.810 \pm 0.012$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4478 \pm 0.0061$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7491.86$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.93$ ;  $R - 1 = 0.00538$



7.5 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nnu\_plikHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02207 \pm 0.00029$	$\langle d^2 \rangle^{1/2}$	$2.455 \pm 0.032$	$H(0.38)$	$81.9 \pm 2.0$
$\Omega_c h^2$	$0.1187 \pm 0.0039$	$z_{\text{re}}$	$7.60^{+0.46}_{-0.85}$	$D_{\text{M}}(0.38)$	$1555 \pm 44$
$100\theta_{MC}$	$1.04101 \pm 0.00059$	$10^9 A_s$	$2.084^{+0.033}_{-0.040}$	$H(0.51)$	$88.6 \pm 2.0$
$\tau$	$0.0534^{+0.0043}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.022$	$D_{\text{M}}(0.51)$	$2013 \pm 55$
$N_{\text{eff}}$	$2.94 \pm 0.27$	$D_{40}$	$1236 \pm 18$	$H(0.61)$	$94.3 \pm 2.1$
$\ln(10^{10} A_s)$	$3.037^{+0.016}_{-0.019}$	$D_{220}$	$5710 \pm 41$	$D_{\text{M}}(0.61)$	$2341 \pm 62$
$n_s$	$0.960 \pm 0.012$	$D_{810}$	$2533 \pm 14$	$H(2.33)$	$235.0 \pm 3.6$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{1420}$	$815.0 \pm 5.2$	$D_{\text{M}}(2.33)$	$5824 \pm 120$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.2 \pm 2.3$	$f\sigma_8(0.15)$	$0.4611 \pm 0.0082$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.960 \pm 0.012$	$\sigma_8(0.15)$	$0.745 \pm 0.012$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2437 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4771 \pm 0.0067$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.2451 \pm 0.0038$	$\sigma_8(0.38)$	$0.659 \pm 0.012$
$A_{143}^{PS}$	$44 \pm 10$	$10^5 D/H$	$2.604 \pm 0.069$	$f\sigma_8(0.51)$	$0.4745 \pm 0.0063$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.94 \pm 0.29$	$\sigma_8(0.51)$	$0.616 \pm 0.011$
$A^{kSZ}$	$< 5.52$	$z_*$	$1090.07 \pm 0.47$	$f\sigma_8(0.61)$	$0.4688 \pm 0.0063$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$r_*$	$145.6 \pm 2.5$	$\sigma_8(0.61)$	$0.586 \pm 0.011$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04130 \pm 0.00072$	$f\sigma_8(2.33)$	$0.2951 \pm 0.0059$
$H_0$	$66.3 \pm 2.1$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.98 \pm 0.24$	$\sigma_8(2.33)$	$0.3039 \pm 0.0066$
$\Omega_\Lambda$	$0.678 \pm 0.014$	$z_{\text{drag}}$	$1059.0 \pm 1.1$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m$	$0.322 \pm 0.014$	$r_{\text{drag}}$	$148.4 \pm 2.6$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.7$
$\Omega_m h^2$	$0.1414 \pm 0.0041$	$k_{\text{D}}$	$0.1397 \pm 0.0019$	$f_{2000}^{217}$	$107.2 \pm 2.4$
$\Omega_m h^3$	$0.0939 \pm 0.0053$	$100\theta_{\text{D}}$	$0.16081 \pm 0.00065$	$\chi^2_{\text{lensing}}$	$9.36 \pm 0.99$
$\sigma_8$	$0.807 \pm 0.012$	$z_{\text{eq}}$	$3414 \pm 50$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.5$
$S_8$	$0.835 \pm 0.017$	$k_{\text{eq}}$	$0.01034 \pm 0.00014$	$\chi^2_{\text{lowl}}$	$24.3 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4574 \pm 0.0090$	$100\theta_{\text{eq}}$	$0.8105 \pm 0.0094$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6074 \pm 0.0084$	$100\theta_{\text{s,eq}}$	$0.4482 \pm 0.0047$	$\chi^2_{\text{CMB}}$	$4347 \pm 3000$
$\sigma_8/h^{0.5}$	$0.991 \pm 0.011$	$H(0.15)$	$71.7 \pm 2.1$		
$r_{\text{drag}} h$	$98.4 \pm 1.7$	$D_{\text{M}}(0.15)$	$653 \pm 20$		

$\bar{\chi}^2_{\text{eff}} = 7500.70$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.97$ ;  $R - 1 = 0.00702$



## 7.6 base\_nnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_Cooke17\_Aver15\_zre6p5/base\_nnu\_plikHM\_TT\_lowl\_lowE\_post\_Cooke17\_Aver15\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02206 \pm 0.00026$	$\langle d^2 \rangle^{1/2}$	$2.461 \pm 0.042$	$H(0.38)$	$81.9 \pm 1.5$
$\Omega_c h^2$	$0.1194 \pm 0.0030$	$z_{\text{re}}$	$7.60^{+0.47}_{-0.84}$	$D_{\text{M}}(0.38)$	$1556 \pm 35$
$100\theta_{MC}$	$1.04093 \pm 0.00051$	$10^9 A_s$	$2.088^{+0.028}_{-0.036}$	$H(0.51)$	$88.7 \pm 1.5$
$\tau$	$0.0532^{+0.0042}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.018$	$D_{\text{M}}(0.51)$	$2013 \pm 43$
$N_{\text{eff}}$	$2.96 \pm 0.19$	$D_{40}$	$1236 \pm 19$	$H(0.61)$	$94.4 \pm 1.5$
$\ln(10^{10} A_s)$	$3.038^{+0.014}_{-0.017}$	$D_{220}$	$5707 \pm 41$	$D_{\text{M}}(0.61)$	$2341 \pm 48$
$n_s$	$0.9597 \pm 0.0099$	$D_{810}$	$2534 \pm 14$	$H(2.33)$	$235.6 \pm 2.5$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{1420}$	$814.8 \pm 5.0$	$D_{\text{M}}(2.33)$	$5816 \pm 87$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.1 \pm 1.9$	$f\sigma_8(0.15)$	$0.464 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9597 \pm 0.0099$	$\sigma_8(0.15)$	$0.7465 \pm 0.0095$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2440 \pm 0.0026$	$f\sigma_8(0.38)$	$0.4794 \pm 0.0093$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.2454 \pm 0.0026$	$\sigma_8(0.38)$	$0.6604 \pm 0.0087$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.614 \pm 0.049$	$f\sigma_8(0.51)$	$0.4766 \pm 0.0080$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.92 \pm 0.20$	$\sigma_8(0.51)$	$0.6175 \pm 0.0083$
$A^{kSZ}$	$< 5.50$	$z_*$	$1090.18 \pm 0.40$	$f\sigma_8(0.61)$	$0.4707 \pm 0.0072$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$r_*$	$145.3 \pm 1.7$	$\sigma_8(0.61)$	$0.5873^{+0.0076}_{-0.0084}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04121 \pm 0.00058$	$f\sigma_8(2.33)$	$0.2957^{+0.0040}_{-0.0045}$
$H_0$	$66.3 \pm 1.7$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.16$	$\sigma_8(2.33)$	$0.3043^{+0.0044}_{-0.0050}$
$\Omega_\Lambda$	$0.676^{+0.017}_{-0.015}$	$z_{\text{drag}}$	$1059.09 \pm 0.83$	$f_{2000}^{143}$	$30.3 \pm 3.2$
$\Omega_m$	$0.324 \pm 0.016$	$r_{\text{drag}}$	$148.1 \pm 1.8$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.3$
$\Omega_m h^2$	$0.1421 \pm 0.0030$	$k_{\text{D}}$	$0.1400 \pm 0.0013$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$\Omega_m h^3$	$0.0942 \pm 0.0037$	$100\theta_{\text{D}}$	$0.16088 \pm 0.00044$	$\chi_{\text{small}}^2$	$396.7 \pm 1.6$
$\sigma_8$	$0.809 \pm 0.010$	$z_{\text{eq}}$	$3422 \pm 57$	$\chi_{\text{lowl}}^2$	$24.3 \pm 1.9$
$S_8$	$0.841 \pm 0.024$	$k_{\text{eq}}$	$0.01038 \pm 0.00015$	$\chi_{\text{Aver15}}^2$	$0.44 \pm 0.62$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.013$	$100\theta_{\text{eq}}$	$0.809 \pm 0.011$	$\chi_{\text{Cooke17}}^2$	$0.28 \pm 0.39$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4474 \pm 0.0054$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.016$	$H(0.15)$	$71.7 \pm 1.7$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$98.1 \pm 1.9$	$D_{\text{M}}(0.15)$	$654 \pm 16$	$\chi_{\text{Abund}}^2$	$0.72 \pm 0.85$

$$\bar{\chi}_{\text{eff}}^2 = 7491.99; \Delta\bar{\chi}_{\text{eff}}^2 = 6292.11; R - 1 = 0.00722$$



## 7.7 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00022$	$r_{\text{drag}} h$	$98.6 \pm 1.3$	$H(0.15)$	$71.8 \pm 1.5$
$\Omega_c h^2$	$0.1181 \pm 0.0032$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.032$	$D_{\text{M}}(0.15)$	$652 \pm 15$
$100\theta_{MC}$	$1.04110 \pm 0.00045$	$z_{\text{re}}$	$7.47 \pm 0.81$	$H(0.38)$	$81.9 \pm 1.5$
$\tau$	$0.0526 \pm 0.0078$	$10^9 A_s$	$2.080 \pm 0.040$	$D_{\text{M}}(0.38)$	$1553 \pm 32$
$N_{\text{eff}}$	$2.92 \pm 0.21$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.019$	$H(0.51)$	$88.7 \pm 1.5$
$\ln(10^{10} A_s)$	$3.035 \pm 0.019$	$D_{40}$	$1235 \pm 16$	$D_{\text{M}}(0.51)$	$2011 \pm 41$
$n_s$	$0.9605 \pm 0.0091$	$D_{220}$	$5725 \pm 39$	$H(0.61)$	$94.3 \pm 1.5$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2339 \pm 46$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.2 \pm 5.0$	$H(2.33)$	$234.8 \pm 2.8$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.3 \pm 2.0$	$D_{\text{M}}(2.33)$	$5822 \pm 92$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9605 \pm 0.0091$	$f\sigma_8(0.15)$	$0.4585 \pm 0.0084$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P$	$0.2436 \pm 0.0029$	$\sigma_8(0.15)$	$0.743 \pm 0.011$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.2449 \pm 0.0029$	$f\sigma_8(0.38)$	$0.4749 \pm 0.0073$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.570 \pm 0.051$	$\sigma_8(0.38)$	$0.657 \pm 0.010$
$A^{kSZ}$	$< 4.99$	Age/Gyr	$13.94 \pm 0.22$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0068$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$z_*$	$1089.82 \pm 0.37$	$\sigma_8(0.51)$	$0.6149 \pm 0.0097$
$c_{217}$	$0.9996 \pm 0.0019$	$r_*$	$145.7 \pm 2.0$	$f\sigma_8(0.61)$	$0.4670 \pm 0.0066$
$H_0$	$66.5 \pm 1.6$	$100\theta_*$	$1.04138 \pm 0.00057$	$\sigma_8(0.61)$	$0.5849 \pm 0.0094$
$\Omega_\Lambda$	$0.681 \pm 0.011$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.99 \pm 0.18$	$f\sigma_8(2.33)$	$0.2946 \pm 0.0049$
$\Omega_m$	$0.319 \pm 0.011$	$z_{\text{drag}}$	$1059.35 \pm 0.82$	$\sigma_8(2.33)$	$0.3034 \pm 0.0053$
$\Omega_m h^2$	$0.1410 \pm 0.0033$	$r_{\text{drag}}$	$148.4 \pm 2.1$	$f_{2000}^{143}$	$28.8 \pm 3.2$
$\Omega_m h^3$	$0.0938 \pm 0.0041$	$k_{\text{D}}$	$0.1399 \pm 0.0015$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$\sigma_8$	$0.804 \pm 0.012$	$100\theta_{\text{D}}$	$0.16056 \pm 0.00047$	$f_{2000}^{217}$	$106.4 \pm 2.1$
$S_8$	$0.830 \pm 0.016$	$z_{\text{eq}}$	$3413 \pm 39$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0090$	$k_{\text{eq}}$	$0.01032 \pm 0.00012$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6047 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8112 \pm 0.0073$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4484 \pm 0.0037$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11920.27$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.55$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.05$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.95$ ;  $R - 1 = 0.00888$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 23.68 ( $\Delta$  -0.73) CamSpec like\_10.7HM\_1400\_unified: 11498.65



## 7.8 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.025$	$H(0.38)$	$81.7 \pm 1.5$
$\Omega_c h^2$	$0.1177 \pm 0.0031$	$z_{\text{re}}$	$7.49 \pm 0.75$	$D_{\text{M}}(0.38)$	$1557 \pm 32$
$100\theta_{MC}$	$1.04114 \pm 0.00045$	$10^9 A_s$	$2.079 \pm 0.036$	$H(0.51)$	$88.5 \pm 1.5$
$\tau$	$0.0528 \pm 0.0073$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.018$	$D_{\text{M}}(0.51)$	$2016 \pm 40$
$N_{\text{eff}}$	$2.89 \pm 0.20$	$D_{40}$	$1237 \pm 15$	$H(0.61)$	$94.1 \pm 1.5$
$\ln(10^{10} A_s)$	$3.034 \pm 0.017$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(0.61)$	$2345 \pm 45$
$n_s$	$0.9592 \pm 0.0089$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$234.3 \pm 2.8$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{1420}$	$817.5 \pm 4.9$	$D_{\text{M}}(2.33)$	$5836 \pm 91$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.4 \pm 1.9$	$f\sigma_8(0.15)$	$0.4584 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9592 \pm 0.0089$	$\sigma_8(0.15)$	$0.741 \pm 0.010$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P$	$0.2432 \pm 0.0029$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0057$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.2445 \pm 0.0029$	$\sigma_8(0.38)$	$0.6564 \pm 0.0096$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.562 \pm 0.050$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.97 \pm 0.22$	$\sigma_8(0.51)$	$0.6139 \pm 0.0093$
$A^{kSZ}$	$< 4.93$	$z_*$	$1089.77 \pm 0.35$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0055$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$r_*$	$146.0 \pm 2.0$	$\sigma_8(0.61)$	$0.5839 \pm 0.0090$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04145 \pm 0.00057$	$f\sigma_8(2.33)$	$0.2941 \pm 0.0048$
$H_0$	$66.3 \pm 1.5$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.02 \pm 0.18$	$\sigma_8(2.33)$	$0.3028 \pm 0.0052$
$\Omega_\Lambda$	$0.680 \pm 0.010$	$z_{\text{drag}}$	$1059.24 \pm 0.82$	$f_{2000}^{143}$	$28.5 \pm 3.2$
$\Omega_m$	$0.320 \pm 0.010$	$r_{\text{drag}}$	$148.7 \pm 2.0$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.2$
$\Omega_m h^2$	$0.1405 \pm 0.0032$	$k_{\text{D}}$	$0.1396 \pm 0.0015$	$f_{2000}^{217}$	$106.2 \pm 2.1$
$\Omega_m h^3$	$0.0932 \pm 0.0040$	$100\theta_{\text{D}}$	$0.16049 \pm 0.00046$	$\chi^2_{\text{lensing}}$	$9.05 \pm 0.73$
$\sigma_8$	$0.803 \pm 0.011$	$z_{\text{eq}}$	$3415 \pm 35$	$\chi^2_{\text{simall}}$	$396.8 \pm 1.5$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.01031 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$24.2 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4545 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8106 \pm 0.0067$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4481 \pm 0.0034$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9870 \pm 0.0091$	$H(0.15)$	$71.6 \pm 1.5$		
$r_{\text{drag}} h$	$98.5 \pm 1.2$	$D_{\text{M}}(0.15)$	$654 \pm 14$		

$\bar{\chi}^2_{\text{eff}} = 11951.65$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.78$ ;  $R - 1 = 0.01144$



**7.9 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Cooke17\_Aver15/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Cooke17\_Aver15**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.031$	$H(0.38)$	$82.1 \pm 1.2$
$\Omega_c h^2$	$0.1186 \pm 0.0025$	$z_{\text{re}}$	$7.47 \pm 0.80$	$D_{\text{M}}(0.38)$	$1550 \pm 26$
$100\theta_{MC}$	$1.04104 \pm 0.00039$	$10^9 A_s$	$2.082 \pm 0.037$	$H(0.51)$	$88.8 \pm 1.2$
$\tau$	$0.0525 \pm 0.0077$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.016$	$D_{\text{M}}(0.51)$	$2007 \pm 33$
$N_{\text{eff}}$	$2.94 \pm 0.16$	$D_{40}$	$1234 \pm 15$	$H(0.61)$	$94.5 \pm 1.2$
$\ln(10^{10} A_s)$	$3.036 \pm 0.018$	$D_{220}$	$5723 \pm 39$	$D_{\text{M}}(0.61)$	$2334 \pm 37$
$n_s$	$0.9612 \pm 0.0076$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$235.1 \pm 2.2$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.9 \pm 4.9$	$D_{\text{M}}(2.33)$	$5812 \pm 71$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.0 \pm 1.8$	$f\sigma_8(0.15)$	$0.4591 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9612 \pm 0.0076$	$\sigma_8(0.15)$	$0.7437 \pm 0.0094$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0022$	$f\sigma_8(0.38)$	$0.4756 \pm 0.0070$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0022$	$\sigma_8(0.38)$	$0.6585 \pm 0.0086$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.578 \pm 0.040$	$f\sigma_8(0.51)$	$0.4733 \pm 0.0064$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.91 \pm 0.17$	$\sigma_8(0.51)$	$0.6159 \pm 0.0081$
$A^{kSZ}$	$< 5.08$	$z_*$	$1089.88 \pm 0.31$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0061$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$145.5 \pm 1.5$	$\sigma_8(0.61)$	$0.5858 \pm 0.0078$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04130 \pm 0.00047$	$f\sigma_8(2.33)$	$0.2951 \pm 0.0041$
$H_0$	$66.6 \pm 1.3$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.97 \pm 0.14$	$\sigma_8(2.33)$	$0.3039 \pm 0.0044$
$\Omega_{\Lambda}$	$0.681 \pm 0.010$	$z_{\text{drag}}$	$1059.40 \pm 0.68$	$f_{2000}^{143}$	$29.0 \pm 3.0$
$\Omega_m$	$0.319 \pm 0.010$	$r_{\text{drag}}$	$148.2 \pm 1.6$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.1$
$\Omega_m h^2$	$0.1414 \pm 0.0026$	$k_{\text{D}}$	$0.1400 \pm 0.0012$	$f_{2000}^{217}$	$106.6 \pm 2.0$
$\Omega_m h^3$	$0.0942 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16063 \pm 0.00036$	$\chi_{\text{small}}^2$	$396.9 \pm 1.6$
$\sigma_8$	$0.806 \pm 0.010$	$z_{\text{eq}}$	$3412 \pm 37$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.4$
$S_8$	$0.831 \pm 0.016$	$k_{\text{eq}}$	$0.01034 \pm 0.00011$	$\chi_{\text{Aver15}}^2$	$0.31 \pm 0.44$
$\sigma_8 \Omega_m^{0.5}$	$0.4552 \pm 0.0090$	$100\theta_{\text{eq}}$	$0.8113 \pm 0.0069$	$\chi_{\text{Cooke17}}^2$	$0.37 \pm 0.44$
$\sigma_8 \Omega_m^{0.25}$	$0.6056 \pm 0.0087$	$100\theta_{\text{s,eq}}$	$0.4484 \pm 0.0035$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$H(0.15)$	$71.9 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$98.6 \pm 1.2$	$D_{\text{M}}(0.15)$	$651 \pm 12$	$\chi_{\text{Abund}}^2$	$0.68 \pm 0.68$

$$\bar{\chi}_{\text{eff}}^2 = 11943.28; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.70; R - 1 = 0.01315$$



7.10 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00022$	$r_{\text{drag}} h$	$98.7 \pm 1.3$	$H(0.15)$	$71.8 \pm 1.5$
$\Omega_c h^2$	$0.1182 \pm 0.0032$	$\langle d^2 \rangle^{1/2}$	$2.450 \pm 0.031$	$D_{\text{M}}(0.15)$	$651 \pm 15$
$100\theta_{MC}$	$1.04109 \pm 0.00045$	$z_{\text{re}}$	$7.64^{+0.52}_{-0.81}$	$H(0.38)$	$82.0 \pm 1.5$
$\tau$	$0.0542^{+0.0045}_{-0.0082}$	$10^9 A_s$	$2.087^{+0.030}_{-0.039}$	$D_{\text{M}}(0.38)$	$1552 \pm 32$
$N_{\text{eff}}$	$2.93 \pm 0.21$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.019$	$H(0.51)$	$88.7 \pm 1.5$
$\ln(10^{10} A_s)$	$3.038^{+0.015}_{-0.018}$	$D_{40}$	$1235 \pm 17$	$D_{\text{M}}(0.51)$	$2009 \pm 40$
$n_s$	$0.9609 \pm 0.0090$	$D_{220}$	$5725 \pm 39$	$H(0.61)$	$94.4 \pm 1.5$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2337 \pm 46$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.2 \pm 5.0$	$H(2.33)$	$234.8 \pm 2.8$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.3 \pm 2.0$	$D_{\text{M}}(2.33)$	$5819 \pm 91$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9609 \pm 0.0090$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0083$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P$	$0.2437 \pm 0.0029$	$\sigma_8(0.15)$	$0.744 \pm 0.010$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.2450 \pm 0.0029$	$f\sigma_8(0.38)$	$0.4755 \pm 0.0071$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.570 \pm 0.051$	$\sigma_8(0.38)$	$0.6586 \pm 0.0097$
$A^{kSZ}$	$< 4.97$	Age/Gyr	$13.93 \pm 0.22$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0066$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$z_*$	$1089.82 \pm 0.37$	$\sigma_8(0.51)$	$0.6160 \pm 0.0092$
$c_{217}$	$0.9996 \pm 0.0019$	$r_*$	$145.7 \pm 2.0$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0063$
$H_0$	$66.5 \pm 1.6$	$100\theta_*$	$1.04137 \pm 0.00057$	$\sigma_8(0.61)$	$0.5860 \pm 0.0089$
$\Omega_\Lambda$	$0.681 \pm 0.011$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.99 \pm 0.18$	$f\sigma_8(2.33)$	$0.2952 \pm 0.0047$
$\Omega_m$	$0.319 \pm 0.011$	$z_{\text{drag}}$	$1059.38 \pm 0.82$	$\sigma_8(2.33)$	$0.3040 \pm 0.0051$
$\Omega_m h^2$	$0.1411 \pm 0.0033$	$r_{\text{drag}}$	$148.4 \pm 2.0$	$f_{2000}^{143}$	$28.7 \pm 3.2$
$\Omega_m h^3$	$0.0939 \pm 0.0040$	$k_{\text{D}}$	$0.1399 \pm 0.0015$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$\sigma_8$	$0.806 \pm 0.011$	$100\theta_{\text{D}}$	$0.16057 \pm 0.00047$	$f_{2000}^{217}$	$106.4 \pm 2.1$
$S_8$	$0.831 \pm 0.016$	$z_{\text{eq}}$	$3411 \pm 39$	$\chi_{\text{small}}^2$	$396.8 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4550 \pm 0.0090$	$k_{\text{eq}}$	$0.01032 \pm 0.00012$	$\chi_{\text{lowl}}^2$	$24.0 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6055 \pm 0.0089$	$100\theta_{\text{eq}}$	$0.8115 \pm 0.0073$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4485 \pm 0.0037$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11942.78$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.97$ ;  $R - 1 = 0.01065$



7.11 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.025$	$H(0.38)$	$81.8 \pm 1.5$
$\Omega_c h^2$	$0.1177 \pm 0.0031$	$z_{\text{re}}$	$7.63^{+0.52}_{-0.76}$	$D_{\text{M}}(0.38)$	$1556 \pm 32$
$100\theta_{MC}$	$1.04114 \pm 0.00045$	$10^9 A_s$	$2.084^{+0.028}_{-0.036}$	$H(0.51)$	$88.5 \pm 1.5$
$\tau$	$0.0541^{+0.0047}_{-0.0077}$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.018$	$D_{\text{M}}(0.51)$	$2014 \pm 40$
$N_{\text{eff}}$	$2.89 \pm 0.20$	$D_{40}$	$1236 \pm 15$	$H(0.61)$	$94.1 \pm 1.5$
$\ln(10^{10} A_s)$	$3.037^{+0.014}_{-0.017}$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(0.61)$	$2343 \pm 45$
$n_s$	$0.9597 \pm 0.0088$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$234.4 \pm 2.8$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.4 \pm 4.9$	$D_{\text{M}}(2.33)$	$5833 \pm 91$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.4 \pm 2.0$	$f\sigma_8(0.15)$	$0.4585 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9597 \pm 0.0088$	$\sigma_8(0.15)$	$0.7424 \pm 0.0098$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2432 \pm 0.0029$	$f\sigma_8(0.38)$	$0.4749 \pm 0.0056$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.2446 \pm 0.0029$	$\sigma_8(0.38)$	$0.6573 \pm 0.0092$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.563 \pm 0.050$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0054$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.96 \pm 0.22$	$\sigma_8(0.51)$	$0.6148 \pm 0.0089$
$A^{kSZ}$	$< 4.92$	$z_*$	$1089.77 \pm 0.35$	$f\sigma_8(0.61)$	$0.4670 \pm 0.0053$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$146.0 \pm 2.0$	$\sigma_8(0.61)$	$0.5847 \pm 0.0086$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04144 \pm 0.00057$	$f\sigma_8(2.33)$	$0.2945 \pm 0.0046$
$H_0$	$66.3 \pm 1.5$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.02 \pm 0.18$	$\sigma_8(2.33)$	$0.3033 \pm 0.0050$
$\Omega_\Lambda$	$0.680 \pm 0.010$	$z_{\text{drag}}$	$1059.27 \pm 0.82$	$f_{2000}^{143}$	$28.5 \pm 3.2$
$\Omega_m$	$0.320 \pm 0.010$	$r_{\text{drag}}$	$148.7 \pm 2.0$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.2$
$\Omega_m h^2$	$0.1405 \pm 0.0032$	$k_{\text{D}}$	$0.1397 \pm 0.0015$	$f_{2000}^{217}$	$106.2 \pm 2.1$
$\Omega_m h^3$	$0.0933 \pm 0.0040$	$100\theta_{\text{D}}$	$0.16050 \pm 0.00046$	$\chi^2_{\text{lensing}}$	$9.03 \pm 0.71$
$\sigma_8$	$0.804 \pm 0.010$	$z_{\text{eq}}$	$3413 \pm 35$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.5$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.01031 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$24.2 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8110 \pm 0.0066$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6047 \pm 0.0071$	$100\theta_{\text{s,eq}}$	$0.4483 \pm 0.0033$	$\chi^2_{\text{CMB}}$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9876 \pm 0.0089$	$H(0.15)$	$71.6 \pm 1.5$		
$r_{\text{drag}} h$	$98.6 \pm 1.2$	$D_{\text{M}}(0.15)$	$653 \pm 14$		

$\bar{\chi}^2_{\text{eff}} = 11951.41$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.80$ ;  $R - 1 = 0.01353$



7.12 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Cooke17\_Aver15\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Cooke17\_Av

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00020$	$\langle d^2 \rangle^{1/2}$	$2.450 \pm 0.030$	$H(0.38)$	$82.1 \pm 1.2$
$\Omega_c h^2$	$0.1186 \pm 0.0025$	$z_{\text{re}}$	$7.64^{+0.51}_{-0.80}$	$D_{\text{M}}(0.38)$	$1549 \pm 26$
$100\theta_{MC}$	$1.04104 \pm 0.00039$	$10^9 A_s$	$2.089^{+0.027}_{-0.037}$	$H(0.51)$	$88.9 \pm 1.2$
$\tau$	$0.0541^{+0.0046}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.016$	$D_{\text{M}}(0.51)$	$2006 \pm 33$
$N_{\text{eff}}$	$2.95 \pm 0.16$	$D_{40}$	$1234 \pm 15$	$H(0.61)$	$94.5 \pm 1.2$
$\ln(10^{10} A_s)$	$3.039^{+0.013}_{-0.017}$	$D_{220}$	$5723 \pm 39$	$D_{\text{M}}(0.61)$	$2333 \pm 37$
$n_s$	$0.9616 \pm 0.0076$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$235.2 \pm 2.2$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.9 \pm 4.9$	$D_{\text{M}}(2.33)$	$5810 \pm 71$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.0 \pm 1.8$	$f\sigma_8(0.15)$	$0.4595 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9616 \pm 0.0076$	$\sigma_8(0.15)$	$0.7449^{+0.0082}_{-0.0092}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2440 \pm 0.0022$	$f\sigma_8(0.38)$	$0.4761 \pm 0.0068$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.2453 \pm 0.0022$	$\sigma_8(0.38)$	$0.6595^{+0.0075}_{-0.0084}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.578 \pm 0.040$	$f\sigma_8(0.51)$	$0.4739 \pm 0.0062$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.91 \pm 0.17$	$\sigma_8(0.51)$	$0.6169^{+0.0070}_{-0.0080}$
$A^{kSZ}$	$< 5.06$	$z_*$	$1089.88 \pm 0.31$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0058$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$145.4 \pm 1.5$	$\sigma_8(0.61)$	$0.5868^{+0.0068}_{-0.0077}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04130 \pm 0.00047$	$f\sigma_8(2.33)$	$0.2956^{+0.0036}_{-0.0040}$
$H_0$	$66.6 \pm 1.3$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.97 \pm 0.14$	$\sigma_8(2.33)$	$0.3045^{+0.0039}_{-0.0043}$
$\Omega_\Lambda$	$0.681 \pm 0.010$	$z_{\text{drag}}$	$1059.42 \pm 0.68$	$f_{2000}^{143}$	$29.0 \pm 3.0$
$\Omega_m$	$0.319 \pm 0.010$	$r_{\text{drag}}$	$148.2 \pm 1.6$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.1$
$\Omega_m h^2$	$0.1414 \pm 0.0026$	$k_{\text{D}}$	$0.1400 \pm 0.0012$	$f_{2000}^{217}$	$106.5 \pm 2.0$
$\Omega_m h^3$	$0.0943 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00036$	$\chi_{\text{small}}^2$	$396.8 \pm 1.7$
$\sigma_8$	$0.8069 \pm 0.0095$	$z_{\text{eq}}$	$3410 \pm 37$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.4$
$S_8$	$0.832 \pm 0.016$	$k_{\text{eq}}$	$0.01034 \pm 0.00011$	$\chi_{\text{Aver15}}^2$	$0.32 \pm 0.45$
$\sigma_8 \Omega_m^{0.5}$	$0.4556 \pm 0.0089$	$100\theta_{\text{eq}}$	$0.8116 \pm 0.0069$	$\chi_{\text{Cooke17}}^2$	$0.37 \pm 0.44$
$\sigma_8 \Omega_m^{0.25}$	$0.6063 \pm 0.0085$	$100\theta_{\text{s,eq}}$	$0.4486 \pm 0.0035$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.012$	$H(0.15)$	$72.0 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$98.7 \pm 1.2$	$D_{\text{M}}(0.15)$	$650 \pm 12$	$\chi_{\text{Abund}}^2$	$0.68 \pm 0.67$

$\bar{\chi}_{\text{eff}}^2 = 11943.02$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.68$ ;  $R - 1 = 0.01235$



### 7.13 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$z_{\text{re}}$	$7.66 \pm 0.80$	$H(0.51)$	$89.5 \pm 1.3$
$\Omega_c h^2$	$0.1184 \pm 0.0032$	$10^9 A_s$	$2.091 \pm 0.039$	$D_M(0.51)$	$1987 \pm 33$
$100\theta_{MC}$	$1.04108 \pm 0.00046$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.019$	$H(0.61)$	$95.1 \pm 1.4$
$\tau$	$0.0546 \pm 0.0079$	$D_{40}$	$1226 \pm 14$	$D_M(0.61)$	$2312 \pm 37$
$N_{\text{eff}}$	$3.00 \pm 0.19$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.3 \pm 2.8$
$\ln(10^{10} A_s)$	$3.040 \pm 0.019$	$D_{810}$	$2536 \pm 14$	$D_M(2.33)$	$5780 \pm 80$
$n_s$	$0.9659 \pm 0.0073$	$D_{1420}$	$817.3 \pm 5.0$	$f\sigma_8(0.15)$	$0.4539 \pm 0.0074$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.0 \pm 2.0$	$\sigma_8(0.15)$	$0.745 \pm 0.011$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9659 \pm 0.0073$	$f\sigma_8(0.38)$	$0.4722 \pm 0.0070$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2448 \pm 0.0026$	$\sigma_8(0.38)$	$0.660 \pm 0.010$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4709 \pm 0.0068$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.575 \pm 0.051$	$\sigma_8(0.51)$	$0.6178 \pm 0.0095$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.84 \pm 0.19$	$f\sigma_8(0.61)$	$0.4660 \pm 0.0067$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.76 \pm 0.38$	$\sigma_8(0.61)$	$0.5879 \pm 0.0091$
$A^{kSZ}$	$< 5.12$	$r_*$	$145.1 \pm 1.9$	$f\sigma_8(2.33)$	$0.2965 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04130 \pm 0.00057$	$\sigma_8(2.33)$	$0.3057 \pm 0.0050$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.94 \pm 0.17$	$f_{2000}^{143}$	$29.1 \pm 3.1$
$H_0$	$67.4 \pm 1.2$	$z_{\text{drag}}$	$1059.73 \pm 0.73$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.3$
$\Omega_\Lambda$	$0.6891 \pm 0.0072$	$r_{\text{drag}}$	$147.8 \pm 1.9$	$f_{2000}^{217}$	$106.6 \pm 2.1$
$\Omega_m$	$0.3109 \pm 0.0072$	$k_D$	$0.1403 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1414 \pm 0.0033$	$100\theta_D$	$0.16070 \pm 0.00045$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^3$	$0.0954 \pm 0.0038$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.075$
$\sigma_8$	$0.806 \pm 0.012$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{MGS}}^2$	$1.29 \pm 0.49$
$S_8$	$0.820 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0050$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4493 \pm 0.0076$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6017 \pm 0.0089$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$D_M(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.66 \pm 0.89$	$H(0.38)$	$82.8 \pm 1.3$		
$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.026$	$D_M(0.38)$	$1534 \pm 26$		

Best-fit  $\chi_{\text{eff}}^2 = 11926.54$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.92$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.07$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.12$ ;  $R - 1 = 0.00571$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 ( $\Delta$  -0.03) MGS: 1.28 ( $\Delta$  0.18) DR12BAO: 4.22 ( $\Delta$  -0.57) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  -0.28) commander\_dx12\_v3\_2\_29: 22.86 ( $\Delta$  -0.35) CamSpec like\_10.7HM\_1400\_unified: 11499.97



7.14 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_JLA/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_JLA

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$z_{\text{re}}$	$7.80 \pm 0.72$	$H(0.51)$	$89.4 \pm 1.3$
$\Omega_c h^2$	$0.1183 \pm 0.0030$	$10^9 A_s$	$2.097 \pm 0.034$	$D_{\text{M}}(0.51)$	$1989 \pm 31$
$100\theta_{MC}$	$1.04109 \pm 0.00044$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.017$	$H(0.61)$	$95.0 \pm 1.3$
$\tau$	$0.0559 \pm 0.0072$	$D_{40}$	$1228 \pm 13$	$D_{\text{M}}(0.61)$	$2314 \pm 36$
$N_{\text{eff}}$	$2.99^{+0.17}_{-0.19}$	$D_{220}$	$5732 \pm 38$	$H(2.33)$	$235.2 \pm 2.7$
$\ln(10^{10} A_s)$	$3.043 \pm 0.016$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5784 \pm 77$
$n_s$	$0.9654 \pm 0.0070$	$D_{1420}$	$817.8 \pm 5.0$	$f\sigma_8(0.15)$	$0.4548 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$231.3 \pm 2.0$	$\sigma_8(0.15)$	$0.7457 \pm 0.0097$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0070$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2446 \pm 0.0025$	$\sigma_8(0.38)$	$0.6610 \pm 0.0089$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2460 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4717 \pm 0.0056$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.572^{+0.046}_{-0.051}$	$\sigma_8(0.51)$	$0.6186 \pm 0.0085$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.85 \pm 0.18$	$f\sigma_8(0.61)$	$0.4668 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.75 \pm 0.36$	$\sigma_8(0.61)$	$0.5886 \pm 0.0082$
$A^{kSZ}$	$< 4.91$	$r_*$	$145.2 \pm 1.8$	$f\sigma_8(2.33)$	$0.2968 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04131 \pm 0.00054$	$\sigma_8(2.33)$	$0.3060 \pm 0.0046$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.16$	$f_{2000}^{143}$	$28.8 \pm 3.2$
$H_0$	$67.4 \pm 1.2$	$z_{\text{drag}}$	$1059.71 \pm 0.71$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.3$
$\Omega_{\Lambda}$	$0.6886 \pm 0.0068$	$r_{\text{drag}}$	$147.9 \pm 1.8$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3114 \pm 0.0068$	$k_{\text{D}}$	$0.1403 \pm 0.0013$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.77$
$\Omega_m h^2$	$0.1413 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16067 \pm 0.00043$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.0952^{+0.0033}_{-0.0038}$	$z_{\text{eq}}$	$3385 \pm 25$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.1$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$706.78 \pm 0.20$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8164 \pm 0.0047$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.074$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0061$	$100\theta_{\text{s,eq}}$	$0.4510 \pm 0.0024$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0072$	$H(0.15)$	$72.6 \pm 1.2$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.9832 \pm 0.0086$	$D_{\text{M}}(0.15)$	$644 \pm 11$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.59 \pm 0.83$	$H(0.38)$	$82.7 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.021$	$D_{\text{M}}(0.38)$	$1535 \pm 25$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$

$$\bar{\chi}_{\text{eff}}^2 = 12664.75; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.70; R - 1 = 0.04059$$



7.15 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensi

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00019$	$z_{\text{re}}$	$7.83 \pm 0.72$	$H(0.51)$	$89.5 \pm 1.3$
$\Omega_c h^2$	$0.1183 \pm 0.0030$	$10^9 A_s$	$2.098 \pm 0.034$	$D_{\text{M}}(0.51)$	$1987 \pm 31$
$100\theta_{MC}$	$1.04109 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.018$	$H(0.61)$	$95.1 \pm 1.3$
$\tau$	$0.0562 \pm 0.0073$	$D_{40}$	$1228 \pm 13$	$D_{\text{M}}(0.61)$	$2312 \pm 36$
$N_{\text{eff}}$	$3.00 \pm 0.18$	$D_{220}$	$5733 \pm 39$	$H(2.33)$	$235.3 \pm 2.7$
$\ln(10^{10} A_s)$	$3.044 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5780 \pm 77$
$n_s$	$0.9657 \pm 0.0070$	$D_{1420}$	$817.7 \pm 5.0$	$f\sigma_8(0.15)$	$0.4545 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$231.2 \pm 2.0$	$\sigma_8(0.15)$	$0.7459 \pm 0.0097$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9657 \pm 0.0070$	$f\sigma_8(0.38)$	$0.4729 \pm 0.0057$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2447 \pm 0.0025$	$\sigma_8(0.38)$	$0.6613 \pm 0.0089$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4716 \pm 0.0056$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.573 \pm 0.050$	$\sigma_8(0.51)$	$0.6189 \pm 0.0085$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.84 \pm 0.18$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0056$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.74 \pm 0.36$	$\sigma_8(0.61)$	$0.5889 \pm 0.0082$
$A^{kSZ}$	$< 5.04$	$r_*$	$145.1 \pm 1.8$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04130 \pm 0.00055$	$\sigma_8(2.33)$	$0.3062 \pm 0.0045$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.17$	$f_{2000}^{143}$	$28.9 \pm 3.1$
$H_0$	$67.4 \pm 1.2$	$z_{\text{drag}}$	$1059.74 \pm 0.71$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.3$
$\Omega_{\Lambda}$	$0.6892 \pm 0.0066$	$r_{\text{drag}}$	$147.8 \pm 1.9$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3108 \pm 0.0066$	$k_{\text{D}}$	$0.1403 \pm 0.0013$	$\chi_{\text{lensing}}^2$	$9.19 \pm 0.77$
$\Omega_m h^2$	$0.1413 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16068 \pm 0.00044$	$\chi_{\text{simall}}^2$	$313 \pm 200$
$\Omega_m h^3$	$0.0954 \pm 0.0036$	$z_{\text{eq}}$	$3383 \pm 24$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$1035.11 \pm 0.34$
$S_8$	$0.821 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0046$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.54$
$\sigma_8 \Omega_m^{0.5}$	$0.4499 \pm 0.0061$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.02 \pm 0.65$
$\sigma_8 \Omega_m^{0.25}$	$0.6026 \pm 0.0072$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.9828 \pm 0.0086$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.68 \pm 0.81$	$H(0.38)$	$82.8 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$D_{\text{M}}(0.38)$	$1534 \pm 25$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$

Best-fit  $\chi_{\text{eff}}^2 = 12970.39$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.01$ ;  $\bar{\chi}_{\text{eff}}^2 = 12993.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.59$ ;  $R - 1 = 0.01037$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  -0.01) MGS: 1.22 ( $\Delta$  0.06) DR12BAO: 4.39 ( $\Delta$  -0.21) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.94 ( $\Delta$  0.32) simall\_100x143\_offlike5\_EE\_Aplanck  
396.09 ( $\Delta$  -0.24) commander\_dx12\_v3.2\_29: 23.00 ( $\Delta$  -0.26) CamSpec like\_10.7HM\_1400\_unified: 11499.66 SN - JLA Pantheon18: 1035.03 ( $\Delta$  -0.04)



**7.16**    **base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$z_{\text{re}}$	$7.79 \pm 0.72$	$H(0.51)$	$89.3 \pm 1.3$
$\Omega_c h^2$	$0.1182 \pm 0.0030$	$10^9 A_s$	$2.096 \pm 0.034$	$D_{\text{M}}(0.51)$	$1991 \pm 32$
$100\theta_{\text{MC}}$	$1.04110 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.018$	$H(0.61)$	$94.9 \pm 1.3$
$\tau$	$0.0558 \pm 0.0073$	$D_{40}$	$1229 \pm 13$	$D_{\text{M}}(0.61)$	$2317 \pm 37$
$N_{\text{eff}}$	$2.98 \pm 0.19$	$D_{220}$	$5732 \pm 39$	$H(2.33)$	$235.1 \pm 2.7$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5788 \pm 78$
$n_s$	$0.9649 \pm 0.0072$	$D_{1420}$	$817.7 \pm 5.0$	$f\sigma_8(0.15)$	$0.4549 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$231.2 \pm 2.0$	$\sigma_8(0.15)$	$0.7452 \pm 0.0098$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9649 \pm 0.0072$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0057$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2445 \pm 0.0026$	$\sigma_8(0.38)$	$0.6606 \pm 0.0090$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2458 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4716 \pm 0.0056$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.571 \pm 0.050$	$\sigma_8(0.51)$	$0.6182 \pm 0.0086$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.86 \pm 0.19$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0056$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.74 \pm 0.36$	$\sigma_8(0.61)$	$0.5882 \pm 0.0082$
$A^{kSZ}$	$< 5.00$	$r_*$	$145.3 \pm 1.8$	$f\sigma_8(2.33)$	$0.2966 \pm 0.0043$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04133 \pm 0.00055$	$\sigma_8(2.33)$	$0.3057 \pm 0.0046$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.17$	$f_{2000}^{143}$	$28.8 \pm 3.1$
$H_0$	$67.3 \pm 1.2$	$z_{\text{drag}}$	$1059.67 \pm 0.72$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.3$
$\Omega_\Lambda$	$0.6881 \pm 0.0069$	$r_{\text{drag}}$	$148.0 \pm 1.9$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3119 \pm 0.0069$	$k_{\text{D}}$	$0.1402 \pm 0.0014$	$\chi_{\text{lensing}}^2$	$9.16 \pm 0.76$
$\Omega_m h^2$	$0.1412 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16065 \pm 0.00044$	$\chi_{\text{simall}}^2$	$313 \pm 200$
$\Omega_m h^3$	$0.0950^{+0.0034}_{-0.0038}$	$z_{\text{eq}}$	$3387 \pm 25$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.51$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8161 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$0.97 \pm 0.63$
$\sigma_8 \Omega_m^{0.5}$	$0.4504 \pm 0.0062$	$100\theta_{\text{s,eq}}$	$0.4509 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6027 \pm 0.0072$	$H(0.15)$	$72.6 \pm 1.2$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9832 \pm 0.0087$	$D_{\text{M}}(0.15)$	$644 \pm 11$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.54 \pm 0.85$	$H(0.38)$	$82.6 \pm 1.3$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.022$	$D_{\text{M}}(0.38)$	$1537 \pm 25$		

$\bar{\chi}_{\text{eff}}^2 = 11958.08$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.63$ ;  $R - 1 = 0.01000$



**7.17** base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00018$	$z_{\text{re}}$	$7.65 \pm 0.80$	$H(0.51)$	$89.3 \pm 1.1$
$\Omega_c h^2$	$0.1180 \pm 0.0027$	$10^9 A_s$	$2.088 \pm 0.038$	$D_{\text{M}}(0.51)$	$1991 \pm 27$
$100\theta_{MC}$	$1.04113 \pm 0.00041$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.017$	$H(0.61)$	$94.9 \pm 1.1$
$\tau$	$0.0545 \pm 0.0079$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2317 \pm 31$
$N_{\text{eff}}$	$2.98 \pm 0.16$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$234.9 \pm 2.4$
$\ln(10^{10} A_s)$	$3.039 \pm 0.018$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5791 \pm 67$
$n_s$	$0.9650 \pm 0.0064$	$D_{1420}$	$817.5 \pm 5.0$	$f\sigma_8(0.15)$	$0.4535 \pm 0.0072$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.9$	$\sigma_8(0.15)$	$0.7434 \pm 0.0099$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9650 \pm 0.0064$	$f\sigma_8(0.38)$	$0.4717 \pm 0.0067$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2444 \pm 0.0022$	$\sigma_8(0.38)$	$0.6590 \pm 0.0089$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4703 \pm 0.0064$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.569 \pm 0.045$	$\sigma_8(0.51)$	$0.6167 \pm 0.0084$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.86 \pm 0.16$	$f\sigma_8(0.61)$	$0.4654 \pm 0.0062$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.72 \pm 0.34$	$\sigma_8(0.61)$	$0.5868 \pm 0.0081$
$A^{kSZ}$	$< 5.05$	$r_*$	$145.4 \pm 1.6$	$f\sigma_8(2.33)$	$0.2959 \pm 0.0041$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04136 \pm 0.00050$	$\sigma_8(2.33)$	$0.3051 \pm 0.0044$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.15$	$f_{2000}^{143}$	$28.9 \pm 3.0$
$H_0$	$67.3 \pm 1.0$	$z_{\text{drag}}$	$1059.64 \pm 0.63$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.2$
$\Omega_{\Lambda}$	$0.6886 \pm 0.0069$	$r_{\text{drag}}$	$148.1 \pm 1.6$	$f_{2000}^{217}$	$106.4 \pm 2.0$
$\Omega_m$	$0.3114 \pm 0.0069$	$k_{\text{D}}$	$0.1401 \pm 0.0012$	$\chi_{\text{simall}}^2$	$313 \pm 200$
$\Omega_m h^2$	$0.1409 \pm 0.0028$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00039$	$\chi_{\text{lowl}}^2$	$108 \pm 200$
$\Omega_m h^3$	$0.0948 \pm 0.0031$	$z_{\text{eq}}$	$3385 \pm 26$	$\chi_{\text{Aver15}}^2$	$0.34 \pm 0.48$
$\sigma_8$	$0.805 \pm 0.011$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.52$
$S_8$	$0.820 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8165 \pm 0.0048$	$\chi_{\text{MGS}}^2$	$1.00 \pm 0.65$
$\sigma_8 \Omega_m^{0.5}$	$0.4489 \pm 0.0075$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0025$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6010 \pm 0.0084$	$H(0.15)$	$72.5 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$D_{\text{M}}(0.15)$	$644.5 \pm 9.6$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$r_{\text{drag}} h$	$99.61 \pm 0.85$	$H(0.38)$	$82.6 \pm 1.1$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.026$	$D_{\text{M}}(0.38)$	$1537 \pm 22$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.20; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.29; R - 1 = 0.00729$$



7.18 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00018$	$10^9 A_s$	$2.090 \pm 0.038$	$H(0.61)$	$95.0 \pm 1.1$
$\Omega_c h^2$	$0.1184 \pm 0.0026$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.016$	$D_M(0.61)$	$2313 \pm 30$
$100\theta_{MC}$	$1.04107 \pm 0.00040$	$D_{40}$	$1227 \pm 13$	$H(2.33)$	$235.3 \pm 2.2$
$\tau$	$0.0544 \pm 0.0079$	$D_{220}$	$5727 \pm 39$	$D_M(2.33)$	$5781 \pm 63$
$N_{eff}$	$3.00 \pm 0.15$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4542 \pm 0.0071$
$\ln(10^{10} A_s)$	$3.040 \pm 0.018$	$D_{1420}$	$817.1 \pm 4.9$	$\sigma_8(0.15)$	$0.7447 \pm 0.0096$
$n_s$	$0.9657 \pm 0.0062$	$D_{2000}$	$231.0 \pm 1.8$	$f\sigma_8(0.38)$	$0.4724 \pm 0.0065$
$y_{cal}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9657 \pm 0.0062$	$\sigma_8(0.38)$	$0.6601 \pm 0.0086$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.2447 \pm 0.0020$	$f\sigma_8(0.51)$	$0.4711 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.2461 \pm 0.0021$	$\sigma_8(0.51)$	$0.6178 \pm 0.0081$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.578 \pm 0.041$	$f\sigma_8(0.61)$	$0.4661 \pm 0.0061$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.84 \pm 0.15$	$\sigma_8(0.61)$	$0.5878 \pm 0.0078$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.79 \pm 0.31$	$f\sigma_8(2.33)$	$0.2964 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.1 \pm 1.5$	$\sigma_8(2.33)$	$0.3056 \pm 0.0042$
$A^{kSZ}$	$< 5.15$	$100\theta_*$	$1.04129 \pm 0.00047$	$f_{2000}^{143}$	$29.2 \pm 3.0$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.94 \pm 0.14$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.1$
$c_{217}$	$0.9996 \pm 0.0019$	$z_{\text{drag}}$	$1059.69 \pm 0.63$	$f_{2000}^{217}$	$106.6 \pm 2.0$
$H_0$	$67.4 \pm 1.0$	$r_{\text{drag}}$	$147.8 \pm 1.5$	$\chi_{\text{small}}^2$	$314 \pm 200$
$\Omega_\Lambda$	$0.6887 \pm 0.0069$	$k_D$	$0.1403 \pm 0.0011$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\Omega_m$	$0.3113 \pm 0.0069$	$100\theta_D$	$0.16071 \pm 0.00035$	$\chi_{\text{Aver15}}^2$	$0.35 \pm 0.48$
$\Omega_m h^2$	$0.1414 \pm 0.0027$	$z_{\text{eq}}$	$3384 \pm 26$	$\chi_{\text{Cooke17}}^2$	$0.37 \pm 0.45$
$\Omega_m h^3$	$0.0953 \pm 0.0030$	$k_{\text{eq}}$	$0.01030 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.31 \pm 0.52$
$\sigma_8$	$0.806 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8166 \pm 0.0048$	$\chi_{\text{MGS}}^2$	$1.01 \pm 0.65$
$S_8$	$0.821 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0025$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4496 \pm 0.0074$	$H(0.15)$	$72.7 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6019 \pm 0.0082$	$D_M(0.15)$	$643.4 \pm 9.3$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$H(0.38)$	$82.7 \pm 1.0$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.61 \pm 0.85$	$D_M(0.38)$	$1534 \pm 21$	$\chi_{\text{Abund}}^2$	$0.72 \pm 0.61$
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.026$	$H(0.51)$	$89.4 \pm 1.0$		
$z_{\text{re}}$	$7.65 \pm 0.80$	$D_M(0.51)$	$1988 \pm 26$		
$\bar{\chi}_{\text{eff}}^2 = 11949.40$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.14$ ; $R - 1 = 0.00827$					



**7.19**    **base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$z_{\text{re}}$	$7.78^{+0.58}_{-0.81}$	$H(0.51)$	$89.5 \pm 1.3$
$\Omega_c h^2$	$0.1184 \pm 0.0032$	$10^9 A_s$	$2.095^{+0.031}_{-0.040}$	$D_{\text{M}}(0.51)$	$1986 \pm 33$
$100\theta_{MC}$	$1.04108 \pm 0.00046$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.019$	$H(0.61)$	$95.1 \pm 1.4$
$\tau$	$0.0557^{+0.0052}_{-0.0083}$	$D_{40}$	$1226 \pm 14$	$D_{\text{M}}(0.61)$	$2311 \pm 37$
$N_{\text{eff}}$	$3.01 \pm 0.19$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.4 \pm 2.8$
$\ln(10^{10} A_s)$	$3.042^{+0.015}_{-0.019}$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5779 \pm 80$
$n_s$	$0.9660 \pm 0.0073$	$D_{1420}$	$817.3 \pm 5.0$	$f\sigma_8(0.15)$	$0.4543 \pm 0.0072$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.0 \pm 2.0$	$\sigma_8(0.15)$	$0.746 \pm 0.011$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9660 \pm 0.0073$	$f\sigma_8(0.38)$	$0.4727 \pm 0.0068$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2448 \pm 0.0026$	$\sigma_8(0.38)$	$0.6610 \pm 0.0097$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4714 \pm 0.0066$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.575 \pm 0.051$	$\sigma_8(0.51)$	$0.6186 \pm 0.0092$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.83 \pm 0.19$	$f\sigma_8(0.61)$	$0.4665 \pm 0.0065$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.76 \pm 0.38$	$\sigma_8(0.61)$	$0.5886 \pm 0.0088$
$A^{kSZ}$	$< 5.10$	$r_*$	$145.1 \pm 1.9$	$f\sigma_8(2.33)$	$0.2968 \pm 0.0045$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04129 \pm 0.00057$	$\sigma_8(2.33)$	$0.3061 \pm 0.0048$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.93 \pm 0.17$	$f_{2000}^{143}$	$29.0 \pm 3.1$
$H_0$	$67.5 \pm 1.2$	$z_{\text{drag}}$	$1059.74 \pm 0.73$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.3$
$\Omega_{\Lambda}$	$0.6893 \pm 0.0072$	$r_{\text{drag}}$	$147.8 \pm 1.9$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3107 \pm 0.0072$	$k_{\text{D}}$	$0.1403 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 2.0$
$\Omega_m h^2$	$0.1414 \pm 0.0033$	$100\theta_{\text{D}}$	$0.16070 \pm 0.00045$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^3$	$0.0954 \pm 0.0038$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{6\text{DF}}^2$	$0.060 \pm 0.073$
$\sigma_8$	$0.807 \pm 0.011$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.49$
$S_8$	$0.821 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0050$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0075$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6023 \pm 0.0086$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.68 \pm 0.89$	$H(0.38)$	$82.8 \pm 1.3$		
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.025$	$D_{\text{M}}(0.38)$	$1533 \pm 26$		

$\bar{\chi}_{\text{eff}}^2 = 11948.82$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.06$ ;  $R - 1 = 0.00628$



7.20 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_JLA\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensi

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$z_{\text{re}}$	$7.86^{+0.60}_{-0.73}$	$H(0.51)$	$89.4 \pm 1.3$
$\Omega_c h^2$	$0.1183 \pm 0.0030$	$10^9 A_s$	$2.099^{+0.029}_{-0.035}$	$D_{\text{M}}(0.51)$	$1989 \pm 31$
$100\theta_{MC}$	$1.04109 \pm 0.00044$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.017$	$H(0.61)$	$95.0 \pm 1.3$
$\tau$	$0.0565^{+0.0057}_{-0.0074}$	$D_{40}$	$1228 \pm 13$	$D_{\text{M}}(0.61)$	$2314 \pm 36$
$N_{\text{eff}}$	$2.99^{+0.17}_{-0.19}$	$D_{220}$	$5732 \pm 38$	$H(2.33)$	$235.2 \pm 2.7$
$\ln(10^{10} A_s)$	$3.044^{+0.014}_{-0.016}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5783 \pm 77$
$n_s$	$0.9655 \pm 0.0070$	$D_{1420}$	$817.7 \pm 5.0$	$f\sigma_8(0.15)$	$0.4550 \pm 0.0058$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$231.3 \pm 2.0$	$\sigma_8(0.15)$	$0.7460 \pm 0.0095$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9655 \pm 0.0070$	$f\sigma_8(0.38)$	$0.4733 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2446 \pm 0.0025$	$\sigma_8(0.38)$	$0.6614 \pm 0.0087$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2460 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4719 \pm 0.0055$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.572^{+0.046}_{-0.051}$	$\sigma_8(0.51)$	$0.6189 \pm 0.0083$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.85 \pm 0.18$	$f\sigma_8(0.61)$	$0.4670 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.75 \pm 0.36$	$\sigma_8(0.61)$	$0.5889 \pm 0.0080$
$A^{kSZ}$	$< 4.90$	$r_*$	$145.2 \pm 1.8$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04131 \pm 0.00054$	$\sigma_8(2.33)$	$0.3062 \pm 0.0045$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.16$	$f_{2000}^{143}$	$28.8 \pm 3.2$
$H_0$	$67.4 \pm 1.2$	$z_{\text{drag}}$	$1059.71 \pm 0.71$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.3$
$\Omega_\Lambda$	$0.6887 \pm 0.0067$	$r_{\text{drag}}$	$147.9 \pm 1.8$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3113 \pm 0.0067$	$k_{\text{D}}$	$0.1403 \pm 0.0013$	$\chi_{\text{lensing}}^2$	$9.14 \pm 0.71$
$\Omega_m h^2$	$0.1413 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16067 \pm 0.00043$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.0952^{+0.0033}_{-0.0038}$	$z_{\text{eq}}$	$3385 \pm 24$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.1$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$706.78 \pm 0.20$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8165 \pm 0.0046$	$\chi_{6\text{DF}}^2$	$0.060 \pm 0.071$
$\sigma_8 \Omega_m^{0.5}$	$0.4504 \pm 0.0061$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.26 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6030 \pm 0.0071$	$H(0.15)$	$72.6 \pm 1.2$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0084$	$D_{\text{M}}(0.15)$	$644 \pm 11$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.62 \pm 0.82$	$H(0.38)$	$82.7 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.021$	$D_{\text{M}}(0.38)$	$1535 \pm 25$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$

$$\bar{\chi}_{\text{eff}}^2 = 12664.58; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.66; R - 1 = 0.04058$$



7.21 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_po

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00019$	$z_{\text{re}}$	$7.89^{+0.61}_{-0.73}$	$H(0.51)$	$89.5 \pm 1.3$
$\Omega_c h^2$	$0.1183 \pm 0.0030$	$10^9 A_s$	$2.100^{+0.029}_{-0.035}$	$D_{\text{M}}(0.51)$	$1987 \pm 31$
$100\theta_{MC}$	$1.04109 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.017$	$H(0.61)$	$95.1 \pm 1.3$
$\tau$	$0.0568^{+0.0057}_{-0.0075}$	$D_{40}$	$1228 \pm 13$	$D_{\text{M}}(0.61)$	$2312 \pm 36$
$N_{\text{eff}}$	$3.00 \pm 0.18$	$D_{220}$	$5733 \pm 39$	$H(2.33)$	$235.3 \pm 2.7$
$\ln(10^{10} A_s)$	$3.045^{+0.014}_{-0.016}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5780 \pm 77$
$n_s$	$0.9658 \pm 0.0070$	$D_{1420}$	$817.6 \pm 5.0$	$f\sigma_8(0.15)$	$0.4546 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$231.2 \pm 2.0$	$\sigma_8(0.15)$	$0.7462 \pm 0.0096$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9658 \pm 0.0070$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2447 \pm 0.0025$	$\sigma_8(0.38)$	$0.6616 \pm 0.0088$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4718 \pm 0.0056$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.572 \pm 0.050$	$\sigma_8(0.51)$	$0.6192 \pm 0.0083$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.84 \pm 0.18$	$f\sigma_8(0.61)$	$0.4669 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.74 \pm 0.36$	$\sigma_8(0.61)$	$0.5892 \pm 0.0080$
$A^{kSZ}$	$< 5.03$	$r_*$	$145.1 \pm 1.8$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04130 \pm 0.00055$	$\sigma_8(2.33)$	$0.3064 \pm 0.0045$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.17$	$f_{2000}^{143}$	$28.9 \pm 3.1$
$H_0$	$67.5 \pm 1.2$	$z_{\text{drag}}$	$1059.75 \pm 0.71$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.3$
$\Omega_{\Lambda}$	$0.6894 \pm 0.0066$	$r_{\text{drag}}$	$147.8 \pm 1.9$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3106 \pm 0.0066$	$k_{\text{D}}$	$0.1403 \pm 0.0013$	$\chi_{\text{lensing}}^2$	$9.15 \pm 0.72$
$\Omega_m h^2$	$0.1413 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16068 \pm 0.00044$	$\chi_{\text{simall}}^2$	$314 \pm 200$
$\Omega_m h^3$	$0.0954 \pm 0.0036$	$z_{\text{eq}}$	$3382 \pm 24$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$1035.10 \pm 0.33$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.54$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0061$	$100\theta_{s,\text{eq}}$	$0.4513 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.03 \pm 0.66$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0072$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.9831 \pm 0.0084$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.70 \pm 0.81$	$H(0.38)$	$82.8 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.021$	$D_{\text{M}}(0.38)$	$1533 \pm 25$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$

$$\bar{\chi}_{\text{eff}}^2 = 12993.02; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.61; R - 1 = 0.01132$$



**7.22**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_BAO_post_lensing_zre6p5/base_nnu_plikHM_TTTEEE_lowl_lowE_BAO_post_lensing_zr`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$z_{\text{re}}$	$7.86^{+0.60}_{-0.73}$	$H(0.51)$	$89.3 \pm 1.3$
$\Omega_c h^2$	$0.1182 \pm 0.0030$	$10^9 A_s$	$2.098^{+0.029}_{-0.035}$	$D_{\text{M}}(0.51)$	$1990 \pm 32$
$100\theta_{MC}$	$1.04110 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.018$	$H(0.61)$	$94.9 \pm 1.3$
$\tau$	$0.0565^{+0.0056}_{-0.0075}$	$D_{40}$	$1229 \pm 13$	$D_{\text{M}}(0.61)$	$2316 \pm 37$
$N_{\text{eff}}$	$2.98 \pm 0.19$	$D_{220}$	$5732 \pm 39$	$H(2.33)$	$235.1 \pm 2.7$
$\ln(10^{10} A_s)$	$3.044^{+0.014}_{-0.016}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5788 \pm 78$
$n_s$	$0.9650 \pm 0.0071$	$D_{1420}$	$817.6 \pm 5.0$	$f\sigma_8(0.15)$	$0.4550 \pm 0.0059$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$231.2 \pm 2.0$	$\sigma_8(0.15)$	$0.7456 \pm 0.0096$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9650 \pm 0.0071$	$f\sigma_8(0.38)$	$0.4732 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2445 \pm 0.0026$	$\sigma_8(0.38)$	$0.6609 \pm 0.0088$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2458 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4718 \pm 0.0055$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.570 \pm 0.050$	$\sigma_8(0.51)$	$0.6185 \pm 0.0084$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.86 \pm 0.19$	$f\sigma_8(0.61)$	$0.4669 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.74 \pm 0.36$	$\sigma_8(0.61)$	$0.5885 \pm 0.0081$
$A^{kSZ}$	$< 4.99$	$r_*$	$145.3 \pm 1.8$	$f\sigma_8(2.33)$	$0.2967 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04133 \pm 0.00055$	$\sigma_8(2.33)$	$0.3059 \pm 0.0045$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.17$	$f_{2000}^{143}$	$28.8 \pm 3.1$
$H_0$	$67.3 \pm 1.2$	$z_{\text{drag}}$	$1059.68 \pm 0.72$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$\Omega_\Lambda$	$0.6883 \pm 0.0069$	$r_{\text{drag}}$	$148.0 \pm 1.9$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m$	$0.3117 \pm 0.0069$	$k_{\text{D}}$	$0.1402 \pm 0.0014$	$\chi_{\text{lensing}}^2$	$9.12 \pm 0.70$
$\Omega_m h^2$	$0.1412 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16065 \pm 0.00044$	$\chi_{\text{simall}}^2$	$313 \pm 200$
$\Omega_m h^3$	$0.0950^{+0.0034}_{-0.0038}$	$z_{\text{eq}}$	$3386 \pm 25$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\sigma_8$	$0.807 \pm 0.010$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.52$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8162 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$0.98 \pm 0.64$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0061$	$100\theta_{\text{s,eq}}$	$0.4509 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6029 \pm 0.0071$	$H(0.15)$	$72.6 \pm 1.2$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0085$	$D_{\text{M}}(0.15)$	$644 \pm 11$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.56 \pm 0.84$	$H(0.38)$	$82.6 \pm 1.3$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.021$	$D_{\text{M}}(0.38)$	$1537 \pm 25$		

$\bar{\chi}_{\text{eff}}^2 = 11957.94$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.65$ ;  $R - 1 = 0.01105$



**7.23** base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15\_zr

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00018$	$z_{\text{re}}$	$7.77^{+0.58}_{-0.80}$	$H(0.51)$	$89.3 \pm 1.1$
$\Omega_c h^2$	$0.1180 \pm 0.0027$	$10^9 A_s$	$2.093^{+0.030}_{-0.038}$	$D_{\text{M}}(0.51)$	$1991 \pm 27$
$100\theta_{MC}$	$1.04113 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.017$	$H(0.61)$	$94.9 \pm 1.1$
$\tau$	$0.0557^{+0.0052}_{-0.0082}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2317 \pm 31$
$N_{\text{eff}}$	$2.98 \pm 0.16$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.0 \pm 2.4$
$\ln(10^{10} A_s)$	$3.041^{+0.014}_{-0.018}$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5790 \pm 67$
$n_s$	$0.9651 \pm 0.0064$	$D_{1420}$	$817.4 \pm 5.0$	$f\sigma_8(0.15)$	$0.4539 \pm 0.0071$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.9$	$\sigma_8(0.15)$	$0.7443 \pm 0.0095$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9651 \pm 0.0064$	$f\sigma_8(0.38)$	$0.4722 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2444 \pm 0.0022$	$\sigma_8(0.38)$	$0.6598 \pm 0.0085$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4708 \pm 0.0062$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.569 \pm 0.045$	$\sigma_8(0.51)$	$0.6175 \pm 0.0081$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.86 \pm 0.16$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0060$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.72 \pm 0.34$	$\sigma_8(0.61)$	$0.5876 \pm 0.0077$
$A^{kSZ}$	$< 5.03$	$r_*$	$145.4 \pm 1.6$	$f\sigma_8(2.33)$	$0.2963 \pm 0.0040$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04136 \pm 0.00050$	$\sigma_8(2.33)$	$0.3055 \pm 0.0042$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.15$	$f_{2000}^{143}$	$28.8 \pm 3.0$
$H_0$	$67.3 \pm 1.0$	$z_{\text{drag}}$	$1059.65 \pm 0.63$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.2$
$\Omega_{\Lambda}$	$0.6888 \pm 0.0068$	$r_{\text{drag}}$	$148.1 \pm 1.6$	$f_{2000}^{217}$	$106.4 \pm 2.0$
$\Omega_m$	$0.3112 \pm 0.0068$	$k_{\text{D}}$	$0.1401 \pm 0.0012$	$\chi_{\text{small}}^2$	$313 \pm 200$
$\Omega_m h^2$	$0.1409 \pm 0.0028$	$100\theta_{\text{D}}$	$0.16064 \pm 0.00039$	$\chi_{\text{lowl}}^2$	$107 \pm 200$
$\Omega_m h^3$	$0.0949 \pm 0.0031$	$z_{\text{eq}}$	$3384 \pm 26$	$\chi_{\text{Aver15}}^2$	$0.34 \pm 0.48$
$\sigma_8$	$0.805 \pm 0.010$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.32 \pm 0.52$
$S_8$	$0.820 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8166 \pm 0.0048$	$\chi_{\text{MGS}}^2$	$1.01 \pm 0.66$
$\sigma_8 \Omega_m^{0.5}$	$0.4493 \pm 0.0074$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6016 \pm 0.0082$	$H(0.15)$	$72.6 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.010$	$D_{\text{M}}(0.15)$	$644.3 \pm 9.6$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$r_{\text{drag}} h$	$99.63 \pm 0.85$	$H(0.38)$	$82.6 \pm 1.1$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.025$	$D_{\text{M}}(0.38)$	$1537 \pm 22$		

$$\bar{\chi}_{\text{eff}}^2 = 11948.97; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.27; R - 1 = 0.00928$$



7.24 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00018$	$10^9 A_s$	$2.095^{+0.029}_{-0.037}$	$H(0.61)$	$95.0 \pm 1.1$
$\Omega_c h^2$	$0.1184 \pm 0.0026$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.016$	$D_M(0.61)$	$2313 \pm 30$
$100\theta_{MC}$	$1.04107 \pm 0.00040$	$D_{40}$	$1227 \pm 13$	$H(2.33)$	$235.3 \pm 2.2$
$\tau$	$0.0556^{+0.0052}_{-0.0081}$	$D_{220}$	$5726 \pm 39$	$D_M(2.33)$	$5780 \pm 63$
$N_{eff}$	$3.00 \pm 0.15$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4546 \pm 0.0069$
$\ln(10^{10} A_s)$	$3.042^{+0.014}_{-0.018}$	$D_{1420}$	$817.1 \pm 5.0$	$\sigma_8(0.15)$	$0.7455 \pm 0.0091$
$n_s$	$0.9658 \pm 0.0062$	$D_{2000}$	$231.0 \pm 1.8$	$f\sigma_8(0.38)$	$0.4729 \pm 0.0063$
$y_{cal}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9658 \pm 0.0062$	$\sigma_8(0.38)$	$0.6609 \pm 0.0082$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.2448 \pm 0.0021$	$f\sigma_8(0.51)$	$0.4716 \pm 0.0060$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.2461 \pm 0.0021$	$\sigma_8(0.51)$	$0.6185 \pm 0.0078$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.578 \pm 0.041$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0058$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.84 \pm 0.15$	$\sigma_8(0.61)$	$0.5886 \pm 0.0074$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.78 \pm 0.31$	$f\sigma_8(2.33)$	$0.2968 \pm 0.0038$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.1 \pm 1.5$	$\sigma_8(2.33)$	$0.3060^{+0.0038}_{-0.0042}$
$A^{kSZ}$	$< 5.12$	$100\theta_*$	$1.04129 \pm 0.00047$	$f_{2000}^{143}$	$29.1 \pm 3.0$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.94 \pm 0.14$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.1$
$c_{217}$	$0.9996 \pm 0.0019$	$z_{\text{drag}}$	$1059.70 \pm 0.63$	$f_{2000}^{217}$	$106.6 \pm 2.0$
$H_0$	$67.4 \pm 1.0$	$r_{\text{drag}}$	$147.8 \pm 1.5$	$\chi^2_{\text{simall}}$	$314 \pm 200$
$\Omega_\Lambda$	$0.6889 \pm 0.0068$	$k_D$	$0.1403 \pm 0.0011$	$\chi^2_{\text{lowl}}$	$106 \pm 200$
$\Omega_m$	$0.3111 \pm 0.0068$	$100\theta_D$	$0.16071 \pm 0.00035$	$\chi^2_{\text{Aver15}}$	$0.35 \pm 0.48$
$\Omega_m h^2$	$0.1414 \pm 0.0027$	$z_{\text{eq}}$	$3383 \pm 26$	$\chi^2_{\text{Cooke17}}$	$0.37 \pm 0.45$
$\Omega_m h^3$	$0.0953 \pm 0.0030$	$k_{\text{eq}}$	$0.01030 \pm 0.00011$	$\chi^2_{6\text{DF}}$	$0.31 \pm 0.52$
$\sigma_8$	$0.8068 \pm 0.0098$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0048$	$\chi^2_{\text{MGS}}$	$1.02 \pm 0.66$
$S_8$	$0.822 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0024$	$\chi^2_{\text{DR12BAO}}$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0072$	$H(0.15)$	$72.7 \pm 1.0$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6025 \pm 0.0079$	$D_M(0.15)$	$643.2 \pm 9.3$	$\chi^2_{\text{BAO}}$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$H(0.38)$	$82.8 \pm 1.0$	$\chi^2_{\text{CMB}}$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.63 \pm 0.85$	$D_M(0.38)$	$1534 \pm 21$	$\chi^2_{\text{Abund}}$	$0.73 \pm 0.61$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.025$	$H(0.51)$	$89.4 \pm 1.0$		
$z_{\text{re}}$	$7.78^{+0.58}_{-0.80}$	$D_M(0.51)$	$1987 \pm 26$		

$\bar{\chi}^2_{\text{eff}} = 11949.15$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.10$ ;  $R - 1 = 0.01020$



**7.25**    **base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Riess18/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_Riess18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02263 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.409 \pm 0.030$	$H(0.38)$	$85.2 \pm 1.2$
$\Omega_c h^2$	$0.1228 \pm 0.0030$	$z_{\text{re}}$	$7.93 \pm 0.82$	$D_{\text{M}}(0.38)$	$1485 \pm 24$
$100\theta_{MC}$	$1.04061 \pm 0.00041$	$10^9 A_s$	$2.124 \pm 0.039$	$H(0.51)$	$92.0 \pm 1.2$
$\tau$	$0.0567 \pm 0.0082$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$D_{\text{M}}(0.51)$	$1925 \pm 30$
$N_{\text{eff}}$	$3.34 \pm 0.17$	$D_{40}$	$1211 \pm 14$	$H(0.61)$	$97.6 \pm 1.2$
$\ln(10^{10} A_s)$	$3.056 \pm 0.018$	$D_{220}$	$5733 \pm 40$	$D_{\text{M}}(0.61)$	$2242 \pm 34$
$n_s$	$0.9787 \pm 0.0071$	$D_{810}$	$2541 \pm 14$	$H(2.33)$	$239.6 \pm 2.5$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$815.8 \pm 5.1$	$D_{\text{M}}(2.33)$	$5636 \pm 69$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.4 \pm 2.0$	$f\sigma_8(0.15)$	$0.4538 \pm 0.0084$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9787 \pm 0.0071$	$\sigma_8(0.15)$	$0.758 \pm 0.010$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2493 \pm 0.0023$	$f\sigma_8(0.38)$	$0.4751 \pm 0.0074$
$A_{100}^{PS}$	$255 \pm 28$	$Y_P^{\text{BBN}}$	$0.2507 \pm 0.0023$	$\sigma_8(0.38)$	$0.6737 \pm 0.0091$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.638^{+0.047}_{-0.054}$	$f\sigma_8(0.51)$	$0.4752 \pm 0.0069$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$13.50 \pm 0.16$	$\sigma_8(0.51)$	$0.6310 \pm 0.0086$
$A^{kSZ}$	$< 5.96$	$z_*$	$1090.12 \pm 0.38$	$f\sigma_8(0.61)$	$0.4711 \pm 0.0066$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$142.1 \pm 1.6$	$\sigma_8(0.61)$	$0.6008 \pm 0.0083$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_*$	$1.04058 \pm 0.00050$	$f\sigma_8(2.33)$	$0.3034 \pm 0.0043$
$H_0$	$69.9 \pm 1.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.66 \pm 0.15$	$\sigma_8(2.33)$	$0.3134 \pm 0.0046$
$\Omega_\Lambda$	$0.7007 \pm 0.0086$	$z_{\text{drag}}$	$1060.97 \pm 0.64$	$f_{2000}^{143}$	$31.4 \pm 3.2$
$\Omega_m$	$0.2993 \pm 0.0086$	$r_{\text{drag}}$	$144.7 \pm 1.6$	$f_{2000}^{143 \times 217}$	$33.6 \pm 2.2$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$k_{\text{D}}$	$0.1426 \pm 0.0012$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m h^3$	$0.1021 \pm 0.0035$	$100\theta_{\text{D}}$	$0.16136^{+0.00040}_{-0.00046}$	$\chi_{\text{small}}^2$	$397.4 \pm 2.2$
$\sigma_8$	$0.819 \pm 0.011$	$z_{\text{eq}}$	$3344 \pm 33$	$\chi_{\text{lowl}}^2$	$21.79 \pm 0.87$
$S_8$	$0.818 \pm 0.016$	$k_{\text{eq}}$	$0.01041 \pm 0.00012$	$\chi_{\text{H073p45}}^2$	$5.2 \pm 3.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4483 \pm 0.0088$	$100\theta_{\text{eq}}$	$0.8246 \pm 0.0064$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6061 \pm 0.0092$	$100\theta_{\text{s,eq}}$	$0.4551 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7362 \pm 5000$
$\sigma_8/h^{0.5}$	$0.980 \pm 0.012$	$H(0.15)$	$75.1 \pm 1.2$		
$r_{\text{drag}} h$	$101.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$621 \pm 11$		

Best-fit  $\chi_{\text{eff}}^2 = 11928.99$ ;  $\Delta\chi_{\text{eff}}^2 = 9152.66$ ;  $\bar{\chi}_{\text{eff}}^2 = 11951.65$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9148.78$ ;  $R - 1 = 0.01475$   
 $\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.09 ( $\Delta$  -0.53) commander\_dx12\_v3.2.29: 21.47 ( $\Delta$  -0.46) CamSpec like\_10.7HM\_1400\_unified: 11505.09 Hubble - H073p45: 3.91 ( $\Delta$  -2.24)



**7.26**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_BAO/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18_post_BAO`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02260 \pm 0.00017$	$z_{\text{re}}$	$7.89 \pm 0.81$	$H(0.51)$	$91.8 \pm 1.1$
$\Omega_c h^2$	$0.1229 \pm 0.0030$	$10^9 A_s$	$2.122 \pm 0.038$	$D_{\text{M}}(0.51)$	$1931 \pm 26$
$100\theta_{\text{MC}}$	$1.04060 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$H(0.61)$	$97.4 \pm 1.2$
$\tau$	$0.0563 \pm 0.0080$	$D_{40}$	$1213 \pm 13$	$D_{\text{M}}(0.61)$	$2248 \pm 30$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$239.5 \pm 2.5$
$\ln(10^{10} A_s)$	$3.055 \pm 0.018$	$D_{810}$	$2541 \pm 14$	$D_{\text{M}}(2.33)$	$5645 \pm 65$
$n_s$	$0.9774 \pm 0.0062$	$D_{1420}$	$815.7 \pm 5.1$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0072$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.4 \pm 2.0$	$\sigma_8(0.15)$	$0.758 \pm 0.010$
$A_{217}^{\text{CIB}}$	$45 \pm 8$	$n_{s,0.002}$	$0.9774 \pm 0.0062$	$f\sigma_8(0.38)$	$0.4761 \pm 0.0068$
$\xi^{tSZ-\text{CIB}}$	—	$Y_P$	$0.2491 \pm 0.0022$	$\sigma_8(0.38)$	$0.6732 \pm 0.0090$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2504 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4759 \pm 0.0065$
$A_{100}^{\text{PS}}$	$255 \pm 28$	$10^5 D/H$	$2.637^{+0.047}_{-0.054}$	$\sigma_8(0.51)$	$0.6305 \pm 0.0085$
$A_{143}^{\text{PS}}$	$45 \pm 9$	Age/Gyr	$13.52 \pm 0.16$	$f\sigma_8(0.61)$	$0.4717 \pm 0.0064$
$A_{217}^{\text{PS}}$	$108^{+20}_{-10}$	$z_*$	$1090.14 \pm 0.38$	$\sigma_8(0.61)$	$0.6002 \pm 0.0081$
$A^{kSZ}$	$< 5.95$	$r_*$	$142.2 \pm 1.6$	$f\sigma_8(2.33)$	$0.3030 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04059 \pm 0.00050$	$\sigma_8(2.33)$	$0.3129 \pm 0.0044$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.67 \pm 0.15$	$f_{2000}^{143}$	$31.3 \pm 3.1$
$H_0$	$69.6 \pm 1.0$	$z_{\text{drag}}$	$1060.89 \pm 0.61$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.2$
$\Omega_{\Lambda}$	$0.6986 \pm 0.0062$	$r_{\text{drag}}$	$144.8 \pm 1.6$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m$	$0.3014 \pm 0.0062$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$\chi_{\text{simall}}^2$	$397.3 \pm 2.1$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$100\theta_{\text{D}}$	$0.16133^{+0.00040}_{-0.00045}$	$\chi_{\text{lowl}}^2$	$21.91 \pm 0.78$
$\Omega_m h^3$	$0.1018 \pm 0.0034$	$z_{\text{eq}}$	$3352 \pm 25$	$\chi_{\text{H073p45}}^2$	$5.7 \pm 2.9$
$\sigma_8$	$0.819 \pm 0.011$	$k_{\text{eq}}$	$0.01042 \pm 0.00012$	$\chi_{6\text{DF}}^2$	$0.032 \pm 0.045$
$S_8$	$0.821 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8230 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.94 \pm 0.52$
$\sigma_8 \Omega_m^{0.5}$	$0.4499 \pm 0.0075$	$100\theta_{\text{s,eq}}$	$0.4543 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$3.87 \pm 0.63$
$\sigma_8 \Omega_m^{0.25}$	$0.6071 \pm 0.0085$	$H(0.15)$	$74.9 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$623.4 \pm 9.0$	$\chi_{\text{BAO}}^2$	$5.84 \pm 0.79$
$r_{\text{drag}} h$	$100.79 \pm 0.82$	$H(0.38)$	$85.0 \pm 1.1$	$\chi_{\text{CMB}}^2$	$7361 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.414 \pm 0.026$	$D_{\text{M}}(0.38)$	$1489 \pm 21$		

$\bar{\chi}_{\text{eff}}^2 = 11957.32$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.21$ ;  $R - 1 = 0.01940$



**7.27**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_BAO_Pantheon18/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18_post_B`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02261 \pm 0.00017$	$z_{\text{re}}$	$7.89 \pm 0.81$	$H(0.51)$	$91.8 \pm 1.1$
$\Omega_c h^2$	$0.1229 \pm 0.0030$	$10^9 A_s$	$2.122 \pm 0.038$	$D_{\text{M}}(0.51)$	$1930 \pm 26$
$100\theta_{MC}$	$1.04060 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$H(0.61)$	$97.4 \pm 1.1$
$\tau$	$0.0563 \pm 0.0080$	$D_{40}$	$1213 \pm 13$	$D_{\text{M}}(0.61)$	$2247 \pm 29$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$239.6 \pm 2.5$
$\ln(10^{10} A_s)$	$3.055 \pm 0.018$	$D_{810}$	$2541 \pm 14$	$D_{\text{M}}(2.33)$	$5645 \pm 65$
$n_s$	$0.9775 \pm 0.0061$	$D_{1420}$	$815.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.4551 \pm 0.0071$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.4 \pm 2.0$	$\sigma_8(0.15)$	$0.758 \pm 0.010$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9775 \pm 0.0061$	$f\sigma_8(0.38)$	$0.4760 \pm 0.0068$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2491 \pm 0.0022$	$\sigma_8(0.38)$	$0.6733 \pm 0.0090$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2504 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4758 \pm 0.0065$
$A_{100}^{PS}$	$255 \pm 28$	$10^5 D/H$	$2.637^{+0.047}_{-0.054}$	$\sigma_8(0.51)$	$0.6305 \pm 0.0085$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.52 \pm 0.15$	$f\sigma_8(0.61)$	$0.4716 \pm 0.0064$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.14 \pm 0.38$	$\sigma_8(0.61)$	$0.6003 \pm 0.0081$
$A^{kSZ}$	$< 5.96$	$r_*$	$142.2 \pm 1.6$	$f\sigma_8(2.33)$	$0.3030 \pm 0.0041$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04059 \pm 0.00050$	$\sigma_8(2.33)$	$0.3129 \pm 0.0044$
$c_{217}$	$0.9998^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.67 \pm 0.15$	$f_{2000}^{143}$	$31.3 \pm 3.1$
$H_0$	$69.7 \pm 1.0$	$z_{\text{drag}}$	$1060.90 \pm 0.60$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.2$
$\Omega_\Lambda$	$0.6988 \pm 0.0060$	$r_{\text{drag}}$	$144.8 \pm 1.6$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m$	$0.3012 \pm 0.0060$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$\chi_{\text{simall}}^2$	$397.3 \pm 2.1$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$100\theta_{\text{D}}$	$0.16133^{+0.00040}_{-0.00044}$	$\chi_{\text{lowl}}^2$	$21.89 \pm 0.77$
$\Omega_m h^3$	$0.1018 \pm 0.0034$	$z_{\text{eq}}$	$3352 \pm 24$	$\chi_{\text{H073p45}}^2$	$5.6 \pm 2.8$
$\sigma_8$	$0.819 \pm 0.011$	$k_{\text{eq}}$	$0.01042 \pm 0.00012$	$\chi_{\text{JLA}}^2$	$1034.82 \pm 0.12$
$S_8$	$0.821 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8231 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.043$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4543 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.95 \pm 0.50$
$\sigma_8 \Omega_m^{0.25}$	$0.6070 \pm 0.0085$	$H(0.15)$	$74.9 \pm 1.0$	$\chi_{\text{DR12BAO}}^2$	$3.83 \pm 0.58$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$623.3 \pm 8.8$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$r_{\text{drag}} h$	$100.81 \pm 0.79$	$H(0.38)$	$85.0 \pm 1.1$	$\chi_{\text{BAO}}^2$	$5.82 \pm 0.75$
$\langle d^2 \rangle^{1/2}$	$2.413 \pm 0.025$	$D_{\text{M}}(0.38)$	$1489 \pm 20$	$\chi_{\text{CMB}}^2$	$7361 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 12992.06$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.20$ ;  $R - 1 = 0.01918$



**7.28**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_lensing/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18_post_lensing`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02262 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.417 \pm 0.023$	$H(0.38)$	$85.0 \pm 1.2$
$\Omega_c h^2$	$0.1227 \pm 0.0028$	$z_{\text{re}}$	$8.07 \pm 0.76$	$D_{\text{M}}(0.38)$	$1489 \pm 23$
$100\theta_{MC}$	$1.04061 \pm 0.00041$	$10^9 A_s$	$2.130 \pm 0.035$	$H(0.51)$	$91.8 \pm 1.2$
$\tau$	$0.0581 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.016$	$D_{\text{M}}(0.51)$	$1930 \pm 29$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{40}$	$1214 \pm 13$	$H(0.61)$	$97.4 \pm 1.2$
$\ln(10^{10} A_s)$	$3.059 \pm 0.016$	$D_{220}$	$5737 \pm 39$	$D_{\text{M}}(0.61)$	$2247 \pm 33$
$n_s$	$0.9774 \pm 0.0069$	$D_{810}$	$2542 \pm 14$	$H(2.33)$	$239.5 \pm 2.4$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{1420}$	$816.2 \pm 5.1$	$D_{\text{M}}(2.33)$	$5645 \pm 69$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.6 \pm 2.0$	$f\sigma_8(0.15)$	$0.4554 \pm 0.0066$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9774 \pm 0.0069$	$\sigma_8(0.15)$	$0.7593 \pm 0.0090$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2491 \pm 0.0023$	$f\sigma_8(0.38)$	$0.4764 \pm 0.0058$
$A_{100}^{PS}$	$255 \pm 28$	$Y_P^{\text{BBN}}$	$0.2504 \pm 0.0023$	$\sigma_8(0.38)$	$0.6743 \pm 0.0083$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.634^{+0.046}_{-0.053}$	$f\sigma_8(0.51)$	$0.4763 \pm 0.0055$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.52 \pm 0.16$	$\sigma_8(0.51)$	$0.6315 \pm 0.0079$
$A^{kSZ}$	$< 5.86$	$z_*$	$1090.11 \pm 0.37$	$f\sigma_8(0.61)$	$0.4721 \pm 0.0053$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$142.2 \pm 1.6$	$\sigma_8(0.61)$	$0.6012 \pm 0.0077$
$c_{217}$	$0.9997^{+0.0022}_{-0.0024}$	$100\theta_*$	$1.04060 \pm 0.00049$	$f\sigma_8(2.33)$	$0.3036 \pm 0.0040$
$H_0$	$69.7 \pm 1.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.67 \pm 0.14$	$\sigma_8(2.33)$	$0.3135 \pm 0.0044$
$\Omega_\Lambda$	$0.6992 \pm 0.0079$	$z_{\text{drag}}$	$1060.91 \pm 0.63$	$f_{2000}^{143}$	$31.2 \pm 3.1$
$\Omega_m$	$0.3008 \pm 0.0079$	$r_{\text{drag}}$	$144.8 \pm 1.6$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.2$
$\Omega_m h^2$	$0.1460 \pm 0.0029$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$f_{2000}^{217}$	$108.0 \pm 2.1$
$\Omega_m h^3$	$0.1017 \pm 0.0034$	$100\theta_{\text{D}}$	$0.16131^{+0.00040}_{-0.00045}$	$\chi^2_{\text{lensing}}$	$9.73 \pm 0.87$
$\sigma_8$	$0.8205 \pm 0.0095$	$z_{\text{eq}}$	$3350 \pm 30$	$\chi^2_{\text{simall}}$	$397.6 \pm 2.3$
$S_8$	$0.821 \pm 0.013$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$21.97 \pm 0.85$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0069$	$100\theta_{\text{eq}}$	$0.8235 \pm 0.0058$	$\chi^2_{\text{H073p45}}$	$5.7 \pm 3.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6076 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4545 \pm 0.0030$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.9830 \pm 0.0091$	$H(0.15)$	$74.9 \pm 1.2$	$\chi^2_{\text{CMB}}$	$7371 \pm 5000$
$r_{\text{drag}} h$	$100.9 \pm 1.0$	$D_{\text{M}}(0.15)$	$623 \pm 10$		

$\bar{\chi}^2_{\text{eff}} = 11961.40$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9149.48$ ;  $R - 1 = 0.02109$



**7.29**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_BAO_lensing/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18_post_BAO.l`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02260 \pm 0.00017$	$z_{\text{re}}$	$8.02 \pm 0.74$	$H(0.51)$	$91.6 \pm 1.1$
$\Omega_c h^2$	$0.1227 \pm 0.0028$	$10^9 A_s$	$2.128 \pm 0.033$	$D_{\text{M}}(0.51)$	$1934 \pm 26$
$100\theta_{MC}$	$1.04062 \pm 0.00041$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.016$	$H(0.61)$	$97.3 \pm 1.1$
$\tau$	$0.0576 \pm 0.0075$	$D_{40}$	$1215 \pm 13$	$D_{\text{M}}(0.61)$	$2251 \pm 30$
$N_{\text{eff}}$	$3.31 \pm 0.17$	$D_{220}$	$5735 \pm 39$	$H(2.33)$	$239.4 \pm 2.4$
$\ln(10^{10} A_s)$	$3.057 \pm 0.016$	$D_{810}$	$2542 \pm 14$	$D_{\text{M}}(2.33)$	$5652 \pm 64$
$n_s$	$0.9766 \pm 0.0061$	$D_{1420}$	$816.1 \pm 5.1$	$f\sigma_8(0.15)$	$0.4561 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$229.6 \pm 2.0$	$\sigma_8(0.15)$	$0.7588 \pm 0.0088$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9766 \pm 0.0061$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0055$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2489 \pm 0.0022$	$\sigma_8(0.38)$	$0.6737 \pm 0.0080$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2502 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4765 \pm 0.0054$
$A_{100}^{PS}$	$255 \pm 28$	$10^5 D/H$	$2.633^{+0.046}_{-0.053}$	$\sigma_8(0.51)$	$0.6309 \pm 0.0076$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.53 \pm 0.15$	$f\sigma_8(0.61)$	$0.4722 \pm 0.0053$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1090.12 \pm 0.37$	$\sigma_8(0.61)$	$0.6006 \pm 0.0073$
$A^{kSZ}$	$< 5.85$	$r_*$	$142.3 \pm 1.5$	$f\sigma_8(2.33)$	$0.3032 \pm 0.0038$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04062 \pm 0.00049$	$\sigma_8(2.33)$	$0.3130 \pm 0.0041$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.68 \pm 0.14$	$f_{2000}^{143}$	$31.2 \pm 3.1$
$H_0$	$69.5 \pm 1.0$	$z_{\text{drag}}$	$1060.85 \pm 0.60$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.2$
$\Omega_{\Lambda}$	$0.6979 \pm 0.0060$	$r_{\text{drag}}$	$144.9 \pm 1.6$	$f_{2000}^{217}$	$108.0 \pm 2.1$
$\Omega_m$	$0.3021 \pm 0.0060$	$k_{\text{D}}$	$0.1424 \pm 0.0012$	$\chi^2_{\text{lensing}}$	$9.64 \pm 0.77$
$\Omega_m h^2$	$0.1459 \pm 0.0029$	$100\theta_{\text{D}}$	$0.16129^{+0.00039}_{-0.00044}$	$\chi^2_{\text{simall}}$	$397.5 \pm 2.1$
$\Omega_m h^3$	$0.1014 \pm 0.0033$	$z_{\text{eq}}$	$3355 \pm 23$	$\chi^2_{\text{lowl}}$	$22.05 \pm 0.79$
$\sigma_8$	$0.8201 \pm 0.0094$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi^2_{\text{H073p45}}$	$6.0 \pm 3.0$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8225 \pm 0.0044$	$\chi^2_{6\text{DF}}$	$0.027 \pm 0.038$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0061$	$100\theta_{s,\text{eq}}$	$0.4540 \pm 0.0022$	$\chi^2_{\text{MGS}}$	$1.88 \pm 0.49$
$\sigma_8 \Omega_m^{0.25}$	$0.6080 \pm 0.0070$	$H(0.15)$	$74.8 \pm 1.0$	$\chi^2_{\text{DR12BAO}}$	$3.85 \pm 0.60$
$\sigma_8/h^{0.5}$	$0.9837 \pm 0.0086$	$D_{\text{M}}(0.15)$	$624.5 \pm 9.0$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.6$
$r_{\text{drag}} h$	$100.70 \pm 0.78$	$H(0.38)$	$84.9 \pm 1.1$	$\chi^2_{\text{CMB}}$	$7370 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.420 \pm 0.021$	$D_{\text{M}}(0.38)$	$1492 \pm 20$	$\chi^2_{\text{BAO}}$	$5.76 \pm 0.67$

$\bar{\chi}^2_{\text{eff}} = 11966.84$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9149.67$ ;  $R - 1 = 0.02276$



**7.30**    **base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Riess18\_post\_BAO\_lensing\_Pantheon18/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_Riess18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02260 \pm 0.00017$	$10^9 A_s$	$2.128 \pm 0.033$	$H(0.61)$	$97.3 \pm 1.1$
$\Omega_c h^2$	$0.1227 \pm 0.0028$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.016$	$D_M(0.61)$	$2251 \pm 29$
$100\theta_{MC}$	$1.04062 \pm 0.00041$	$D_{40}$	$1215 \pm 13$	$H(2.33)$	$239.4 \pm 2.4$
$\tau$	$0.0577 \pm 0.0074$	$D_{220}$	$5736 \pm 39$	$D_M(2.33)$	$5651 \pm 64$
$N_{eff}$	$3.31 \pm 0.16$	$D_{810}$	$2542 \pm 14$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0058$
$\ln(10^{10} A_s)$	$3.058 \pm 0.016$	$D_{1420}$	$816.1 \pm 5.1$	$\sigma_8(0.15)$	$0.7589 \pm 0.0088$
$n_s$	$0.9767 \pm 0.0060$	$D_{2000}$	$229.6 \pm 2.0$	$f\sigma_8(0.38)$	$0.4767 \pm 0.0055$
$y_{cal}$	$1.0008 \pm 0.0025$	$n_{s,0.002}$	$0.9767 \pm 0.0060$	$\sigma_8(0.38)$	$0.6738 \pm 0.0080$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P$	$0.2489 \pm 0.0021$	$f\sigma_8(0.51)$	$0.4765 \pm 0.0054$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.2502 \pm 0.0022$	$\sigma_8(0.51)$	$0.6310 \pm 0.0076$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.633^{+0.046}_{-0.053}$	$f\sigma_8(0.61)$	$0.4722 \pm 0.0053$
$A_{100}^{PS}$	$255 \pm 28$	Age/Gyr	$13.53 \pm 0.15$	$\sigma_8(0.61)$	$0.6007 \pm 0.0073$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.12 \pm 0.37$	$f\sigma_8(2.33)$	$0.3032 \pm 0.0038$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$r_*$	$142.3 \pm 1.5$	$\sigma_8(2.33)$	$0.3131 \pm 0.0040$
$A^{kSZ}$	$< 5.85$	$100\theta_*$	$1.04061 \pm 0.00049$	$f_{2000}^{143}$	$31.2 \pm 3.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.68 \pm 0.14$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.2$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1060.86 \pm 0.59$	$f_{2000}^{217}$	$108.0 \pm 2.1$
$H_0$	$69.5 \pm 1.0$	$r_{\text{drag}}$	$144.9 \pm 1.6$	$\chi^2_{\text{lensing}}$	$9.64 \pm 0.77$
$\Omega_\Lambda$	$0.6981 \pm 0.0058$	$k_D$	$0.1424 \pm 0.0012$	$\chi^2_{\text{small}}$	$397.5 \pm 2.1$
$\Omega_m$	$0.3019 \pm 0.0058$	$100\theta_D$	$0.16129^{+0.00039}_{-0.00044}$	$\chi^2_{\text{lowl}}$	$22.03 \pm 0.78$
$\Omega_m h^2$	$0.1459 \pm 0.0029$	$z_{\text{eq}}$	$3354 \pm 22$	$\chi^2_{\text{H073p45}}$	$5.9 \pm 2.9$
$\Omega_m h^3$	$0.1015 \pm 0.0033$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi^2_{\text{JLA}}$	$1034.82 \pm 0.12$
$\sigma_8$	$0.8202 \pm 0.0094$	$100\theta_{\text{eq}}$	$0.8226 \pm 0.0043$	$\chi^2_{6\text{DF}}$	$0.026 \pm 0.037$
$S_8$	$0.823 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4541 \pm 0.0022$	$\chi^2_{\text{MGS}}$	$1.90 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0060$	$H(0.15)$	$74.8 \pm 1.0$	$\chi^2_{\text{DR12BAO}}$	$3.81 \pm 0.55$
$\sigma_8 \Omega_m^{0.25}$	$0.6079 \pm 0.0070$	$D_M(0.15)$	$624.3 \pm 8.8$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0085$	$H(0.38)$	$84.9 \pm 1.1$	$\chi^2_{\text{CMB}}$	$7370 \pm 5000$
$r_{\text{drag}} h$	$100.73 \pm 0.75$	$D_M(0.38)$	$1491 \pm 20$	$\chi^2_{\text{BAO}}$	$5.74 \pm 0.64$
$\langle d^2 \rangle^{1/2}$	$2.419 \pm 0.021$	$H(0.51)$	$91.7 \pm 1.1$		
$z_{\text{re}}$	$8.03 \pm 0.73$	$D_M(0.51)$	$1933 \pm 25$		

Best-fit  $\chi^2_{\text{eff}} = 12978.85$ ;  $\Delta\chi^2_{\text{eff}} = 9153.73$ ;  $\bar{\chi}^2_{\text{eff}} = 13001.59$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9149.66$ ;  $R - 1 = 0.02251$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.89 ( $\Delta$  0.14) DR12BAO: 3.43 ( $\Delta$  -0.07) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.46 ( $\Delta$  0.41) small\_100x143\_offlike5\_EE\_Aplanck: 396.28 ( $\Delta$  -0.32) commander\_dx12\_v3.2\_29: 21.82 ( $\Delta$  -0.29) CamSpec like\_10.7HM\_1400\_unified: 11503.77 Hubble - H073p45: 5.08 ( $\Delta$  -1.56) SN - JLA Pantheon18: 1034.74 ( $\Delta$  -0.02)



**7.31 base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Riess18\_post\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_Riess18\_post\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02264 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.410 \pm 0.029$	$H(0.38)$	$85.2 \pm 1.2$
$\Omega_c h^2$	$0.1228 \pm 0.0030$	$z_{\text{re}}$	$8.00^{+0.68}_{-0.82}$	$D_{\text{M}}(0.38)$	$1484 \pm 24$
$100\theta_{MC}$	$1.04061 \pm 0.00041$	$10^9 A_s$	$2.127^{+0.032}_{-0.040}$	$H(0.51)$	$92.0 \pm 1.2$
$\tau$	$0.0574^{+0.0063}_{-0.0085}$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$D_{\text{M}}(0.51)$	$1925 \pm 30$
$N_{\text{eff}}$	$3.34 \pm 0.17$	$D_{40}$	$1211 \pm 14$	$H(0.61)$	$97.6 \pm 1.2$
$\ln(10^{10} A_s)$	$3.057^{+0.015}_{-0.019}$	$D_{220}$	$5733 \pm 40$	$D_{\text{M}}(0.61)$	$2241 \pm 34$
$n_s$	$0.9788 \pm 0.0070$	$D_{810}$	$2541 \pm 14$	$H(2.33)$	$239.6 \pm 2.5$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$815.8 \pm 5.1$	$D_{\text{M}}(2.33)$	$5635 \pm 69$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.4 \pm 2.0$	$f\sigma_8(0.15)$	$0.4540 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9788 \pm 0.0070$	$\sigma_8(0.15)$	$0.7590 \pm 0.0098$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2494 \pm 0.0023$	$f\sigma_8(0.38)$	$0.4754 \pm 0.0073$
$A_{100}^{PS}$	$255 \pm 28$	$Y_P^{\text{BBN}}$	$0.2507 \pm 0.0023$	$\sigma_8(0.38)$	$0.6742 \pm 0.0088$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.638^{+0.047}_{-0.053}$	$f\sigma_8(0.51)$	$0.4754 \pm 0.0068$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.50 \pm 0.16$	$\sigma_8(0.51)$	$0.6315 \pm 0.0084$
$A^{kSZ}$	$< 5.96$	$z_*$	$1090.11 \pm 0.38$	$f\sigma_8(0.61)$	$0.4714 \pm 0.0065$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$142.1 \pm 1.6$	$\sigma_8(0.61)$	$0.6012 \pm 0.0080$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_*$	$1.04058 \pm 0.00050$	$f\sigma_8(2.33)$	$0.3036 \pm 0.0041$
$H_0$	$69.9 \pm 1.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.66 \pm 0.15$	$\sigma_8(2.33)$	$0.3136 \pm 0.0044$
$\Omega_\Lambda$	$0.7008 \pm 0.0086$	$z_{\text{drag}}$	$1060.98 \pm 0.64$	$f_{2000}^{143}$	$31.4 \pm 3.2$
$\Omega_m$	$0.2992 \pm 0.0086$	$r_{\text{drag}}$	$144.6 \pm 1.6$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.2$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$k_{\text{D}}$	$0.1426 \pm 0.0012$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m h^3$	$0.1022 \pm 0.0035$	$100\theta_{\text{D}}$	$0.16136^{+0.00040}_{-0.00045}$	$\chi_{\text{small}}^2$	$397.4 \pm 2.2$
$\sigma_8$	$0.820 \pm 0.011$	$z_{\text{eq}}$	$3344 \pm 33$	$\chi_{\text{lowl}}^2$	$21.78 \pm 0.87$
$S_8$	$0.819 \pm 0.016$	$k_{\text{eq}}$	$0.01041 \pm 0.00012$	$\chi_{\text{H073p45}}^2$	$5.1 \pm 3.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4485 \pm 0.0088$	$100\theta_{\text{eq}}$	$0.8247 \pm 0.0064$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6064 \pm 0.0091$	$100\theta_{\text{s,eq}}$	$0.4551 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7362 \pm 5000$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.012$	$H(0.15)$	$75.2 \pm 1.2$		
$r_{\text{drag}} h$	$101.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$621 \pm 11$		

$\bar{\chi}_{\text{eff}}^2 = 11951.46$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9148.72$ ;  $R - 1 = 0.01420$



**7.32** base\_nnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Riess18\_post\_BAO\_zre6p5/base\_nnu\_plikHM\_TTTEEE\_lowl\_lowE\_Riess18\_post\_BAO\_z

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02260 \pm 0.00017$	$z_{\text{re}}$	$7.97^{+0.65}_{-0.83}$	$H(0.51)$	$91.8 \pm 1.1$
$\Omega_c h^2$	$0.1229 \pm 0.0030$	$10^9 A_s$	$2.125^{+0.031}_{-0.039}$	$D_{\text{M}}(0.51)$	$1930 \pm 26$
$100\theta_{MC}$	$1.04060 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$H(0.61)$	$97.4 \pm 1.2$
$\tau$	$0.0570^{+0.0060}_{-0.0085}$	$D_{40}$	$1213 \pm 13$	$D_{\text{M}}(0.61)$	$2248 \pm 30$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$239.6 \pm 2.5$
$\ln(10^{10} A_s)$	$3.056^{+0.015}_{-0.018}$	$D_{810}$	$2541 \pm 14$	$D_{\text{M}}(2.33)$	$5645 \pm 65$
$n_s$	$0.9775 \pm 0.0062$	$D_{1420}$	$815.7 \pm 5.1$	$f\sigma_8(0.15)$	$0.4555 \pm 0.0071$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.4 \pm 2.0$	$\sigma_8(0.15)$	$0.7588 \pm 0.0098$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9775 \pm 0.0062$	$f\sigma_8(0.38)$	$0.4764 \pm 0.0067$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2491 \pm 0.0022$	$\sigma_8(0.38)$	$0.6737 \pm 0.0087$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2504 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4762 \pm 0.0064$
$A_{100}^{PS}$	$255 \pm 28$	$10^5 D/H$	$2.637^{+0.047}_{-0.053}$	$\sigma_8(0.51)$	$0.6310 \pm 0.0082$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.52 \pm 0.16$	$f\sigma_8(0.61)$	$0.4720 \pm 0.0062$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1090.14 \pm 0.38$	$\sigma_8(0.61)$	$0.6007 \pm 0.0079$
$A^{kSZ}$	$< 5.94$	$r_*$	$142.2 \pm 1.6$	$f\sigma_8(2.33)$	$0.3033 \pm 0.0040$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04059 \pm 0.00050$	$\sigma_8(2.33)$	$0.3131 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.67 \pm 0.15$	$f_{2000}^{143}$	$31.3 \pm 3.1$
$H_0$	$69.6 \pm 1.0$	$z_{\text{drag}}$	$1060.90 \pm 0.61$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.2$
$\Omega_{\Lambda}$	$0.6987 \pm 0.0062$	$r_{\text{drag}}$	$144.8 \pm 1.6$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m$	$0.3013 \pm 0.0062$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$\chi_{\text{simall}}^2$	$397.3 \pm 2.1$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$100\theta_{\text{D}}$	$0.16133^{+0.00040}_{-0.00044}$	$\chi_{\text{lowl}}^2$	$21.91 \pm 0.79$
$\Omega_m h^3$	$0.1018 \pm 0.0034$	$z_{\text{eq}}$	$3352 \pm 25$	$\chi_{\text{H073p45}}^2$	$5.6 \pm 2.9$
$\sigma_8$	$0.820 \pm 0.011$	$k_{\text{eq}}$	$0.01042 \pm 0.00012$	$\chi_{6\text{DF}}^2$	$0.032 \pm 0.045$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8230 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.95 \pm 0.52$
$\sigma_8 \Omega_m^{0.5}$	$0.4501 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4543 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$3.86 \pm 0.62$
$\sigma_8 \Omega_m^{0.25}$	$0.6075 \pm 0.0084$	$H(0.15)$	$74.9 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$D_{\text{M}}(0.15)$	$623.3 \pm 9.0$	$\chi_{\text{BAO}}^2$	$5.84 \pm 0.79$
$r_{\text{drag}} h$	$100.80 \pm 0.81$	$H(0.38)$	$85.0 \pm 1.1$	$\chi_{\text{CMB}}^2$	$7361 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.025$	$D_{\text{M}}(0.38)$	$1489 \pm 20$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.12; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.13; R - 1 = 0.01923$$



**7.33**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_BAO_Pantheon18_zre6p5/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02261 \pm 0.00017$	$z_{\text{re}}$	$7.97^{+0.65}_{-0.83}$	$H(0.51)$	$91.8 \pm 1.1$
$\Omega_c h^2$	$0.1229 \pm 0.0030$	$10^9 A_s$	$2.125^{+0.031}_{-0.039}$	$D_{\text{M}}(0.51)$	$1930 \pm 26$
$100\theta_{MC}$	$1.04060 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.017$	$H(0.61)$	$97.4 \pm 1.1$
$\tau$	$0.0571^{+0.0060}_{-0.0085}$	$D_{40}$	$1213 \pm 13$	$D_{\text{M}}(0.61)$	$2247 \pm 29$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{220}$	$5731 \pm 40$	$H(2.33)$	$239.6 \pm 2.5$
$\ln(10^{10} A_s)$	$3.056^{+0.015}_{-0.018}$	$D_{810}$	$2541 \pm 14$	$D_{\text{M}}(2.33)$	$5644 \pm 65$
$n_s$	$0.9776 \pm 0.0061$	$D_{1420}$	$815.7 \pm 5.1$	$f\sigma_8(0.15)$	$0.4554 \pm 0.0070$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.4 \pm 2.0$	$\sigma_8(0.15)$	$0.7588 \pm 0.0098$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9776 \pm 0.0061$	$f\sigma_8(0.38)$	$0.4763 \pm 0.0066$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2491 \pm 0.0022$	$\sigma_8(0.38)$	$0.6738 \pm 0.0087$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2505 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4761 \pm 0.0064$
$A_{100}^{PS}$	$255 \pm 28$	$10^5 D/H$	$2.637^{+0.047}_{-0.053}$	$\sigma_8(0.51)$	$0.6310 \pm 0.0082$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.52 \pm 0.15$	$f\sigma_8(0.61)$	$0.4720 \pm 0.0062$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1090.14 \pm 0.38$	$\sigma_8(0.61)$	$0.6007 \pm 0.0079$
$A^{kSZ}$	$< 5.95$	$r_*$	$142.2 \pm 1.6$	$f\sigma_8(2.33)$	$0.3033 \pm 0.0040$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04059 \pm 0.00050$	$\sigma_8(2.33)$	$0.3132 \pm 0.0042$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.66 \pm 0.15$	$f_{2000}^{143}$	$31.3 \pm 3.1$
$H_0$	$69.7 \pm 1.0$	$z_{\text{drag}}$	$1060.90 \pm 0.60$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.2$
$\Omega_\Lambda$	$0.6988 \pm 0.0060$	$r_{\text{drag}}$	$144.7 \pm 1.6$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m$	$0.3012 \pm 0.0060$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$\chi_{\text{simall}}^2$	$397.3 \pm 2.1$
$\Omega_m h^2$	$0.1461 \pm 0.0030$	$100\theta_{\text{D}}$	$0.16133^{+0.00040}_{-0.00044}$	$\chi_{\text{lowl}}^2$	$21.90 \pm 0.77$
$\Omega_m h^3$	$0.1018 \pm 0.0034$	$z_{\text{eq}}$	$3351 \pm 24$	$\chi_{\text{H073p45}}^2$	$5.6 \pm 2.8$
$\sigma_8$	$0.820 \pm 0.011$	$k_{\text{eq}}$	$0.01042 \pm 0.00012$	$\chi_{\text{JLA}}^2$	$1034.82 \pm 0.12$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8232 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.030 \pm 0.043$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4544 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.96 \pm 0.50$
$\sigma_8 \Omega_m^{0.25}$	$0.6074 \pm 0.0083$	$H(0.15)$	$74.9 \pm 1.0$	$\chi_{\text{DR12BAO}}^2$	$3.83 \pm 0.58$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$D_{\text{M}}(0.15)$	$623.2 \pm 8.8$	$\chi_{\text{prior}}^2$	$9.9 \pm 4.6$
$r_{\text{drag}} h$	$100.82 \pm 0.78$	$H(0.38)$	$85.0 \pm 1.1$	$\chi_{\text{BAO}}^2$	$5.82 \pm 0.75$
$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.024$	$D_{\text{M}}(0.38)$	$1489 \pm 20$	$\chi_{\text{CMB}}^2$	$7361 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 12991.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.12; R - 1 = 0.01898$$



**7.34**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_lensing_zre6p5/base_nnu_plikHM_TTTEEE_lowl_lowE_Riess18_post_lensing`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02262 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.418 \pm 0.023$	$H(0.38)$	$85.1 \pm 1.2$
$\Omega_c h^2$	$0.1227 \pm 0.0028$	$z_{\text{re}}$	$8.11^{+0.68}_{-0.77}$	$D_{\text{M}}(0.38)$	$1488 \pm 23$
$100\theta_{MC}$	$1.04061 \pm 0.00041$	$10^9 A_s$	$2.132^{+0.030}_{-0.036}$	$H(0.51)$	$91.8 \pm 1.2$
$\tau$	$0.0585^{+0.0065}_{-0.0081}$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.016$	$D_{\text{M}}(0.51)$	$1930 \pm 29$
$N_{\text{eff}}$	$3.32 \pm 0.17$	$D_{40}$	$1214 \pm 13$	$H(0.61)$	$97.4 \pm 1.2$
$\ln(10^{10} A_s)$	$3.059^{+0.014}_{-0.017}$	$D_{220}$	$5737 \pm 40$	$D_{\text{M}}(0.61)$	$2247 \pm 33$
$n_s$	$0.9775 \pm 0.0069$	$D_{810}$	$2542 \pm 14$	$H(2.33)$	$239.5 \pm 2.4$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{1420}$	$816.2 \pm 5.1$	$D_{\text{M}}(2.33)$	$5645 \pm 68$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.6 \pm 2.0$	$f\sigma_8(0.15)$	$0.4555 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9775 \pm 0.0069$	$\sigma_8(0.15)$	$0.7596 \pm 0.0088$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.2491 \pm 0.0023$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0058$
$A_{100}^{PS}$	$255 \pm 28$	$Y_P^{\text{BBN}}$	$0.2504 \pm 0.0023$	$\sigma_8(0.38)$	$0.6745 \pm 0.0082$
$A_{143}^{PS}$	$45 \pm 9$	$10^5 D/H$	$2.634^{+0.046}_{-0.053}$	$f\sigma_8(0.51)$	$0.4764 \pm 0.0055$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.52 \pm 0.16$	$\sigma_8(0.51)$	$0.6318 \pm 0.0078$
$A^{kSZ}$	$< 5.86$	$z_*$	$1090.10 \pm 0.37$	$f\sigma_8(0.61)$	$0.4722 \pm 0.0053$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$142.2 \pm 1.5$	$\sigma_8(0.61)$	$0.6014 \pm 0.0075$
$c_{217}$	$0.9997^{+0.0022}_{-0.0024}$	$100\theta_*$	$1.04060 \pm 0.00049$	$f\sigma_8(2.33)$	$0.3037 \pm 0.0040$
$H_0$	$69.7 \pm 1.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.67 \pm 0.14$	$\sigma_8(2.33)$	$0.3136 \pm 0.0043$
$\Omega_\Lambda$	$0.6994 \pm 0.0079$	$z_{\text{drag}}$	$1060.92 \pm 0.63$	$f_{2000}^{143}$	$31.2 \pm 3.1$
$\Omega_m$	$0.3006 \pm 0.0079$	$r_{\text{drag}}$	$144.8 \pm 1.6$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.2$
$\Omega_m h^2$	$0.1460 \pm 0.0029$	$k_{\text{D}}$	$0.1425 \pm 0.0012$	$f_{2000}^{217}$	$108.0 \pm 2.1$
$\Omega_m h^3$	$0.1018 \pm 0.0034$	$100\theta_{\text{D}}$	$0.16131^{+0.00040}_{-0.00045}$	$\chi^2_{\text{lensing}}$	$9.71 \pm 0.84$
$\sigma_8$	$0.8208 \pm 0.0093$	$z_{\text{eq}}$	$3349 \pm 30$	$\chi^2_{\text{simall}}$	$397.6 \pm 2.3$
$S_8$	$0.822 \pm 0.013$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$21.97 \pm 0.85$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0069$	$100\theta_{\text{eq}}$	$0.8236 \pm 0.0058$	$\chi^2_{\text{H073p45}}$	$5.6 \pm 3.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6077 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4546 \pm 0.0029$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.9832 \pm 0.0091$	$H(0.15)$	$75.0 \pm 1.2$	$\chi^2_{\text{CMB}}$	$7371 \pm 5000$
$r_{\text{drag}} h$	$100.9 \pm 1.0$	$D_{\text{M}}(0.15)$	$623 \pm 10$		

$\bar{\chi}^2_{\text{eff}} = 11961.28$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9149.45$ ;  $R - 1 = 0.02116$



**7.35**    `base_nnu_CamSpecHM_TTTEEE_lowl_lowE_Riess18_post_BAO_lensing_Pantheon18_zre6p5/base_nnu_plikHM_TTTEEE_lowl_lowE`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02260 \pm 0.00017$	$10^9 A_s$	$2.129^{+0.029}_{-0.034}$	$H(0.61)$	$97.3 \pm 1.1$
$\Omega_c h^2$	$0.1227 \pm 0.0028$	$10^9 A_s e^{-2\tau}$	$1.896 \pm 0.016$	$D_M(0.61)$	$2251 \pm 29$
$100\theta_{MC}$	$1.04062 \pm 0.00041$	$D_{40}$	$1215 \pm 13$	$H(2.33)$	$239.4 \pm 2.4$
$\tau$	$0.0580^{+0.0063}_{-0.0078}$	$D_{220}$	$5735 \pm 39$	$D_M(2.33)$	$5651 \pm 64$
$N_{eff}$	$3.31 \pm 0.16$	$D_{810}$	$2542 \pm 13$	$f\sigma_8(0.15)$	$0.4561 \pm 0.0058$
$\ln(10^{10} A_s)$	$3.058^{+0.014}_{-0.016}$	$D_{1420}$	$816.1 \pm 5.1$	$\sigma_8(0.15)$	$0.7591 \pm 0.0087$
$n_s$	$0.9768 \pm 0.0060$	$D_{2000}$	$229.6 \pm 2.0$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0055$
$y_{cal}$	$1.0008 \pm 0.0025$	$n_{s,0.002}$	$0.9768 \pm 0.0060$	$\sigma_8(0.38)$	$0.6740 \pm 0.0079$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P$	$0.2489 \pm 0.0021$	$f\sigma_8(0.51)$	$0.4766 \pm 0.0053$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.2502 \pm 0.0022$	$\sigma_8(0.51)$	$0.6312 \pm 0.0075$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.633^{+0.046}_{-0.053}$	$f\sigma_8(0.61)$	$0.4723 \pm 0.0052$
$A_{100}^{PS}$	$255 \pm 28$	Age/Gyr	$13.53 \pm 0.15$	$\sigma_8(0.61)$	$0.6009 \pm 0.0072$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.11 \pm 0.37$	$f\sigma_8(2.33)$	$0.3033 \pm 0.0037$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$r_*$	$142.3 \pm 1.5$	$\sigma_8(2.33)$	$0.3132 \pm 0.0040$
$A^{kSZ}$	$< 5.85$	$100\theta_*$	$1.04061 \pm 0.00049$	$f_{2000}^{143}$	$31.2 \pm 3.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.68 \pm 0.14$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.2$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1060.86 \pm 0.59$	$f_{2000}^{217}$	$108.0 \pm 2.1$
$H_0$	$69.5 \pm 1.0$	$r_{\text{drag}}$	$144.9 \pm 1.6$	$\chi^2_{\text{lensing}}$	$9.62 \pm 0.73$
$\Omega_\Lambda$	$0.6982 \pm 0.0057$	$k_D$	$0.1424 \pm 0.0012$	$\chi^2_{\text{small}}$	$397.5 \pm 2.1$
$\Omega_m$	$0.3018 \pm 0.0057$	$100\theta_D$	$0.16129^{+0.00039}_{-0.00044}$	$\chi^2_{\text{lowl}}$	$22.03 \pm 0.78$
$\Omega_m h^2$	$0.1459 \pm 0.0029$	$z_{\text{eq}}$	$3354 \pm 22$	$\chi^2_{\text{H073p45}}$	$5.9 \pm 2.9$
$\Omega_m h^3$	$0.1015 \pm 0.0033$	$k_{\text{eq}}$	$0.01041 \pm 0.00011$	$\chi^2_{\text{JLA}}$	$1034.82 \pm 0.12$
$\sigma_8$	$0.8204 \pm 0.0092$	$100\theta_{\text{eq}}$	$0.8227 \pm 0.0042$	$\chi^2_{6\text{DF}}$	$0.026 \pm 0.037$
$S_8$	$0.823 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4541 \pm 0.0022$	$\chi^2_{\text{MGS}}$	$1.91 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0060$	$H(0.15)$	$74.8 \pm 1.0$	$\chi^2_{\text{DR12BAO}}$	$3.81 \pm 0.54$
$\sigma_8 \Omega_m^{0.25}$	$0.6081 \pm 0.0069$	$D_M(0.15)$	$624.2 \pm 8.8$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.9839 \pm 0.0084$	$H(0.38)$	$84.9 \pm 1.1$	$\chi^2_{\text{CMB}}$	$7370 \pm 5000$
$r_{\text{drag}} h$	$100.74 \pm 0.75$	$D_M(0.38)$	$1491 \pm 20$	$\chi^2_{\text{BAO}}$	$5.74 \pm 0.64$
$\langle d^2 \rangle^{1/2}$	$2.420 \pm 0.020$	$H(0.51)$	$91.7 \pm 1.1$		
$z_{\text{re}}$	$8.07^{+0.66}_{-0.74}$	$D_M(0.51)$	$1933 \pm 25$		

$\bar{\chi}^2_{\text{eff}} = 13001.46$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9149.61$ ;  $R - 1 = 0.02255$



## 8 nnu+meffsterile

### 8.1 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00017$	$\sigma_8/h^{0.5}$	$0.952^{+0.035}_{-0.019}$	$H(0.15)$	$72.68^{+0.54}_{-0.82}$
$\Omega_c h^2$	$0.1199^{+0.0035}_{-0.0023}$	$r_{\text{drag}} h$	$98.2^{+1.5}_{-1.3}$	$D_{\text{M}}(0.15)$	$643.9^{+7.9}_{-5.9}$
$100\theta_{MC}$	$1.04071^{+0.00037}_{-0.00032}$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.030$	$H(0.38)$	$83.05^{+0.34}_{-0.70}$
$\tau$	$0.0537 \pm 0.0080$	$z_{\text{re}}$	$7.65 \pm 0.82$	$D_{\text{M}}(0.38)$	$1533^{+17}_{-11}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.321$	$10^9 A_s$	$2.103 \pm 0.036$	$H(0.51)$	$89.93^{+0.25}_{-0.65}$
$N_{\text{eff}}$	$3.164^{+0.027}_{-0.12}$	$10^9 A_s e^{-2\tau}$	$1.888 \pm 0.014$	$D_{\text{M}}(0.51)$	$1984^{+20}_{-12}$
$\ln(10^{10} A_s)$	$3.046 \pm 0.017$	$D_{40}$	$1226 \pm 15$	$H(0.61)$	$95.67^{+0.21}_{-0.65}$
$n_s$	$0.9664^{+0.0050}_{-0.0064}$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2308^{+22}_{-13}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{810}$	$2539 \pm 14$	$H(2.33)$	$238.6^{+1.3}_{-2.2}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.5 \pm 5.0$	$D_{\text{M}}(2.33)$	$5737^{+37}_{-12}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.5 \pm 1.8$	$f\sigma_8(0.15)$	$0.447^{+0.015}_{-0.010}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.9664^{+0.0050}_{-0.0064}$	$\sigma_8(0.15)$	$0.720^{+0.029}_{-0.016}$
$A_{100}^{PS}$	$253 \pm 28$	$Y_P$	$0.24696^{+0.00046}_{-0.0015}$	$f\sigma_8(0.38)$	$0.462^{+0.016}_{-0.0098}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24830^{+0.00046}_{-0.0015}$	$\sigma_8(0.38)$	$0.637^{+0.026}_{-0.015}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.622^{+0.031}_{-0.042}$	$f\sigma_8(0.51)$	$0.460^{+0.017}_{-0.0097}$
$A^{kSZ}$	$< 5.72$	Age/Gyr	$13.733^{+0.089}_{-0.028}$	$\sigma_8(0.51)$	$0.596^{+0.025}_{-0.014}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1090.21^{+0.30}_{-0.36}$	$f\sigma_8(0.61)$	$0.454^{+0.017}_{-0.0095}$
$c_{217}$	$0.9997 \pm 0.0019$	$r_*$	$143.3^{+1.2}_{-0.57}$	$\sigma_8(0.61)$	$0.567^{+0.024}_{-0.013}$
$H_0$	$67.25^{+0.69}_{-0.91}$	$100\theta_*$	$1.04084^{+0.00041}_{-0.00033}$	$f\sigma_8(2.33)$	$0.286^{+0.012}_{-0.0068}$
$\Omega_\Lambda$	$0.677^{+0.013}_{-0.0099}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.77^{+0.11}_{-0.053}$	$\sigma_8(2.33)$	$0.294^{+0.013}_{-0.0072}$
$\Omega_m$	$0.3226^{+0.0099}_{-0.013}$	$z_{\text{drag}}$	$1060.26^{+0.38}_{-0.51}$	$f_{2000}^{143}$	$31.1 \pm 3.0$
$\Omega_m h^2$	$0.1458^{+0.0019}_{-0.0030}$	$r_{\text{drag}}$	$146.0^{+1.2}_{-0.58}$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.1$
$\Omega_\nu h^2$	$0.00351^{+0.00061}_{-0.0029}$	$k_{\text{D}}$	$0.14171^{+0.00055}_{-0.00098}$	$f_{2000}^{217}$	$108.0 \pm 2.0$
$\Omega_m h^3$	$0.09804^{+0.00062}_{-0.0020}$	$100\theta_{\text{D}}$	$0.16098^{+0.00020}_{-0.00032}$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\sigma_8$	$0.781^{+0.031}_{-0.017}$	$z_{\text{eq}}$	$3347^{+66}_{-31}$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$S_8$	$0.809^{+0.027}_{-0.019}$	$k_{\text{eq}}$	$0.01033^{+0.00019}_{-0.00011}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.6$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.015}_{-0.011}$	$100\theta_{\text{eq}}$	$0.8252^{+0.0057}_{-0.014}$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.588^{+0.021}_{-0.012}$	$100\theta_{\text{s,eq}}$	$0.4556^{+0.0029}_{-0.0074}$		

Best-fit  $\chi_{\text{eff}}^2 = 11921.37$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.70$ ;  $\bar{\chi}_{\text{eff}}^2 = 11945.34$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.57$ ;  $R - 1 = 0.02481$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.18 ( $\Delta$  -1.41) commander\_dx12.v3.2.29: 23.00 ( $\Delta$  -0.01) CamSpec like\_10.7HM\_1400\_unified: 11499.96



## 8.2 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00016$	$\sigma_8/h^{0.5}$	$0.956^{+0.029}_{-0.017}$	$H(0.15)$	$72.60^{+0.50}_{-0.75}$
$\Omega_c h^2$	$0.1201^{+0.0033}_{-0.0022}$	$r_{\text{drag}} h$	$98.1^{+1.4}_{-1.2}$	$D_M(0.15)$	$644.7^{+7.2}_{-5.4}$
$100\theta_{MC}$	$1.04070^{+0.00036}_{-0.00031}$	$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.024$	$H(0.38)$	$82.98^{+0.30}_{-0.63}$
$\tau$	$0.0548^{+0.0069}_{-0.0079}$	$z_{\text{re}}$	$7.76 \pm 0.77$	$D_M(0.38)$	$1535^{+15}_{-10}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.308$	$10^9 A_s$	$2.109^{+0.030}_{-0.034}$	$H(0.51)$	$89.86^{+0.22}_{-0.59}$
$N_{eff}$	$3.156^{+0.024}_{-0.11}$	$10^9 A_s e^{-2\tau}$	$1.890 \pm 0.013$	$D_M(0.51)$	$1986^{+18}_{-11}$
$\ln(10^{10} A_s)$	$3.048^{+0.014}_{-0.016}$	$D_{40}$	$1229 \pm 13$	$H(0.61)$	$95.61^{+0.18}_{-0.59}$
$n_s$	$0.9658^{+0.0047}_{-0.0060}$	$D_{220}$	$5727 \pm 40$	$D_M(0.61)$	$2310^{+20}_{-12}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2540 \pm 14$	$H(2.33)$	$238.6^{+1.2}_{-2.1}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.7 \pm 5.0$	$D_M(2.33)$	$5740^{+34}_{-9.9}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.15)$	$0.449^{+0.012}_{-0.0084}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.9658^{+0.0047}_{-0.0060}$	$\sigma_8(0.15)$	$0.723^{+0.024}_{-0.015}$
$A_{100}^{PS}$	$253 \pm 28$	$Y_P$	$0.24686^{+0.00043}_{-0.0014}$	$f\sigma_8(0.38)$	$0.464^{+0.013}_{-0.0085}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24819^{+0.00043}_{-0.0014}$	$\sigma_8(0.38)$	$0.640^{+0.022}_{-0.014}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.622^{+0.030}_{-0.041}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0085}$
$A^{kSZ}$	$< 5.60$	Age/Gyr	$13.740^{+0.081}_{-0.024}$	$\sigma_8(0.51)$	$0.598^{+0.021}_{-0.014}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1090.22^{+0.29}_{-0.36}$	$f\sigma_8(0.61)$	$0.456^{+0.014}_{-0.0086}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$143.4^{+1.1}_{-0.54}$	$\sigma_8(0.61)$	$0.569^{+0.020}_{-0.013}$
$H_0$	$67.16^{+0.63}_{-0.83}$	$100\theta_*$	$1.04083^{+0.00039}_{-0.00031}$	$f\sigma_8(2.33)$	$0.287^{+0.010}_{-0.0068}$
$\Omega_\Lambda$	$0.677^{+0.012}_{-0.0094}$	$D_M(z_*)/\text{Gpc}$	$13.77^{+0.10}_{-0.051}$	$\sigma_8(2.33)$	$0.295^{+0.011}_{-0.0073}$
$\Omega_m$	$0.3234^{+0.0094}_{-0.012}$	$z_{\text{drag}}$	$1060.23^{+0.37}_{-0.48}$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$\Omega_m h^2$	$0.1458^{+0.0018}_{-0.0029}$	$r_{\text{drag}}$	$146.0^{+1.1}_{-0.55}$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\nu h^2$	$0.00334^{+0.00071}_{-0.0027}$	$k_D$	$0.14168^{+0.00053}_{-0.00092}$	$f_{2000}^{217}$	$108.0 \pm 2.0$
$\Omega_m h^3$	$0.09792^{+0.00056}_{-0.0019}$	$100\theta_D$	$0.16097^{+0.00020}_{-0.00031}$	$\chi_{\text{lensing}}^2$	$9.14 \pm 0.83$
$\sigma_8$	$0.784^{+0.026}_{-0.016}$	$z_{\text{eq}}$	$3355^{+58}_{-26}$	$\chi_{\text{small}}^2$	$1021 \pm 900$
$S_8$	$0.813^{+0.022}_{-0.016}$	$k_{\text{eq}}$	$0.01035^{+0.00017}_{-0.00010}$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.0$
$\sigma_8 \Omega_m^{0.5}$	$0.445^{+0.012}_{-0.0086}$	$100\theta_{\text{eq}}$	$0.8236^{+0.0049}_{-0.012}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.591^{+0.017}_{-0.011}$	$100\theta_{s,\text{eq}}$	$0.4548^{+0.0025}_{-0.0064}$	$\chi_{\text{CMB}}^2$	$7369 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11954.00; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.80; R - 1 = 0.02353$$



### 8.3 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00017$	$\sigma_8/h^{0.5}$	$0.953^{+0.035}_{-0.019}$	$H(0.15)$	$72.70^{+0.54}_{-0.83}$
$\Omega_c h^2$	$0.1199^{+0.0035}_{-0.0023}$	$r_{\text{drag}} h$	$98.2^{+1.5}_{-1.3}$	$D_{\text{M}}(0.15)$	$643.8^{+8.0}_{-5.9}$
$100\theta_{MC}$	$1.04071^{+0.00037}_{-0.00032}$	$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.030$	$H(0.38)$	$83.07^{+0.33}_{-0.70}$
$\tau$	$0.0549^{+0.0052}_{-0.0084}$	$z_{\text{re}}$	$7.78^{+0.58}_{-0.83}$	$D_{\text{M}}(0.38)$	$1533^{+17}_{-11}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.319$	$10^9 A_s$	$2.108^{+0.026}_{-0.037}$	$H(0.51)$	$89.94^{+0.25}_{-0.66}$
$N_{\text{eff}}$	$3.165^{+0.027}_{-0.12}$	$10^9 A_s e^{-2\tau}$	$1.888 \pm 0.014$	$D_{\text{M}}(0.51)$	$1984^{+20}_{-12}$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.017}$	$D_{40}$	$1226 \pm 15$	$H(0.61)$	$95.68^{+0.21}_{-0.65}$
$n_s$	$0.9666^{+0.0051}_{-0.0064}$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2307^{+22}_{-13}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{810}$	$2539 \pm 14$	$H(2.33)$	$238.6^{+1.3}_{-2.3}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.5 \pm 5.0$	$D_{\text{M}}(2.33)$	$5737^{+38}_{-12}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.15)$	$0.447^{+0.015}_{-0.010}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.9666^{+0.0051}_{-0.0064}$	$\sigma_8(0.15)$	$0.721^{+0.029}_{-0.016}$
$A_{100}^{PS}$	$253 \pm 28$	$Y_P$	$0.24698^{+0.00047}_{-0.0015}$	$f\sigma_8(0.38)$	$0.463^{+0.016}_{-0.0097}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24831^{+0.00047}_{-0.0015}$	$\sigma_8(0.38)$	$0.638^{+0.026}_{-0.014}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.622^{+0.031}_{-0.042}$	$f\sigma_8(0.51)$	$0.460^{+0.016}_{-0.0095}$
$A^{kSZ}$	$< 5.69$	Age/Gyr	$13.731^{+0.090}_{-0.028}$	$\sigma_8(0.51)$	$0.597^{+0.025}_{-0.013}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_*$	$1090.20^{+0.30}_{-0.36}$	$f\sigma_8(0.61)$	$0.455^{+0.017}_{-0.0094}$
$c_{217}$	$0.9997^{+0.0022}_{-0.0024}$	$r_*$	$143.3^{+1.2}_{-0.58}$	$\sigma_8(0.61)$	$0.568^{+0.024}_{-0.013}$
$H_0$	$67.27^{+0.69}_{-0.92}$	$100\theta_*$	$1.04084^{+0.00041}_{-0.00033}$	$f\sigma_8(2.33)$	$0.286^{+0.012}_{-0.0066}$
$\Omega_\Lambda$	$0.678^{+0.013}_{-0.0099}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.77^{+0.11}_{-0.054}$	$\sigma_8(2.33)$	$0.294^{+0.013}_{-0.0071}$
$\Omega_m$	$0.3224^{+0.0099}_{-0.013}$	$z_{\text{drag}}$	$1060.27^{+0.38}_{-0.51}$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$\Omega_m h^2$	$0.1458^{+0.0019}_{-0.0030}$	$r_{\text{drag}}$	$146.0^{+1.2}_{-0.59}$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\nu h^2$	$0.00350^{+0.00061}_{-0.0029}$	$k_{\text{D}}$	$0.14171^{+0.00056}_{-0.00098}$	$f_{2000}^{217}$	$108.0 \pm 2.0$
$\Omega_m h^3$	$0.09806^{+0.00063}_{-0.0020}$	$100\theta_{\text{D}}$	$0.16098^{+0.00020}_{-0.00032}$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\sigma_8$	$0.781^{+0.031}_{-0.017}$	$z_{\text{eq}}$	$3347^{+66}_{-31}$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$S_8$	$0.810^{+0.027}_{-0.019}$	$k_{\text{eq}}$	$0.01033^{+0.00019}_{-0.00011}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.6$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.015}_{-0.010}$	$100\theta_{\text{eq}}$	$0.8253^{+0.0057}_{-0.014}$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.589^{+0.021}_{-0.012}$	$100\theta_{\text{s,eq}}$	$0.4557^{+0.0029}_{-0.0073}$		

$$\bar{\chi}_{\text{eff}}^2 = 11945.16; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.59; R - 1 = 0.02558$$



8.4 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_post\_

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$\sigma_8/h^{0.5}$	$0.956^{+0.029}_{-0.017}$	$H(0.15)$	$72.62^{+0.50}_{-0.75}$
$\Omega_c h^2$	$0.1201^{+0.0033}_{-0.0022}$	$r_{\text{drag}} h$	$98.1^{+1.4}_{-1.2}$	$D_M(0.15)$	$644.5^{+7.2}_{-5.4}$
$100\theta_{MC}$	$1.04070^{+0.00036}_{-0.00031}$	$\langle d^2 \rangle^{1/2}$	$2.447 \pm 0.023$	$H(0.38)$	$83.00^{+0.30}_{-0.63}$
$\tau$	$0.0556^{+0.0055}_{-0.0081}$	$z_{\text{re}}$	$7.84^{+0.60}_{-0.80}$	$D_M(0.38)$	$1534^{+15}_{-10}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.308$	$10^9 A_s$	$2.112^{+0.025}_{-0.034}$	$H(0.51)$	$89.87^{+0.22}_{-0.59}$
$N_{eff}$	$3.158^{+0.024}_{-0.11}$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.013$	$D_M(0.51)$	$1986^{+18}_{-11}$
$\ln(10^{10} A_s)$	$3.050^{+0.012}_{-0.016}$	$D_{40}$	$1228 \pm 13$	$H(0.61)$	$95.62^{+0.18}_{-0.59}$
$n_s$	$0.9659^{+0.0047}_{-0.0060}$	$D_{220}$	$5727 \pm 40$	$D_M(0.61)$	$2309^{+20}_{-12}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2540 \pm 14$	$H(2.33)$	$238.6^{+1.2}_{-2.1}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.7 \pm 5.1$	$D_M(2.33)$	$5740^{+34}_{-10}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.15)$	$0.449^{+0.012}_{-0.0084}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.9659^{+0.0047}_{-0.0060}$	$\sigma_8(0.15)$	$0.723^{+0.025}_{-0.015}$
$A_{100}^{PS}$	$253 \pm 28$	$Y_P$	$0.24687^{+0.00044}_{-0.0014}$	$f\sigma_8(0.38)$	$0.465^{+0.013}_{-0.0084}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24821^{+0.00044}_{-0.0014}$	$\sigma_8(0.38)$	$0.640^{+0.022}_{-0.014}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.621^{+0.030}_{-0.041}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0085}$
$A^{kSZ}$	$< 5.59$	Age/Gyr	$13.739^{+0.082}_{-0.024}$	$\sigma_8(0.51)$	$0.599^{+0.021}_{-0.013}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1090.21^{+0.29}_{-0.36}$	$f\sigma_8(0.61)$	$0.456^{+0.014}_{-0.0085}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$143.4^{+1.1}_{-0.55}$	$\sigma_8(0.61)$	$0.569^{+0.020}_{-0.013}$
$H_0$	$67.18^{+0.63}_{-0.83}$	$100\theta_*$	$1.04083^{+0.00039}_{-0.00031}$	$f\sigma_8(2.33)$	$0.287^{+0.010}_{-0.0067}$
$\Omega_\Lambda$	$0.677^{+0.012}_{-0.0093}$	$D_M(z_*)/\text{Gpc}$	$13.77^{+0.10}_{-0.051}$	$\sigma_8(2.33)$	$0.295^{+0.011}_{-0.0072}$
$\Omega_m$	$0.3232^{+0.0093}_{-0.012}$	$z_{\text{drag}}$	$1060.23^{+0.38}_{-0.48}$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$\Omega_m h^2$	$0.1458^{+0.0018}_{-0.0029}$	$r_{\text{drag}}$	$146.0^{+1.2}_{-0.56}$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\nu h^2$	$0.00334^{+0.00071}_{-0.0027}$	$k_D$	$0.14169^{+0.00054}_{-0.00093}$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m h^3$	$0.09794^{+0.00058}_{-0.0019}$	$100\theta_D$	$0.16097^{+0.00020}_{-0.00031}$	$\chi_{\text{lensing}}^2$	$9.11 \pm 0.80$
$\sigma_8$	$0.784^{+0.026}_{-0.016}$	$z_{\text{eq}}$	$3354^{+58}_{-26}$	$\chi_{\text{small}}^2$	$1021 \pm 900$
$S_8$	$0.813^{+0.022}_{-0.016}$	$k_{\text{eq}}$	$0.01034^{+0.00017}_{-0.00010}$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.0$
$\sigma_8 \Omega_m^{0.5}$	$0.445^{+0.012}_{-0.0085}$	$100\theta_{\text{eq}}$	$0.8237^{+0.0048}_{-0.012}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.591^{+0.017}_{-0.011}$	$100\theta_{s,\text{eq}}$	$0.4549^{+0.0025}_{-0.0064}$	$\chi_{\text{CMB}}^2$	$7369 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11953.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.76; R - 1 = 0.02344$$



## 8.5 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00016$	$r_{\text{drag}} h$	$99.56 \pm 0.86$	$H(0.38)$	$83.48^{+0.25}_{-0.75}$
$\Omega_c h^2$	$0.1187^{+0.0037}_{-0.0024}$	$\langle d^2 \rangle^{1/2}$	$2.423 \pm 0.026$	$D_{\text{M}}(0.38)$	$1521^{+16}_{-7.4}$
$100\theta_{MC}$	$1.04087^{+0.00036}_{-0.00031}$	$z_{\text{re}}$	$7.78 \pm 0.80$	$H(0.51)$	$90.24^{+0.19}_{-0.74}$
$\tau$	$0.0555 \pm 0.0079$	$10^9 A_s$	$2.104^{+0.032}_{-0.037}$	$D_{\text{M}}(0.51)$	$1970^{+19}_{-8.5}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.215$	$10^9 A_s e^{-2\tau}$	$1.883^{+0.012}_{-0.014}$	$H(0.61)$	$95.89^{+0.16}_{-0.73}$
$N_{\text{eff}}$	$< 3.16$	$D_{40}$	$1221 \pm 14$	$D_{\text{M}}(0.61)$	$2292^{+22}_{-9.1}$
$\ln(10^{10} A_s)$	$3.046^{+0.016}_{-0.018}$	$D_{220}$	$5730 \pm 40$	$H(2.33)$	$237.44^{+0.76}_{-1.8}$
$n_s$	$0.9696^{+0.0045}_{-0.0061}$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5729^{+41}_{-8.7}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{1420}$	$816.3 \pm 4.9$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0087}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.0 \pm 1.7$	$\sigma_8(0.15)$	$0.730^{+0.022}_{-0.013}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9696^{+0.0045}_{-0.0061}$	$f\sigma_8(0.38)$	$0.463^{+0.014}_{-0.0084}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P$	$0.24674^{+0.00025}_{-0.0013}$	$\sigma_8(0.38)$	$0.647^{+0.020}_{-0.012}$
$A_{100}^{PS}$	$251 \pm 28$	$Y_P^{\text{BBN}}$	$0.24808^{+0.00025}_{-0.0013}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0082}$
$A_{143}^{PS}$	$44 \pm 8$	$10^5 D/H$	$2.603^{+0.027}_{-0.040}$	$\sigma_8(0.51)$	$0.606^{+0.019}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.716^{+0.098}_{-0.020}$	$f\sigma_8(0.61)$	$0.457^{+0.014}_{-0.0081}$
$A^{kSZ}$	$< 5.58$	$z_*$	$1089.95^{+0.24}_{-0.30}$	$\sigma_8(0.61)$	$0.576^{+0.018}_{-0.011}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$143.8^{+1.1}_{-0.32}$	$f\sigma_8(2.33)$	$0.2909^{+0.0091}_{-0.0055}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04099^{+0.00041}_{-0.00030}$	$\sigma_8(2.33)$	$0.2997^{+0.0095}_{-0.0058}$
$H_0$	$68.00^{+0.45}_{-0.80}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.812^{+0.098}_{-0.031}$	$f_{2000}^{143}$	$30.4 \pm 2.9$
$\Omega_{\Lambda}$	$0.6886 \pm 0.0068$	$z_{\text{drag}}$	$1060.27^{+0.37}_{-0.49}$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.0$
$\Omega_m$	$0.3114 \pm 0.0068$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.34}$	$f_{2000}^{217}$	$107.5 \pm 1.9$
$\Omega_m h^2$	$0.1439^{+0.0012}_{-0.0023}$	$k_{\text{D}}$	$0.14133^{+0.00039}_{-0.00086}$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\Omega_{\nu} h^2$	$0.00276^{+0.00039}_{-0.0022}$	$100\theta_{\text{D}}$	$0.16094^{+0.00019}_{-0.00034}$	$\chi_{\text{lowl}}^2$	$22.68 \pm 0.93$
$\Omega_m h^3$	$0.09789^{+0.00039}_{-0.0020}$	$z_{\text{eq}}$	$3329^{+64}_{-21}$	$\chi_{6\text{DF}}^2$	$0.068 \pm 0.079$
$\sigma_8$	$0.790^{+0.024}_{-0.014}$	$k_{\text{eq}}$	$0.01026^{+0.00019}_{-0.000098}$	$\chi_{\text{MGS}}^2$	$1.23 \pm 0.46$
$S_8$	$0.805^{+0.024}_{-0.016}$	$100\theta_{\text{eq}}$	$0.8284^{+0.0036}_{-0.014}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.441^{+0.013}_{-0.0089}$	$100\theta_{\text{s,eq}}$	$0.4572^{+0.0018}_{-0.0071}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.590^{+0.017}_{-0.011}$	$H(0.15)$	$73.31^{+0.37}_{-0.77}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.958^{+0.028}_{-0.015}$	$D_{\text{M}}(0.15)$	$637.6^{+7.1}_{-3.8}$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11926.47$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.84$ ;  $\bar{\chi}_{\text{eff}}^2 = 11950.99$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.42$ ;  $R - 1 = 0.01562$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 ( $\Delta$  -0.01) MGS: 1.34 ( $\Delta$  0.13) DR12BAO: 4.08 ( $\Delta$  -0.35) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.95 ( $\Delta$  -0.10) commander\_dx12\_v3\_2\_29: 22.71 ( $\Delta$  -0.16) CamSpec like\_10.7HM\_1400\_unified: 11500.30



## 8.6 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.420 \pm 0.026$	$H(0.51)$	$90.29^{+0.18}_{-0.76}$
$\Omega_c h^2$	$0.1187^{+0.0037}_{-0.0025}$	$z_{\text{re}}$	$7.80 \pm 0.79$	$D_{\text{M}}(0.51)$	$1968^{+20}_{-8.2}$
$100\theta_{MC}$	$1.04087^{+0.00035}_{-0.00031}$	$10^9 A_s$	$2.104^{+0.032}_{-0.038}$	$H(0.61)$	$95.94^{+0.16}_{-0.76}$
$\tau$	$0.0556 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.883^{+0.012}_{-0.014}$	$D_{\text{M}}(0.61)$	$2290^{+22}_{-8.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.206$	$D_{40}$	$1221 \pm 13$	$H(2.33)$	$237.39^{+0.74}_{-1.9}$
$N_{eff}$	$< 3.16$	$D_{220}$	$5731 \pm 39$	$D_{\text{M}}(2.33)$	$5727^{+43}_{-9.0}$
$\ln(10^{10} A_s)$	$3.046^{+0.016}_{-0.018}$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0086}$
$n_s$	$0.9700^{+0.0045}_{-0.0061}$	$D_{1420}$	$816.3 \pm 4.9$	$\sigma_8(0.15)$	$0.730^{+0.022}_{-0.013}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.1 \pm 1.8$	$f\sigma_8(0.38)$	$0.463^{+0.014}_{-0.0084}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9700^{+0.0045}_{-0.0061}$	$\sigma_8(0.38)$	$0.648^{+0.020}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24678^{+0.00025}_{-0.0014}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0082}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24811^{+0.00026}_{-0.0014}$	$\sigma_8(0.51)$	$0.606^{+0.019}_{-0.011}$
$A_{100}^{PS}$	$252 \pm 28$	$10^5 D/H$	$2.602^{+0.027}_{-0.041}$	$f\sigma_8(0.61)$	$0.457^{+0.014}_{-0.0080}$
$A_{143}^{PS}$	$44 \pm 8$	Age/Gyr	$13.71^{+0.10}_{-0.021}$	$\sigma_8(0.61)$	$0.577^{+0.018}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.93^{+0.23}_{-0.30}$	$f\sigma_8(2.33)$	$0.2912^{+0.0091}_{-0.0055}$
$A^{kSZ}$	$< 5.62$	$r_*$	$143.8^{+1.1}_{-0.32}$	$\sigma_8(2.33)$	$0.3001^{+0.0095}_{-0.0058}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04100^{+0.00041}_{-0.00030}$	$f_{2000}^{143}$	$30.4 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.81^{+0.10}_{-0.030}$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.0$
$H_0$	$68.10^{+0.43}_{-0.81}$	$z_{\text{drag}}$	$1060.29^{+0.36}_{-0.50}$	$f_{2000}^{217}$	$107.5 \pm 1.9$
$\Omega_{\Lambda}$	$0.6897 \pm 0.0065$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.34}$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m$	$0.3103 \pm 0.0065$	$k_{\text{D}}$	$0.14133^{+0.00038}_{-0.00089}$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\Omega_m h^2$	$0.1438^{+0.0011}_{-0.0023}$	$100\theta_{\text{D}}$	$0.16094^{+0.00019}_{-0.00035}$	$\chi_{\text{JLA}}^2$	$1035.08 \pm 0.32$
$\Omega_{\nu} h^2$	$0.00270^{+0.00035}_{-0.0022}$	$z_{\text{eq}}$	$3327^{+64}_{-19}$	$\chi_{\text{6DF}}^2$	$0.22 \pm 0.45$
$\Omega_m h^3$	$0.09795^{+0.00041}_{-0.0021}$	$k_{\text{eq}}$	$0.01025^{+0.00020}_{-0.000098}$	$\chi_{\text{MGS}}^2$	$1.13 \pm 0.61$
$\sigma_8$	$0.790^{+0.024}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8288^{+0.0033}_{-0.014}$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.5$
$S_8$	$0.804^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4574^{+0.0017}_{-0.0071}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0088}$	$H(0.15)$	$73.40^{+0.36}_{-0.79}$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.590^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$636.8^{+7.1}_{-3.7}$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$
$\sigma_8/h^{0.5}$	$0.958^{+0.028}_{-0.015}$	$H(0.38)$	$83.55^{+0.24}_{-0.77}$		
$r_{\text{drag}} h$	$99.69 \pm 0.83$	$D_{\text{M}}(0.38)$	$1519^{+16}_{-7.1}$		

$\bar{\chi}_{\text{eff}}^2 = 12985.86$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.18$ ;  $R - 1 = 0.01581$



8.7 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.026$	$H(0.51)$	$90.09^{+0.19}_{-0.55}$
$\Omega_c h^2$	$0.1181^{+0.0036}_{-0.0021}$	$z_{\text{re}}$	$7.76 \pm 0.79$	$D_{\text{M}}(0.51)$	$1973^{+15}_{-8.7}$
$100\theta_{MC}$	$1.04091 \pm 0.00032$	$10^9 A_s$	$2.101^{+0.032}_{-0.036}$	$H(0.61)$	$95.73^{+0.15}_{-0.55}$
$\tau$	$0.0553 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.61)$	$2296^{+17}_{-9.3}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.243$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.09^{+0.72}_{-1.5}$
$N_{\text{eff}}$	$3.1221^{+0.0070}_{-0.076}$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(2.33)$	$5738^{+31}_{-7.2}$
$\ln(10^{10} A_s)$	$3.045 \pm 0.017$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.444^{+0.013}_{-0.0088}$
$n_s$	$0.9687^{+0.0043}_{-0.0053}$	$D_{1420}$	$816.3 \pm 4.9$	$\sigma_8(0.15)$	$0.728^{+0.022}_{-0.013}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.1 \pm 1.7$	$f\sigma_8(0.38)$	$0.462^{+0.014}_{-0.0084}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9687^{+0.0043}_{-0.0053}$	$\sigma_8(0.38)$	$0.646^{+0.020}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24643^{+0.00017}_{-0.0010}$	$f\sigma_8(0.51)$	$0.461^{+0.014}_{-0.0082}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24776^{+0.00017}_{-0.0010}$	$\sigma_8(0.51)$	$0.604^{+0.019}_{-0.011}$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.598^{+0.027}_{-0.035}$	$f\sigma_8(0.61)$	$0.456^{+0.014}_{-0.0080}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.737^{+0.074}_{-0.016}$	$\sigma_8(0.61)$	$0.575^{+0.018}_{-0.010}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.92^{+0.23}_{-0.27}$	$f\sigma_8(2.33)$	$0.2901^{+0.0090}_{-0.0052}$
$A^{kSZ}$	$< 5.53$	$r_*$	$144.01^{+0.82}_{-0.27}$	$\sigma_8(2.33)$	$0.2990^{+0.0094}_{-0.0055}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04105^{+0.00035}_{-0.00030}$	$f_{2000}^{143}$	$30.3 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.833^{+0.077}_{-0.026}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.88^{+0.45}_{-0.66}$	$z_{\text{drag}}$	$1060.19^{+0.36}_{-0.42}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6885 \pm 0.0066$	$r_{\text{drag}}$	$146.64^{+0.86}_{-0.29}$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m$	$0.3115 \pm 0.0066$	$k_{\text{D}}$	$0.14117^{+0.00037}_{-0.00070}$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\Omega_m h^2$	$0.1435^{+0.0011}_{-0.0019}$	$100\theta_{\text{D}}$	$0.16089^{+0.00019}_{-0.00028}$	$\chi_{\text{Aver15}}^2$	$0.57 \pm 0.47$
$\Omega_{\nu} h^2$	$0.00295^{+0.00051}_{-0.0024}$	$z_{\text{eq}}$	$3325^{+70}_{-22}$	$\chi_{6\text{DF}}^2$	$0.22 \pm 0.43$
$\Omega_m h^3$	$0.09743^{+0.00029}_{-0.0015}$	$k_{\text{eq}}$	$0.01023^{+0.00020}_{-0.000092}$	$\chi_{\text{MGS}}^2$	$1.06 \pm 0.58$
$\sigma_8$	$0.788^{+0.024}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8293^{+0.0039}_{-0.015}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$S_8$	$0.803^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4577^{+0.0020}_{-0.0078}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0090}$	$H(0.15)$	$73.19^{+0.38}_{-0.62}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.589^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$638.7^{+5.7}_{-3.9}$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.957^{+0.028}_{-0.016}$	$H(0.38)$	$83.34^{+0.26}_{-0.57}$		
$r_{\text{drag}} h$	$99.54 \pm 0.84$	$D_{\text{M}}(0.38)$	$1523^{+12}_{-7.6}$		

$\bar{\chi}_{\text{eff}}^2 = 11951.21$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.31$ ;  $R - 1 = 0.01810$



# 8.8 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02244 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.026$	$H(0.51)$	$90.08^{+0.19}_{-0.56}$
$\Omega_c h^2$	$0.1182^{+0.0036}_{-0.0020}$	$z_{\text{re}}$	$7.76 \pm 0.79$	$D_{\text{M}}(0.51)$	$1973^{+15}_{-8.7}$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s$	$2.101^{+0.032}_{-0.036}$	$H(0.61)$	$95.73^{+0.15}_{-0.55}$
$\tau$	$0.0553 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.61)$	$2296^{+17}_{-9.2}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.242$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.10^{+0.74}_{-1.4}$
$N_{eff}$	$3.1222^{+0.0082}_{-0.076}$	$D_{220}$	$5730 \pm 39$	$D_{\text{M}}(2.33)$	$5738^{+31}_{-7.3}$
$\ln(10^{10} A_s)$	$3.045 \pm 0.017$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0088}$
$n_s$	$0.9686^{+0.0043}_{-0.0053}$	$D_{1420}$	$816.2 \pm 4.9$	$\sigma_8(0.15)$	$0.728^{+0.022}_{-0.013}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.1 \pm 1.7$	$f\sigma_8(0.38)$	$0.462^{+0.014}_{-0.0084}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9686^{+0.0043}_{-0.0053}$	$\sigma_8(0.38)$	$0.646^{+0.020}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24643^{+0.00018}_{-0.0010}$	$f\sigma_8(0.51)$	$0.461^{+0.014}_{-0.0081}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24776^{+0.00018}_{-0.0010}$	$\sigma_8(0.51)$	$0.604^{+0.019}_{-0.011}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.600^{+0.026}_{-0.033}$	$f\sigma_8(0.61)$	$0.456^{+0.014}_{-0.0079}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.738^{+0.074}_{-0.017}$	$\sigma_8(0.61)$	$0.575^{+0.018}_{-0.010}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.93^{+0.22}_{-0.26}$	$f\sigma_8(2.33)$	$0.2901^{+0.0090}_{-0.0052}$
$A^{kSZ}$	$< 5.55$	$r_*$	$144.01^{+0.82}_{-0.28}$	$\sigma_8(2.33)$	$0.2989^{+0.0094}_{-0.0055}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04104^{+0.00034}_{-0.00030}$	$f_{2000}^{143}$	$30.3 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.833^{+0.077}_{-0.027}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.87^{+0.45}_{-0.66}$	$z_{\text{drag}}$	$1060.17^{+0.35}_{-0.43}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6883 \pm 0.0066$	$r_{\text{drag}}$	$146.64^{+0.86}_{-0.30}$	$\chi_{\text{small}}^2$	$343 \pm 100$
$\Omega_m$	$0.3117 \pm 0.0066$	$k_{\text{D}}$	$0.14116^{+0.00038}_{-0.00070}$	$\chi_{\text{lowl}}^2$	$77 \pm 100$
$\Omega_m h^2$	$0.1435^{+0.0011}_{-0.0019}$	$100\theta_{\text{D}}$	$0.16089^{+0.00018}_{-0.00027}$	$\chi_{\text{Aver15}}^2$	$0.57 \pm 0.46$
$\Omega_{\nu} h^2$	$0.00294^{+0.00050}_{-0.0024}$	$z_{\text{eq}}$	$3326^{+70}_{-22}$	$\chi_{\text{Cooke17}}^2$	$0.14 \pm 0.18$
$\Omega_m h^3$	$0.09741^{+0.00031}_{-0.0015}$	$k_{\text{eq}}$	$0.01023^{+0.00020}_{-0.000091}$	$\chi_{6\text{DF}}^2$	$0.22 \pm 0.42$
$\sigma_8$	$0.788^{+0.024}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8291^{+0.0039}_{-0.015}$	$\chi_{\text{MGS}}^2$	$1.05 \pm 0.58$
$S_8$	$0.803^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4576^{+0.0020}_{-0.0078}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0090}$	$H(0.15)$	$73.17^{+0.37}_{-0.62}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.589^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$638.8^{+5.8}_{-3.8}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.957^{+0.028}_{-0.016}$	$H(0.38)$	$83.33^{+0.26}_{-0.57}$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$r_{\text{drag}} h$	$99.52 \pm 0.84$	$D_{\text{M}}(0.38)$	$1523^{+12}_{-7.5}$	$\chi_{\text{Abund}}^2$	$0.71 \pm 0.50$

$$\bar{\chi}_{\text{eff}}^2 = 11951.25; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.20; R - 1 = 0.01822$$



# 8.9 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00016$	$r_{\text{drag}} h$	$99.57 \pm 0.86$	$H(0.38)$	$83.49^{+0.25}_{-0.75}$
$\Omega_c h^2$	$0.1187^{+0.0037}_{-0.0024}$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.026$	$D_{\text{M}}(0.38)$	$1520^{+16}_{-7.4}$
$100\theta_{MC}$	$1.04087^{+0.00036}_{-0.00031}$	$z_{\text{re}}$	$7.87^{+0.62}_{-0.82}$	$H(0.51)$	$90.24^{+0.19}_{-0.74}$
$\tau$	$0.0563^{+0.0056}_{-0.0083}$	$10^9 A_s$	$2.108^{+0.027}_{-0.038}$	$D_{\text{M}}(0.51)$	$1970^{+19}_{-8.5}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.214$	$10^9 A_s e^{-2\tau}$	$1.883^{+0.012}_{-0.014}$	$H(0.61)$	$95.90^{+0.16}_{-0.74}$
$N_{\text{eff}}$	$< 3.16$	$D_{40}$	$1221 \pm 14$	$D_{\text{M}}(0.61)$	$2292^{+22}_{-9.0}$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.018}$	$D_{220}$	$5730 \pm 40$	$H(2.33)$	$237.45^{+0.77}_{-1.8}$
$n_s$	$0.9697^{+0.0045}_{-0.0061}$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5729^{+42}_{-8.8}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{1420}$	$816.3 \pm 4.9$	$f\sigma_8(0.15)$	$0.446^{+0.013}_{-0.0087}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.1 \pm 1.8$	$\sigma_8(0.15)$	$0.731^{+0.022}_{-0.013}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9697^{+0.0045}_{-0.0061}$	$f\sigma_8(0.38)$	$0.464^{+0.014}_{-0.0084}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P$	$0.24676^{+0.00026}_{-0.0013}$	$\sigma_8(0.38)$	$0.648^{+0.020}_{-0.012}$
$A_{100}^{PS}$	$251 \pm 28$	$Y_P^{\text{BBN}}$	$0.24809^{+0.00026}_{-0.0013}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0082}$
$A_{143}^{PS}$	$44 \pm 8$	$10^5 D/H$	$2.603^{+0.027}_{-0.040}$	$\sigma_8(0.51)$	$0.606^{+0.019}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.715^{+0.099}_{-0.021}$	$f\sigma_8(0.61)$	$0.458^{+0.014}_{-0.0080}$
$A^{kSZ}$	$< 5.56$	$z_*$	$1089.95^{+0.24}_{-0.30}$	$\sigma_8(0.61)$	$0.577^{+0.018}_{-0.011}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$143.8^{+1.1}_{-0.32}$	$f\sigma_8(2.33)$	$0.2911^{+0.0091}_{-0.0054}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04099^{+0.00041}_{-0.00030}$	$\sigma_8(2.33)$	$0.2999^{+0.0094}_{-0.0058}$
$H_0$	$68.01^{+0.45}_{-0.80}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.812^{+0.099}_{-0.031}$	$f_{2000}^{143}$	$30.4 \pm 2.9$
$\Omega_{\Lambda}$	$0.6887 \pm 0.0068$	$z_{\text{drag}}$	$1060.27^{+0.36}_{-0.49}$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.0$
$\Omega_m$	$0.3113 \pm 0.0068$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.35}$	$f_{2000}^{217}$	$107.5 \pm 1.9$
$\Omega_m h^2$	$0.1439^{+0.0012}_{-0.0023}$	$k_{\text{D}}$	$0.14134^{+0.00039}_{-0.00087}$	$\chi_{\text{small}}^2$	$397.2 \pm 2.1$
$\Omega_{\nu} h^2$	$0.00275^{+0.00039}_{-0.0022}$	$100\theta_{\text{D}}$	$0.16094^{+0.00019}_{-0.00034}$	$\chi_{\text{lowl}}^2$	$22.69 \pm 0.93$
$\Omega_m h^3$	$0.09790^{+0.00040}_{-0.0020}$	$z_{\text{eq}}$	$3329^{+64}_{-21}$	$\chi_{6\text{DF}}^2$	$0.067 \pm 0.079$
$\sigma_8$	$0.790^{+0.024}_{-0.014}$	$k_{\text{eq}}$	$0.01026^{+0.00019}_{-0.000097}$	$\chi_{\text{MGS}}^2$	$1.23 \pm 0.46$
$S_8$	$0.805^{+0.024}_{-0.016}$	$100\theta_{\text{eq}}$	$0.8284^{+0.0036}_{-0.014}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.441^{+0.013}_{-0.0089}$	$100\theta_{\text{s,eq}}$	$0.4572^{+0.0018}_{-0.0071}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.590^{+0.017}_{-0.011}$	$H(0.15)$	$73.32^{+0.37}_{-0.78}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.959^{+0.028}_{-0.015}$	$D_{\text{M}}(0.15)$	$637.5^{+7.1}_{-3.8}$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11950.77; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.32; R - 1 = 0.01713$$



8.10 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.422 \pm 0.025$	$H(0.51)$	$90.30^{+0.19}_{-0.76}$
$\Omega_c h^2$	$0.1187^{+0.0037}_{-0.0025}$	$z_{\text{re}}$	$7.88^{+0.62}_{-0.81}$	$D_{\text{M}}(0.51)$	$1968^{+20}_{-8.2}$
$100\theta_{MC}$	$1.04087^{+0.00035}_{-0.00031}$	$10^9 A_s$	$2.108^{+0.027}_{-0.038}$	$H(0.61)$	$95.94^{+0.16}_{-0.76}$
$\tau$	$0.0564^{+0.0057}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.883^{+0.012}_{-0.014}$	$D_{\text{M}}(0.61)$	$2290^{+23}_{-8.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.205$	$D_{40}$	$1221 \pm 13$	$H(2.33)$	$237.39^{+0.74}_{-1.9}$
$N_{eff}$	$< 3.16$	$D_{220}$	$5731 \pm 40$	$D_{\text{M}}(2.33)$	$5726^{+43}_{-9.1}$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.018}$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0085}$
$n_s$	$0.9701^{+0.0045}_{-0.0061}$	$D_{1420}$	$816.3 \pm 4.9$	$\sigma_8(0.15)$	$0.731^{+0.022}_{-0.013}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.1 \pm 1.8$	$f\sigma_8(0.38)$	$0.463^{+0.014}_{-0.0083}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9701^{+0.0045}_{-0.0061}$	$\sigma_8(0.38)$	$0.648^{+0.020}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24680^{+0.00026}_{-0.0014}$	$f\sigma_8(0.51)$	$0.462^{+0.014}_{-0.0081}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24813^{+0.00026}_{-0.0014}$	$\sigma_8(0.51)$	$0.607^{+0.019}_{-0.011}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.602^{+0.027}_{-0.041}$	$f\sigma_8(0.61)$	$0.458^{+0.014}_{-0.0080}$
$A_{143}^{PS}$	$44 \pm 8$	Age/Gyr	$13.71^{+0.10}_{-0.021}$	$\sigma_8(0.61)$	$0.577^{+0.018}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.93^{+0.23}_{-0.30}$	$f\sigma_8(2.33)$	$0.2914^{+0.0090}_{-0.0054}$
$A^{kSZ}$	$< 5.60$	$r_*$	$143.8^{+1.1}_{-0.32}$	$\sigma_8(2.33)$	$0.3003^{+0.0094}_{-0.0058}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04100^{+0.00041}_{-0.00030}$	$f_{2000}^{143}$	$30.4 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.81^{+0.10}_{-0.031}$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.0$
$H_0$	$68.11^{+0.43}_{-0.81}$	$z_{\text{drag}}$	$1060.29^{+0.36}_{-0.50}$	$f_{2000}^{217}$	$107.5 \pm 1.9$
$\Omega_{\Lambda}$	$0.6898 \pm 0.0065$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.34}$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m$	$0.3102 \pm 0.0065$	$k_{\text{D}}$	$0.14133^{+0.00039}_{-0.00090}$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\Omega_m h^2$	$0.1438^{+0.0011}_{-0.0024}$	$100\theta_{\text{D}}$	$0.16094^{+0.00019}_{-0.00035}$	$\chi_{\text{JLA}}^2$	$1035.08 \pm 0.32$
$\Omega_{\nu} h^2$	$0.00270^{+0.00035}_{-0.0022}$	$z_{\text{eq}}$	$3327^{+64}_{-19}$	$\chi_{6\text{DF}}^2$	$0.22 \pm 0.46$
$\Omega_m h^3$	$0.09797^{+0.00042}_{-0.0021}$	$k_{\text{eq}}$	$0.01025^{+0.00020}_{-0.000099}$	$\chi_{\text{MGS}}^2$	$1.13 \pm 0.61$
$\sigma_8$	$0.791^{+0.024}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8288^{+0.0033}_{-0.013}$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.5$
$S_8$	$0.804^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4575^{+0.0017}_{-0.0071}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0087}$	$H(0.15)$	$73.40^{+0.35}_{-0.79}$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.590^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$636.7^{+7.2}_{-3.7}$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$
$\sigma_8/h^{0.5}$	$0.958^{+0.027}_{-0.015}$	$H(0.38)$	$83.56^{+0.24}_{-0.77}$		
$r_{\text{drag}} h$	$99.70 \pm 0.83$	$D_{\text{M}}(0.38)$	$1519^{+16}_{-7.1}$		

$\bar{\chi}_{\text{eff}}^2 = 12985.64$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.08$ ;  $R - 1 = 0.01787$



8.11 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.425 \pm 0.025$	$H(0.51)$	$90.10^{+0.19}_{-0.56}$
$\Omega_c h^2$	$0.1181^{+0.0036}_{-0.0021}$	$z_{\text{re}}$	$7.85^{+0.61}_{-0.81}$	$D_{\text{M}}(0.51)$	$1973^{+15}_{-8.7}$
$100\theta_{MC}$	$1.04090 \pm 0.00032$	$10^9 A_s$	$2.105^{+0.026}_{-0.037}$	$H(0.61)$	$95.74^{+0.15}_{-0.55}$
$\tau$	$0.0562^{+0.0056}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.61)$	$2296^{+17}_{-9.3}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.242$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.09^{+0.72}_{-1.5}$
$N_{eff}$	$3.1227^{+0.0074}_{-0.076}$	$D_{220}$	$5730 \pm 40$	$D_{\text{M}}(2.33)$	$5738^{+31}_{-7.2}$
$\ln(10^{10} A_s)$	$3.047^{+0.013}_{-0.017}$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0088}$
$n_s$	$0.9688^{+0.0043}_{-0.0053}$	$D_{1420}$	$816.3 \pm 4.9$	$\sigma_8(0.15)$	$0.729^{+0.022}_{-0.013}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.2 \pm 1.7$	$f\sigma_8(0.38)$	$0.463^{+0.014}_{-0.0084}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9688^{+0.0043}_{-0.0053}$	$\sigma_8(0.38)$	$0.646^{+0.020}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24644^{+0.00017}_{-0.0010}$	$f\sigma_8(0.51)$	$0.461^{+0.014}_{-0.0081}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24777^{+0.00017}_{-0.0010}$	$\sigma_8(0.51)$	$0.605^{+0.018}_{-0.011}$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.598^{+0.027}_{-0.035}$	$f\sigma_8(0.61)$	$0.457^{+0.013}_{-0.0079}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.737^{+0.074}_{-0.017}$	$\sigma_8(0.61)$	$0.575^{+0.018}_{-0.010}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.91^{+0.23}_{-0.27}$	$f\sigma_8(2.33)$	$0.2904^{+0.0089}_{-0.0051}$
$A^{kSZ}$	$< 5.51$	$r_*$	$144.00^{+0.83}_{-0.27}$	$\sigma_8(2.33)$	$0.2992^{+0.0093}_{-0.0054}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04104^{+0.00035}_{-0.00030}$	$f_{2000}^{143}$	$30.3 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.833^{+0.077}_{-0.027}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.89^{+0.45}_{-0.66}$	$z_{\text{drag}}$	$1060.19^{+0.36}_{-0.42}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6886 \pm 0.0066$	$r_{\text{drag}}$	$146.63^{+0.86}_{-0.29}$	$\chi_{\text{small}}^2$	$345 \pm 100$
$\Omega_m$	$0.3114 \pm 0.0066$	$k_{\text{D}}$	$0.14117^{+0.00038}_{-0.00070}$	$\chi_{\text{lowl}}^2$	$75 \pm 100$
$\Omega_m h^2$	$0.1435^{+0.0011}_{-0.0019}$	$100\theta_{\text{D}}$	$0.16089^{+0.00019}_{-0.00028}$	$\chi_{\text{Aver15}}^2$	$0.58 \pm 0.48$
$\Omega_{\nu} h^2$	$0.00294^{+0.00051}_{-0.0024}$	$z_{\text{eq}}$	$3325^{+70}_{-22}$	$\chi_{6\text{DF}}^2$	$0.22 \pm 0.43$
$\Omega_m h^3$	$0.09744^{+0.00030}_{-0.0015}$	$k_{\text{eq}}$	$0.01023^{+0.00020}_{-0.000093}$	$\chi_{\text{MGS}}^2$	$1.07 \pm 0.58$
$\sigma_8$	$0.789^{+0.024}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8293^{+0.0039}_{-0.015}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$S_8$	$0.804^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4577^{+0.0020}_{-0.0078}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0090}$	$H(0.15)$	$73.20^{+0.38}_{-0.62}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.589^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$638.6^{+5.7}_{-3.8}$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.957^{+0.028}_{-0.015}$	$H(0.38)$	$83.35^{+0.26}_{-0.57}$		
$r_{\text{drag}} h$	$99.55 \pm 0.84$	$D_{\text{M}}(0.38)$	$1523^{+12}_{-7.5}$		

$\bar{\chi}_{\text{eff}}^2 = 11950.98$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.21$ ;  $R - 1 = 0.01936$



8.12 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02244 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.025$	$H(0.51)$	$90.09^{+0.19}_{-0.56}$
$\Omega_c h^2$	$0.1182^{+0.0036}_{-0.0020}$	$z_{\text{re}}$	$7.85^{+0.61}_{-0.81}$	$D_{\text{M}}(0.51)$	$1973^{+15}_{-8.6}$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s$	$2.105^{+0.026}_{-0.037}$	$H(0.61)$	$95.73^{+0.15}_{-0.55}$
$\tau$	$0.0561^{+0.0056}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.61)$	$2296^{+17}_{-9.2}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.241$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.10^{+0.74}_{-1.5}$
$N_{eff}$	$3.1228^{+0.0086}_{-0.076}$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5738^{+31}_{-7.4}$
$\ln(10^{10} A_s)$	$3.047^{+0.013}_{-0.017}$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.445^{+0.013}_{-0.0087}$
$n_s$	$0.9687^{+0.0043}_{-0.0053}$	$D_{1420}$	$816.2 \pm 4.9$	$\sigma_8(0.15)$	$0.729^{+0.022}_{-0.012}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.1 \pm 1.7$	$f\sigma_8(0.38)$	$0.463^{+0.014}_{-0.0083}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9687^{+0.0043}_{-0.0053}$	$\sigma_8(0.38)$	$0.646^{+0.020}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24644^{+0.00019}_{-0.0010}$	$f\sigma_8(0.51)$	$0.461^{+0.014}_{-0.0081}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24777^{+0.00019}_{-0.0010}$	$\sigma_8(0.51)$	$0.605^{+0.019}_{-0.011}$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.599^{+0.026}_{-0.033}$	$f\sigma_8(0.61)$	$0.457^{+0.014}_{-0.0079}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.737^{+0.074}_{-0.017}$	$\sigma_8(0.61)$	$0.575^{+0.018}_{-0.010}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.93^{+0.22}_{-0.26}$	$f\sigma_8(2.33)$	$0.2904^{+0.0090}_{-0.0051}$
$A^{kSZ}$	$< 5.52$	$r_*$	$144.00^{+0.83}_{-0.28}$	$\sigma_8(2.33)$	$0.2992^{+0.0093}_{-0.0054}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04104^{+0.00034}_{-0.00030}$	$f_{2000}^{143}$	$30.3 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.833^{+0.077}_{-0.027}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.88^{+0.45}_{-0.66}$	$z_{\text{drag}}$	$1060.18^{+0.35}_{-0.42}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6884 \pm 0.0066$	$r_{\text{drag}}$	$146.64^{+0.86}_{-0.30}$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m$	$0.3116 \pm 0.0066$	$k_{\text{D}}$	$0.14116^{+0.00038}_{-0.00070}$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\Omega_m h^2$	$0.1435^{+0.0011}_{-0.0019}$	$100\theta_{\text{D}}$	$0.16089^{+0.00019}_{-0.00027}$	$\chi_{\text{Aver15}}^2$	$0.57 \pm 0.46$
$\Omega_{\nu} h^2$	$0.00293^{+0.00050}_{-0.0024}$	$z_{\text{eq}}$	$3325^{+70}_{-22}$	$\chi_{\text{Cooke17}}^2$	$0.14 \pm 0.18$
$\Omega_m h^3$	$0.09743^{+0.00031}_{-0.0015}$	$k_{\text{eq}}$	$0.01023^{+0.00020}_{-0.000091}$	$\chi_{6\text{DF}}^2$	$0.22 \pm 0.43$
$\sigma_8$	$0.789^{+0.024}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8292^{+0.0039}_{-0.015}$	$\chi_{\text{MGS}}^2$	$1.06 \pm 0.58$
$S_8$	$0.804^{+0.024}_{-0.016}$	$100\theta_{\text{s,eq}}$	$0.4577^{+0.0020}_{-0.0077}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.440^{+0.013}_{-0.0089}$	$H(0.15)$	$73.18^{+0.37}_{-0.62}$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.589^{+0.017}_{-0.011}$	$D_{\text{M}}(0.15)$	$638.7^{+5.8}_{-3.8}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.957^{+0.028}_{-0.015}$	$H(0.38)$	$83.34^{+0.26}_{-0.57}$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$r_{\text{drag}} h$	$99.53 \pm 0.84$	$D_{\text{M}}(0.38)$	$1523^{+12}_{-7.5}$	$\chi_{\text{Abund}}^2$	$0.72 \pm 0.50$

$$\bar{\chi}_{\text{eff}}^2 = 11951.02; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.10; R - 1 = 0.01932$$



### 8.13 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.022$	$H(0.51)$	$90.15^{+0.16}_{-0.67}$
$\Omega_c h^2$	$0.1190^{+0.0032}_{-0.0023}$	$z_{\text{re}}$	$7.95 \pm 0.74$	$D_{\text{M}}(0.51)$	$1973^{+18}_{-7.8}$
$100\theta_{MC}$	$1.04086^{+0.00035}_{-0.00031}$	$10^9 A_s$	$2.112^{+0.030}_{-0.035}$	$H(0.61)$	$95.81^{+0.13}_{-0.67}$
$\tau$	$0.0570^{+0.0068}_{-0.0079}$	$10^9 A_s e^{-2\tau}$	$1.885^{+0.011}_{-0.013}$	$D_{\text{M}}(0.61)$	$2295^{+20}_{-8.3}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.197$	$D_{40}$	$1224 \pm 13$	$H(2.33)$	$237.45^{+0.69}_{-1.7}$
$N_{\text{eff}}$	$3.1364^{+0.0065}_{-0.090}$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5733^{+38}_{-6.7}$
$\ln(10^{10} A_s)$	$3.050^{+0.014}_{-0.016}$	$D_{810}$	$2540 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0070}$
$n_s$	$0.9688^{+0.0043}_{-0.0058}$	$D_{1420}$	$816.6 \pm 4.8$	$\sigma_8(0.15)$	$0.733^{+0.019}_{-0.011}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.2 \pm 1.7$	$f\sigma_8(0.38)$	$0.466^{+0.012}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9688^{+0.0043}_{-0.0058}$	$\sigma_8(0.38)$	$0.650^{+0.017}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24662^{+0.00017}_{-0.0012}$	$f\sigma_8(0.51)$	$0.465^{+0.012}_{-0.0068}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24795^{+0.00017}_{-0.0012}$	$\sigma_8(0.51)$	$0.608^{+0.016}_{-0.0099}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.603^{+0.027}_{-0.039}$	$f\sigma_8(0.61)$	$0.460^{+0.012}_{-0.0067}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.725^{+0.089}_{-0.016}$	$\sigma_8(0.61)$	$0.579^{+0.015}_{-0.0095}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.97^{+0.23}_{-0.29}$	$f\sigma_8(2.33)$	$0.2920^{+0.0079}_{-0.0049}$
$A^{kSZ}$	$< 5.48$	$r_*$	$143.81^{+0.97}_{-0.27}$	$\sigma_8(2.33)$	$0.3008^{+0.0082}_{-0.0053}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04099^{+0.00039}_{-0.00031}$	$f_{2000}^{143}$	$30.3 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.815^{+0.091}_{-0.026}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.88^{+0.42}_{-0.75}$	$z_{\text{drag}}$	$1060.23^{+0.35}_{-0.47}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6874 \pm 0.0065$	$r_{\text{drag}}$	$146.4^{+1.0}_{-0.29}$	$\chi_{\text{lensing}}^2$	$9.32 \pm 0.92$
$\Omega_m$	$0.3126 \pm 0.0065$	$k_{\text{D}}$	$0.14132^{+0.00036}_{-0.00080}$	$\chi_{\text{small}}^2$	$397.5 \pm 2.2$
$\Omega_m h^2$	$0.1440^{+0.0011}_{-0.0021}$	$100\theta_{\text{D}}$	$0.16092^{+0.00018}_{-0.00033}$	$\chi_{\text{lowl}}^2$	$22.87 \pm 0.91$
$\Omega_{\nu} h^2$	$0.00258^{+0.00036}_{-0.0020}$	$z_{\text{eq}}$	$3339^{+57}_{-19}$	$\chi_{6\text{DF}}^2$	$0.079 \pm 0.086$
$\Omega_m h^3$	$0.09775^{+0.00030}_{-0.0018}$	$k_{\text{eq}}$	$0.01028^{+0.00017}_{-0.000094}$	$\chi_{\text{MGS}}^2$	$1.14 \pm 0.43$
$\sigma_8$	$0.794^{+0.021}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8264^{+0.0033}_{-0.012}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$S_8$	$0.810^{+0.020}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4562^{+0.0017}_{-0.0063}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.444^{+0.011}_{-0.0072}$	$H(0.15)$	$73.20^{+0.34}_{-0.72}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.015}_{-0.0087}$	$D_{\text{M}}(0.15)$	$638.7^{+6.6}_{-3.5}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$H(0.38)$	$83.39^{+0.22}_{-0.68}$		
$r_{\text{drag}} h$	$99.40 \pm 0.83$	$D_{\text{M}}(0.38)$	$1523^{+14}_{-6.8}$		

Best-fit  $\chi_{\text{eff}}^2 = 11935.63$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.23$ ;  $\bar{\chi}_{\text{eff}}^2 = 11959.89$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.41$ ;  $R - 1 = 0.03604$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  0.00) MGS: 1.22 ( $\Delta$  0.00) DR12BAO: 4.42 ( $\Delta$  -0.00) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.94 ( $\Delta$  0.19) simall\_100x143\_offlike5\_EE\_Aplanck: 396.07 ( $\Delta$  -0.36) commander\_dx12\_v3.2\_29: 22.86 ( $\Delta$  -0.19) CamSpec like\_10.7HM\_1400\_unified: 11499.95



8.14 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.021$	$H(0.51)$	$90.21^{+0.16}_{-0.71}$
$\Omega_c h^2$	$0.1190^{+0.0031}_{-0.0024}$	$z_{\text{re}}$	$7.96 \pm 0.74$	$D_{\text{M}}(0.51)$	$1971^{+19}_{-7.3}$
$100\theta_{MC}$	$1.04086^{+0.00036}_{-0.00031}$	$10^9 A_s$	$2.113^{+0.030}_{-0.035}$	$H(0.61)$	$95.86^{+0.13}_{-0.70}$
$\tau$	$0.0572^{+0.0067}_{-0.0078}$	$10^9 A_s e^{-2\tau}$	$1.884^{+0.011}_{-0.013}$	$D_{\text{M}}(0.61)$	$2293^{+21}_{-7.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.182$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.41^{+0.65}_{-1.8}$
$N_{eff}$	$< 3.15$	$D_{220}$	$5734 \pm 39$	$D_{\text{M}}(2.33)$	$5731^{+40}_{-6.9}$
$\ln(10^{10} A_s)$	$3.050^{+0.015}_{-0.016}$	$D_{810}$	$2540 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0070}$
$n_s$	$0.9693^{+0.0042}_{-0.0059}$	$D_{1420}$	$816.7 \pm 4.8$	$\sigma_8(0.15)$	$0.734^{+0.019}_{-0.011}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.3 \pm 1.7$	$f\sigma_8(0.38)$	$0.466^{+0.011}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9693^{+0.0042}_{-0.0059}$	$\sigma_8(0.38)$	$0.651^{+0.017}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24666^{+0.00017}_{-0.0013}$	$f\sigma_8(0.51)$	$0.465^{+0.011}_{-0.0068}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24799^{+0.00017}_{-0.0013}$	$\sigma_8(0.51)$	$0.609^{+0.016}_{-0.0099}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.602^{+0.026}_{-0.040}$	$f\sigma_8(0.61)$	$0.460^{+0.011}_{-0.0067}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.719^{+0.094}_{-0.016}$	$\sigma_8(0.61)$	$0.580^{+0.015}_{-0.0095}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.95^{+0.22}_{-0.29}$	$f\sigma_8(2.33)$	$0.2926^{+0.0076}_{-0.0049}$
$A^{kSZ}$	$< 5.49$	$r_*$	$143.8^{+1.0}_{-0.26}$	$\sigma_8(2.33)$	$0.3015^{+0.0080}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04099^{+0.00040}_{-0.00031}$	$f_{2000}^{143}$	$30.3 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.815^{+0.095}_{-0.025}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.97^{+0.39}_{-0.77}$	$z_{\text{drag}}$	$1060.25^{+0.34}_{-0.49}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6884 \pm 0.0062$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.28}$	$\chi_{\text{lensing}}^2$	$9.36 \pm 0.95$
$\Omega_m$	$0.3116 \pm 0.0062$	$k_{\text{D}}$	$0.14132^{+0.00035}_{-0.00084}$	$\chi_{\text{small}}^2$	$330 \pm 100$
$\Omega_m h^2$	$0.1439^{+0.0010}_{-0.0022}$	$100\theta_{\text{D}}$	$0.16093^{+0.00018}_{-0.00033}$	$\chi_{\text{lowl}}^2$	$90 \pm 100$
$\Omega_{\nu} h^2$	$0.00245^{+0.00032}_{-0.0019}$	$z_{\text{eq}}$	$3338^{+55}_{-18}$	$\chi_{\text{JLA}}^2$	$1035.14 \pm 0.34$
$\Omega_m h^3$	$0.09782^{+0.00031}_{-0.0019}$	$k_{\text{eq}}$	$0.01028^{+0.00017}_{-0.000096}$	$\chi_{6\text{DF}}^2$	$0.27 \pm 0.46$
$\sigma_8$	$0.795^{+0.020}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8264^{+0.0032}_{-0.011}$	$\chi_{\text{MGS}}^2$	$1.00 \pm 0.59$
$S_8$	$0.810^{+0.019}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4562^{+0.0016}_{-0.0060}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.444^{+0.011}_{-0.0071}$	$H(0.15)$	$73.28^{+0.32}_{-0.75}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.594^{+0.014}_{-0.0087}$	$D_{\text{M}}(0.15)$	$637.9^{+6.8}_{-3.3}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8/h^{0.5}$	$0.964^{+0.022}_{-0.012}$	$H(0.38)$	$83.45^{+0.21}_{-0.72}$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.3$
$r_{\text{drag}} h$	$99.53 \pm 0.79$	$D_{\text{M}}(0.38)$	$1521^{+15}_{-6.4}$		

Best-fit  $\chi_{\text{eff}}^2 = 12970.74$ ;  $\bar{\chi}_{\text{eff}}^2 = 12994.91$ ;  $\Delta\chi_{\text{eff}}^2 = 9150.47$ ;  $R - 1 = 0.03797$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 MGS: 1.34 DR12BAO: 4.09 CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.02 small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.12 comman-  
der\_dx12\_v3\_2\_29: 22.86 CamSpec like\_10.7HM\_1400\_unified: 11500.05 SN - JLA Pantheon18: 1034.94



8.15 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Aver15/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$H(0.51)$	$90.02^{+0.18}_{-0.51}$
$\Omega_c h^2$	$0.1186^{+0.0031}_{-0.0020}$	$z_{\text{re}}$	$7.91 \pm 0.74$	$D_{\text{M}}(0.51)$	$1976^{+14}_{-8.0}$
$100\theta_{MC}$	$1.04089 \pm 0.00032$	$10^9 A_s$	$2.109^{+0.030}_{-0.033}$	$H(0.61)$	$95.67^{+0.14}_{-0.50}$
$\tau$	$0.0567^{+0.0067}_{-0.0077}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.61)$	$2299^{+16}_{-8.5}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.210$	$D_{40}$	$1225 \pm 12$	$H(2.33)$	$237.16^{+0.68}_{-1.4}$
$N_{eff}$	$3.1158^{+0.0059}_{-0.0069}$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5741^{+29}_{-6.6}$
$\ln(10^{10} A_s)$	$3.049 \pm 0.015$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0071}$
$n_s$	$0.9680^{+0.0042}_{-0.0050}$	$D_{1420}$	$816.7 \pm 4.8$	$\sigma_8(0.15)$	$0.732^{+0.018}_{-0.011}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$230.3 \pm 1.6$	$f\sigma_8(0.38)$	$0.465^{+0.011}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9680^{+0.0042}_{-0.0050}$	$\sigma_8(0.38)$	$0.649^{+0.016}_{-0.0098}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24634^{+0.00014}_{-0.00092}$	$f\sigma_8(0.51)$	$0.464^{+0.011}_{-0.0067}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24767^{+0.00014}_{-0.00092}$	$\sigma_8(0.51)$	$0.607^{+0.015}_{-0.0093}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.599^{+0.026}_{-0.034}$	$f\sigma_8(0.61)$	$0.459^{+0.011}_{-0.0066}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.744^{+0.068}_{-0.015}$	$\sigma_8(0.61)$	$0.578^{+0.015}_{-0.0089}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.94^{+0.22}_{-0.26}$	$f\sigma_8(2.33)$	$0.2916^{+0.0075}_{-0.0046}$
$A^{kSZ}$	$< 5.44$	$r_*$	$144.00^{+0.76}_{-0.26}$	$\sigma_8(2.33)$	$0.3004^{+0.0079}_{-0.0049}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$100\theta_*$	$1.04103^{+0.00035}_{-0.00030}$	$f_{2000}^{143}$	$30.1 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.832^{+0.071}_{-0.025}$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.0$
$H_0$	$67.77^{+0.41}_{-0.62}$	$z_{\text{drag}}$	$1060.16^{+0.35}_{-0.41}$	$f_{2000}^{217}$	$107.3 \pm 1.9$
$\Omega_{\Lambda}$	$0.6871 \pm 0.0063$	$r_{\text{drag}}$	$146.63^{+0.79}_{-0.28}$	$\chi_{\text{lensing}}^2$	$9.29 \pm 0.91$
$\Omega_m$	$0.3129 \pm 0.0063$	$k_{\text{D}}$	$0.14118^{+0.00036}_{-0.00065}$	$\chi_{\text{small}}^2$	$333 \pm 100$
$\Omega_m h^2$	$0.1437^{+0.0011}_{-0.0018}$	$100\theta_{\text{D}}$	$0.16088^{+0.00018}_{-0.00027}$	$\chi_{\text{lowl}}^2$	$87 \pm 100$
$\Omega_{\nu} h^2$	$0.00265^{+0.00025}_{-0.0020}$	$z_{\text{eq}}$	$3338^{+59}_{-20}$	$\chi_{\text{Aver15}}^2$	$0.53 \pm 0.44$
$\Omega_m h^3$	$0.09735^{+0.00029}_{-0.0014}$	$k_{\text{eq}}$	$0.01026^{+0.00017}_{-0.000088}$	$\chi_{6\text{DF}}^2$	$0.26 \pm 0.43$
$\sigma_8$	$0.793^{+0.020}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8266^{+0.0036}_{-0.012}$	$\chi_{\text{MGS}}^2$	$0.95 \pm 0.55$
$S_8$	$0.809^{+0.019}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4563^{+0.0019}_{-0.0065}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.011}_{-0.0073}$	$H(0.15)$	$73.08^{+0.34}_{-0.58}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.014}_{-0.0087}$	$D_{\text{M}}(0.15)$	$639.7^{+5.4}_{-3.5}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$H(0.38)$	$83.26^{+0.23}_{-0.53}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$r_{\text{drag}} h$	$99.37 \pm 0.80$	$D_{\text{M}}(0.38)$	$1525^{+12}_{-6.9}$		

$\bar{\chi}_{\text{eff}}^2 = 11960.11$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.55$ ;  $R - 1 = 0.03672$



8.16 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_meffsterile\_plikHM\_TTTEEE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00015$	$z_{\text{re}}$	$7.91 \pm 0.74$	$H(0.61)$	$95.67^{+0.14}_{-0.50}$
$\Omega_c h^2$	$0.1186^{+0.0031}_{-0.0019}$	$10^9 A_s$	$2.109^{+0.030}_{-0.033}$	$D_{\text{M}}(0.61)$	$2299^{+16}_{-8.3}$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$H(2.33)$	$237.16^{+0.69}_{-1.4}$
$\tau$	$0.0566^{+0.0067}_{-0.0077}$	$D_{40}$	$1225 \pm 12$	$D_{\text{M}}(2.33)$	$5741^{+29}_{-6.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.210$	$D_{220}$	$5732 \pm 39$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0070}$
$N_{eff}$	$3.1158^{+0.0067}_{-0.0069}$	$D_{810}$	$2539 \pm 13$	$\sigma_8(0.15)$	$0.732^{+0.018}_{-0.011}$
$\ln(10^{10} A_s)$	$3.049 \pm 0.015$	$D_{1420}$	$816.6 \pm 4.7$	$f\sigma_8(0.38)$	$0.466^{+0.011}_{-0.0068}$
$n_s$	$0.9680^{+0.0042}_{-0.0050}$	$D_{2000}$	$230.3 \pm 1.6$	$\sigma_8(0.38)$	$0.649^{+0.016}_{-0.0098}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$n_{s,0.002}$	$0.9680^{+0.0042}_{-0.0050}$	$f\sigma_8(0.51)$	$0.464^{+0.011}_{-0.0066}$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.24634^{+0.00015}_{-0.00092}$	$\sigma_8(0.51)$	$0.607^{+0.015}_{-0.0093}$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.24767^{+0.00016}_{-0.00092}$	$f\sigma_8(0.61)$	$0.459^{+0.011}_{-0.0065}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$10^5 D/H$	$2.600^{+0.025}_{-0.032}$	$\sigma_8(0.61)$	$0.578^{+0.015}_{-0.0089}$
$A_{100}^{PS}$	$251 \pm 28$	Age/Gyr	$13.745^{+0.068}_{-0.015}$	$f\sigma_8(2.33)$	$0.2915^{+0.0075}_{-0.0046}$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1089.95^{+0.22}_{-0.25}$	$\sigma_8(2.33)$	$0.3003^{+0.0079}_{-0.0049}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$r_*$	$144.00^{+0.76}_{-0.26}$	$f_{2000}^{143}$	$30.2 \pm 2.8$
$A^{kSZ}$	$< 5.45$	$100\theta_*$	$1.04103^{+0.00035}_{-0.00030}$	$f_{2000}^{143 \times 217}$	$32.6 \pm 1.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.832^{+0.071}_{-0.026}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1060.15^{+0.34}_{-0.41}$	$\chi_{\text{lensing}}^2$	$9.29 \pm 0.91$
$H_0$	$67.75^{+0.41}_{-0.62}$	$r_{\text{drag}}$	$146.64^{+0.79}_{-0.28}$	$\chi_{\text{small}}^2$	$334 \pm 100$
$\Omega_{\Lambda}$	$0.6870 \pm 0.0063$	$k_{\text{D}}$	$0.14117^{+0.00036}_{-0.00065}$	$\chi_{\text{lowl}}^2$	$87 \pm 100$
$\Omega_m$	$0.3130 \pm 0.0063$	$100\theta_{\text{D}}$	$0.16089^{+0.00018}_{-0.00026}$	$\chi_{\text{Aver15}}^2$	$0.53 \pm 0.42$
$\Omega_m h^2$	$0.1437^{+0.0011}_{-0.0018}$	$z_{\text{eq}}$	$3338^{+59}_{-20}$	$\chi_{\text{Cooke17}}^2$	$0.14 \pm 0.17$
$\Omega_{\nu} h^2$	$0.00266^{+0.00025}_{-0.0020}$	$k_{\text{eq}}$	$0.01026^{+0.00017}_{-0.000086}$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.42$
$\Omega_m h^3$	$0.09734^{+0.00030}_{-0.0014}$	$100\theta_{\text{eq}}$	$0.8265^{+0.0036}_{-0.012}$	$\chi_{\text{MGS}}^2$	$0.94 \pm 0.54$
$\sigma_8$	$0.793^{+0.020}_{-0.011}$	$100\theta_{\text{s,eq}}$	$0.4563^{+0.0018}_{-0.0065}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$S_8$	$0.810^{+0.019}_{-0.013}$	$H(0.15)$	$73.07^{+0.34}_{-0.58}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.011}_{-0.0072}$	$D_{\text{M}}(0.15)$	$639.8^{+5.4}_{-3.5}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.014}_{-0.0086}$	$H(0.38)$	$83.25^{+0.23}_{-0.53}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$D_{\text{M}}(0.38)$	$1525^{+12}_{-6.8}$	$\chi_{\text{Abund}}^2$	$0.67 \pm 0.46$
$r_{\text{drag}} h$	$99.35 \pm 0.80$	$H(0.51)$	$90.01^{+0.17}_{-0.51}$		
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$D_{\text{M}}(0.51)$	$1976^{+14}_{-7.8}$		

$$\bar{\chi}_{\text{eff}}^2 = 11960.15; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.43; R - 1 = 0.03562$$



8.17 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$H(0.51)$	$90.16^{+0.16}_{-0.67}$
$\Omega_c h^2$	$0.1190^{+0.0032}_{-0.0023}$	$z_{\text{re}}$	$7.99^{+0.63}_{-0.78}$	$D_{\text{M}}(0.51)$	$1972^{+18}_{-7.8}$
$100\theta_{MC}$	$1.04086^{+0.00035}_{-0.00031}$	$10^9 A_s$	$2.114^{+0.027}_{-0.035}$	$H(0.61)$	$95.82^{+0.13}_{-0.67}$
$\tau$	$0.0575^{+0.0059}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.884^{+0.011}_{-0.013}$	$D_{\text{M}}(0.61)$	$2295^{+20}_{-8.3}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.196$	$D_{40}$	$1224 \pm 13$	$H(2.33)$	$237.45^{+0.69}_{-1.7}$
$N_{eff}$	$< 3.14$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5733^{+38}_{-6.8}$
$\ln(10^{10} A_s)$	$3.051^{+0.013}_{-0.016}$	$D_{810}$	$2540 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0069}$
$n_s$	$0.9689^{+0.0043}_{-0.0058}$	$D_{1420}$	$816.6 \pm 4.8$	$\sigma_8(0.15)$	$0.733^{+0.019}_{-0.011}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{2000}$	$230.2 \pm 1.7$	$f\sigma_8(0.38)$	$0.466^{+0.012}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9689^{+0.0043}_{-0.0058}$	$\sigma_8(0.38)$	$0.650^{+0.017}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24663^{+0.00018}_{-0.0012}$	$f\sigma_8(0.51)$	$0.465^{+0.012}_{-0.0067}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24796^{+0.00018}_{-0.0012}$	$\sigma_8(0.51)$	$0.608^{+0.016}_{-0.0098}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.603^{+0.027}_{-0.039}$	$f\sigma_8(0.61)$	$0.460^{+0.012}_{-0.0067}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.724^{+0.090}_{-0.016}$	$\sigma_8(0.61)$	$0.579^{+0.015}_{-0.0094}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.97^{+0.23}_{-0.29}$	$f\sigma_8(2.33)$	$0.2921^{+0.0079}_{-0.0049}$
$A^{kSZ}$	$< 5.48$	$r_*$	$143.81^{+0.98}_{-0.27}$	$\sigma_8(2.33)$	$0.3009^{+0.0082}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04099^{+0.00039}_{-0.00031}$	$f_{2000}^{143}$	$30.3 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.815^{+0.091}_{-0.026}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.89^{+0.41}_{-0.75}$	$z_{\text{drag}}$	$1060.24^{+0.35}_{-0.47}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6875 \pm 0.0065$	$r_{\text{drag}}$	$146.4^{+1.0}_{-0.30}$	$\chi_{\text{lensing}}^2$	$9.29 \pm 0.89$
$\Omega_m$	$0.3125 \pm 0.0065$	$k_{\text{D}}$	$0.14132^{+0.00036}_{-0.00080}$	$\chi_{\text{small}}^2$	$397.5 \pm 2.2$
$\Omega_m h^2$	$0.1440^{+0.0011}_{-0.0022}$	$100\theta_{\text{D}}$	$0.16092^{+0.00018}_{-0.00033}$	$\chi_{\text{lowl}}^2$	$22.87 \pm 0.91$
$\Omega_{\nu} h^2$	$0.00258^{+0.00036}_{-0.0020}$	$z_{\text{eq}}$	$3338^{+57}_{-19}$	$\chi_{6\text{DF}}^2$	$0.078 \pm 0.085$
$\Omega_m h^3$	$0.09776^{+0.00031}_{-0.0018}$	$k_{\text{eq}}$	$0.01028^{+0.00017}_{-0.000094}$	$\chi_{\text{MGS}}^2$	$1.14 \pm 0.43$
$\sigma_8$	$0.794^{+0.021}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8265^{+0.0033}_{-0.012}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$S_8$	$0.810^{+0.020}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4562^{+0.0017}_{-0.0063}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.444^{+0.011}_{-0.0071}$	$H(0.15)$	$73.21^{+0.34}_{-0.72}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.015}_{-0.0086}$	$D_{\text{M}}(0.15)$	$638.6^{+6.6}_{-3.5}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$H(0.38)$	$83.39^{+0.22}_{-0.68}$		
$r_{\text{drag}} h$	$99.41 \pm 0.83$	$D_{\text{M}}(0.38)$	$1523^{+15}_{-6.8}$		

$\bar{\chi}_{\text{eff}}^2 = 11959.80$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.40$ ;  $R - 1 = 0.03599$



8.18 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02246 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.021$	$H(0.51)$	$90.22^{+0.16}_{-0.71}$
$\Omega_c h^2$	$0.1190^{+0.0032}_{-0.0024}$	$z_{\text{re}}$	$8.00^{+0.63}_{-0.77}$	$D_{\text{M}}(0.51)$	$1970^{+19}_{-7.3}$
$100\theta_{MC}$	$1.04086^{+0.00036}_{-0.00031}$	$10^9 A_s$	$2.114^{+0.027}_{-0.035}$	$H(0.61)$	$95.87^{+0.13}_{-0.71}$
$\tau$	$0.0576^{+0.0059}_{-0.0079}$	$10^9 A_s e^{-2\tau}$	$1.884^{+0.011}_{-0.013}$	$D_{\text{M}}(0.61)$	$2293^{+21}_{-7.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.181$	$D_{40}$	$1223 \pm 13$	$H(2.33)$	$237.42^{+0.66}_{-1.8}$
$N_{eff}$	$< 3.15$	$D_{220}$	$5734 \pm 39$	$D_{\text{M}}(2.33)$	$5730^{+40}_{-7.0}$
$\ln(10^{10} A_s)$	$3.051^{+0.013}_{-0.016}$	$D_{810}$	$2540 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0069}$
$n_s$	$0.9693^{+0.0042}_{-0.0059}$	$D_{1420}$	$816.7 \pm 4.8$	$\sigma_8(0.15)$	$0.735^{+0.019}_{-0.011}$
$y_{\text{cal}}$	$1.0009 \pm 0.0024$	$D_{2000}$	$230.3 \pm 1.7$	$f\sigma_8(0.38)$	$0.466^{+0.011}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9693^{+0.0042}_{-0.0059}$	$\sigma_8(0.38)$	$0.651^{+0.017}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24667^{+0.00018}_{-0.0013}$	$f\sigma_8(0.51)$	$0.465^{+0.011}_{-0.0067}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24800^{+0.00018}_{-0.0013}$	$\sigma_8(0.51)$	$0.609^{+0.016}_{-0.0098}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.602^{+0.026}_{-0.040}$	$f\sigma_8(0.61)$	$0.460^{+0.011}_{-0.0066}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.719^{+0.095}_{-0.016}$	$\sigma_8(0.61)$	$0.580^{+0.015}_{-0.0094}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.95^{+0.22}_{-0.29}$	$f\sigma_8(2.33)$	$0.2927^{+0.0076}_{-0.0049}$
$A^{kSZ}$	$< 5.50$	$r_*$	$143.8^{+1.0}_{-0.26}$	$\sigma_8(2.33)$	$0.3016^{+0.0080}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04099^{+0.00040}_{-0.00031}$	$f_{2000}^{143}$	$30.2 \pm 2.9$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.814^{+0.095}_{-0.026}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.0$
$H_0$	$67.98^{+0.39}_{-0.77}$	$z_{\text{drag}}$	$1060.26^{+0.35}_{-0.49}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$\Omega_{\Lambda}$	$0.6885 \pm 0.0062$	$r_{\text{drag}}$	$146.4^{+1.1}_{-0.28}$	$\chi_{\text{lensing}}^2$	$9.33 \pm 0.91$
$\Omega_m$	$0.3115 \pm 0.0062$	$k_{\text{D}}$	$0.14132^{+0.00035}_{-0.00084}$	$\chi_{\text{small}}^2$	$330 \pm 100$
$\Omega_m h^2$	$0.1439^{+0.0010}_{-0.0022}$	$100\theta_{\text{D}}$	$0.16093^{+0.00018}_{-0.00034}$	$\chi_{\text{lowl}}^2$	$91 \pm 100$
$\Omega_{\nu} h^2$	$0.00245^{+0.00032}_{-0.0019}$	$z_{\text{eq}}$	$3338^{+55}_{-18}$	$\chi_{\text{JLA}}^2$	$1035.13 \pm 0.33$
$\Omega_m h^3$	$0.09784^{+0.00031}_{-0.0019}$	$k_{\text{eq}}$	$0.01028^{+0.00017}_{-0.000096}$	$\chi_{6\text{DF}}^2$	$0.27 \pm 0.47$
$\sigma_8$	$0.795^{+0.020}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8264^{+0.0032}_{-0.011}$	$\chi_{\text{MGS}}^2$	$1.01 \pm 0.59$
$S_8$	$0.810^{+0.019}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4562^{+0.0016}_{-0.0060}$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.444^{+0.011}_{-0.0071}$	$H(0.15)$	$73.29^{+0.32}_{-0.75}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.594^{+0.014}_{-0.0086}$	$D_{\text{M}}(0.15)$	$637.8^{+6.8}_{-3.3}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8/h^{0.5}$	$0.964^{+0.022}_{-0.012}$	$H(0.38)$	$83.46^{+0.21}_{-0.72}$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$r_{\text{drag}} h$	$99.54 \pm 0.79$	$D_{\text{M}}(0.38)$	$1521^{+15}_{-6.4}$		

$\bar{\chi}_{\text{eff}}^2 = 12994.82$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.45$ ;  $R - 1 = 0.03782$



8.19 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Aver15\_zre6p5/base\_nnu\_meffsterile\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Aver15\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$H(0.51)$	$90.03^{+0.18}_{-0.51}$
$\Omega_c h^2$	$0.1186^{+0.0031}_{-0.0020}$	$z_{\text{re}}$	$7.96^{+0.62}_{-0.77}$	$D_{\text{M}}(0.51)$	$1975^{+14}_{-7.9}$
$100\theta_{MC}$	$1.04089 \pm 0.00032$	$10^9 A_s$	$2.111^{+0.027}_{-0.034}$	$H(0.61)$	$95.68^{+0.14}_{-0.51}$
$\tau$	$0.0572^{+0.0059}_{-0.0079}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.61)$	$2299^{+16}_{-8.5}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.210$	$D_{40}$	$1225 \pm 12$	$H(2.33)$	$237.16^{+0.68}_{-1.4}$
$N_{\text{eff}}$	$3.1163^{+0.0059}_{-0.069}$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5741^{+29}_{-6.7}$
$\ln(10^{10} A_s)$	$3.050^{+0.013}_{-0.016}$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0071}$
$n_s$	$0.9681^{+0.0042}_{-0.0050}$	$D_{1420}$	$816.6 \pm 4.7$	$\sigma_8(0.15)$	$0.733^{+0.018}_{-0.011}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{2000}$	$230.3 \pm 1.6$	$f\sigma_8(0.38)$	$0.466^{+0.011}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9681^{+0.0042}_{-0.0050}$	$\sigma_8(0.38)$	$0.649^{+0.016}_{-0.0097}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24635^{+0.00015}_{-0.00093}$	$f\sigma_8(0.51)$	$0.464^{+0.011}_{-0.0066}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24768^{+0.00015}_{-0.00093}$	$\sigma_8(0.51)$	$0.608^{+0.015}_{-0.0092}$
$A_{100}^{PS}$	$251 \pm 28$	$10^5 D/H$	$2.599^{+0.026}_{-0.034}$	$f\sigma_8(0.61)$	$0.459^{+0.011}_{-0.0065}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.743^{+0.068}_{-0.015}$	$\sigma_8(0.61)$	$0.578^{+0.015}_{-0.0088}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.94^{+0.22}_{-0.26}$	$f\sigma_8(2.33)$	$0.2917^{+0.0075}_{-0.0045}$
$A^{kSZ}$	$< 5.45$	$r_*$	$144.00^{+0.77}_{-0.26}$	$\sigma_8(2.33)$	$0.3005^{+0.0078}_{-0.0048}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04103^{+0.00035}_{-0.00030}$	$f_{2000}^{143}$	$30.1 \pm 2.8$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.832^{+0.072}_{-0.025}$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.0$
$H_0$	$67.78^{+0.41}_{-0.62}$	$z_{\text{drag}}$	$1060.16^{+0.35}_{-0.41}$	$f_{2000}^{217}$	$107.3 \pm 1.9$
$\Omega_{\Lambda}$	$0.6872 \pm 0.0063$	$r_{\text{drag}}$	$146.63^{+0.80}_{-0.28}$	$\chi_{\text{lensing}}^2$	$9.26 \pm 0.87$
$\Omega_m$	$0.3128 \pm 0.0063$	$k_{\text{D}}$	$0.14118^{+0.00036}_{-0.00065}$	$\chi_{\text{small}}^2$	$333 \pm 100$
$\Omega_m h^2$	$0.1436^{+0.0011}_{-0.0018}$	$100\theta_{\text{D}}$	$0.16088^{+0.00018}_{-0.00027}$	$\chi_{\text{lowl}}^2$	$87 \pm 100$
$\Omega_{\nu} h^2$	$0.00266^{+0.00025}_{-0.0020}$	$z_{\text{eq}}$	$3338^{+59}_{-20}$	$\chi_{\text{Aver15}}^2$	$0.54 \pm 0.44$
$\Omega_m h^3$	$0.09736^{+0.00029}_{-0.0014}$	$k_{\text{eq}}$	$0.01026^{+0.00017}_{-0.000088}$	$\chi_{6\text{DF}}^2$	$0.26 \pm 0.43$
$\sigma_8$	$0.793^{+0.020}_{-0.011}$	$100\theta_{\text{eq}}$	$0.8266^{+0.0036}_{-0.012}$	$\chi_{\text{MGS}}^2$	$0.95 \pm 0.55$
$S_8$	$0.809^{+0.019}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4563^{+0.0018}_{-0.0065}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.011}_{-0.0073}$	$H(0.15)$	$73.09^{+0.34}_{-0.58}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.014}_{-0.0086}$	$D_{\text{M}}(0.15)$	$639.6^{+5.4}_{-3.5}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$H(0.38)$	$83.27^{+0.23}_{-0.53}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$r_{\text{drag}} h$	$99.38 \pm 0.80$	$D_{\text{M}}(0.38)$	$1525^{+12}_{-6.9}$		
$\bar{\chi}_{\text{eff}}^2 = 11960.01; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.54; R - 1 = 0.03614$					



8.20 base\_nnu\_meffsterile\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Cooke17\_Aver15\_zre6p5/base\_nnu\_meffsterile\_plikHM\_T

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00015$	$z_{\text{re}}$	$7.95^{+0.62}_{-0.76}$	$H(0.61)$	$95.67^{+0.14}_{-0.51}$
$\Omega_c h^2$	$0.1186^{+0.0031}_{-0.0019}$	$10^9 A_s$	$2.111^{+0.027}_{-0.034}$	$D_{\text{M}}(0.61)$	$2299^{+16}_{-8.3}$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$H(2.33)$	$237.16^{+0.69}_{-1.4}$
$\tau$	$0.0571^{+0.0058}_{-0.0079}$	$D_{40}$	$1225 \pm 12$	$D_{\text{M}}(2.33)$	$5741^{+29}_{-6.7}$
$m_{\nu, \text{sterile}}^{\text{eff}}$	$< 0.209$	$D_{220}$	$5732 \pm 39$	$f\sigma_8(0.15)$	$0.448^{+0.011}_{-0.0070}$
$N_{eff}$	$3.1163^{+0.0068}_{-0.069}$	$D_{810}$	$2539 \pm 13$	$\sigma_8(0.15)$	$0.733^{+0.018}_{-0.011}$
$\ln(10^{10} A_s)$	$3.050^{+0.013}_{-0.016}$	$D_{1420}$	$816.6 \pm 4.7$	$f\sigma_8(0.38)$	$0.466^{+0.011}_{-0.0067}$
$n_s$	$0.9680^{+0.0042}_{-0.0050}$	$D_{2000}$	$230.3 \pm 1.6$	$\sigma_8(0.38)$	$0.649^{+0.016}_{-0.0097}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$n_{s,0.002}$	$0.9680^{+0.0042}_{-0.0050}$	$f\sigma_8(0.51)$	$0.464^{+0.011}_{-0.0066}$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.24635^{+0.00016}_{-0.00093}$	$\sigma_8(0.51)$	$0.607^{+0.015}_{-0.0092}$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.24768^{+0.00016}_{-0.00093}$	$f\sigma_8(0.61)$	$0.459^{+0.011}_{-0.0065}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$10^5 D/H$	$2.600^{+0.025}_{-0.032}$	$\sigma_8(0.61)$	$0.578^{+0.015}_{-0.0088}$
$A_{100}^{PS}$	$251 \pm 28$	Age/Gyr	$13.744^{+0.068}_{-0.015}$	$f\sigma_8(2.33)$	$0.2916^{+0.0075}_{-0.0045}$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1089.95^{+0.22}_{-0.25}$	$\sigma_8(2.33)$	$0.3004^{+0.0079}_{-0.0048}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$r_*$	$144.00^{+0.77}_{-0.27}$	$f_{2000}^{143}$	$30.2 \pm 2.8$
$A^{kSZ}$	$< 5.46$	$100\theta_*$	$1.04103^{+0.00035}_{-0.00030}$	$f_{2000}^{143 \times 217}$	$32.6 \pm 1.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.832^{+0.072}_{-0.026}$	$f_{2000}^{217}$	$107.4 \pm 1.9$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1060.15^{+0.34}_{-0.41}$	$\chi_{\text{lensing}}^2$	$9.26 \pm 0.87$
$H_0$	$67.76^{+0.41}_{-0.62}$	$r_{\text{drag}}$	$146.63^{+0.80}_{-0.29}$	$\chi_{\text{small}}^2$	$333 \pm 100$
$\Omega_{\Lambda}$	$0.6871 \pm 0.0063$	$k_{\text{D}}$	$0.14117^{+0.00036}_{-0.00065}$	$\chi_{\text{lowl}}^2$	$87 \pm 100$
$\Omega_m$	$0.3129 \pm 0.0063$	$100\theta_{\text{D}}$	$0.16089^{+0.00018}_{-0.00026}$	$\chi_{\text{Aver15}}^2$	$0.53 \pm 0.43$
$\Omega_m h^2$	$0.1437^{+0.0011}_{-0.0018}$	$z_{\text{eq}}$	$3338^{+59}_{-20}$	$\chi_{\text{Cooke17}}^2$	$0.14 \pm 0.17$
$\Omega_{\nu} h^2$	$0.00266^{+0.00025}_{-0.0020}$	$k_{\text{eq}}$	$0.01026^{+0.00017}_{-0.000086}$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.42$
$\Omega_m h^3$	$0.09735^{+0.00030}_{-0.0014}$	$100\theta_{\text{eq}}$	$0.8266^{+0.0035}_{-0.012}$	$\chi_{\text{MGS}}^2$	$0.95 \pm 0.55$
$\sigma_8$	$0.793^{+0.020}_{-0.011}$	$100\theta_{\text{s,eq}}$	$0.4563^{+0.0018}_{-0.0065}$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.8$
$S_8$	$0.810^{+0.019}_{-0.013}$	$H(0.15)$	$73.08^{+0.34}_{-0.58}$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.443^{+0.011}_{-0.0072}$	$D_{\text{M}}(0.15)$	$639.7^{+5.5}_{-3.5}$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.593^{+0.014}_{-0.0085}$	$H(0.38)$	$83.26^{+0.23}_{-0.53}$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.963^{+0.023}_{-0.012}$	$D_{\text{M}}(0.38)$	$1525^{+12}_{-6.8}$	$\chi_{\text{Abund}}^2$	$0.67 \pm 0.47$
$r_{\text{drag}} h$	$99.36 \pm 0.79$	$H(0.51)$	$90.02^{+0.17}_{-0.51}$		
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.021$	$D_{\text{M}}(0.51)$	$1976^{+14}_{-7.8}$		

$$\bar{\chi}_{\text{eff}}^2 = 11960.05; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.42; R - 1 = 0.03510$$



## 9 nnu+mnu

### 9.1 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02191^{+0.00040}_{-0.00035}$	$\sigma_8/h^{0.5}$	$0.969^{+0.045}_{-0.018}$	$H(0.15)$	$69.9^{+3.8}_{-2.6}$
$\Omega_c h^2$	$0.1194 \pm 0.0041$	$r_{\text{drag}} h$	$95.5^{+5.1}_{-2.5}$	$D_{\text{M}}(0.15)$	$673^{+23}_{-42}$
$100\theta_{MC}$	$1.04083 \pm 0.00061$	$\langle d^2 \rangle^{1/2}$	$2.460 \pm 0.048$	$H(0.38)$	$80.5^{+3.3}_{-2.6}$
$\tau$	$0.0508 \pm 0.0081$	$z_{\text{re}}$	$7.38 \pm 0.86$	$D_{\text{M}}(0.38)$	$1595^{+52}_{-88}$
$\Sigma m_\nu$	$< 0.240$	$10^9 A_s$	$2.075 \pm 0.045$	$H(0.51)$	$87.5^{+3.0}_{-2.5}$
$N_{eff}$	$2.91 \pm 0.30$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.024$	$D_{\text{M}}(0.51)$	$2061^{+65}_{-110}$
$\ln(10^{10} A_s)$	$3.032 \pm 0.021$	$D_{40}$	$1240 \pm 23$	$H(0.61)$	$93.3^{+2.8}_{-2.5}$
$n_s$	$0.955 \pm 0.015$	$D_{220}$	$5705 \pm 42$	$D_{\text{M}}(0.61)$	$2393^{+73}_{-120}$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2534 \pm 15$	$H(2.33)$	$236.1 \pm 3.8$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.7 \pm 5.3$	$D_{\text{M}}(2.33)$	$5880^{+140}_{-180}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.8 \pm 2.4$	$f\sigma_8(0.15)$	$0.460^{+0.014}_{-0.013}$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$n_{s,0.002}$	$0.955 \pm 0.015$	$\sigma_8(0.15)$	$0.715^{+0.052}_{-0.016}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P$	$0.2432 \pm 0.0042$	$f\sigma_8(0.38)$	$0.470^{+0.019}_{-0.0097}$
$A_{143}^{PS}$	$45 \pm 10$	$Y_P^{\text{BBN}}$	$0.2445 \pm 0.0043$	$\sigma_8(0.38)$	$0.631^{+0.050}_{-0.015}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.622 \pm 0.072$	$f\sigma_8(0.51)$	$0.465^{+0.021}_{-0.0084}$
$A^{kSZ}$	$< 5.75$	Age/Gyr	$14.07^{+0.33}_{-0.42}$	$\sigma_8(0.51)$	$0.589^{+0.048}_{-0.015}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$z_*$	$1090.35^{+0.52}_{-0.58}$	$f\sigma_8(0.61)$	$0.458^{+0.023}_{-0.0078}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$145.7 \pm 2.7$	$\sigma_8(0.61)$	$0.560^{+0.046}_{-0.014}$
$H_0$	$64.3^{+4.2}_{-2.7}$	$100\theta_*$	$1.04122 \pm 0.00074$	$f\sigma_8(2.33)$	$0.283^{+0.022}_{-0.0071}$
$\Omega_\Lambda$	$0.650^{+0.049}_{-0.018}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.99 \pm 0.25$	$\sigma_8(2.33)$	$0.289^{+0.025}_{-0.0084}$
$\Omega_m$	$0.350^{+0.018}_{-0.049}$	$z_{\text{drag}}$	$1058.7 \pm 1.2$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_m h^2$	$0.1436^{+0.0044}_{-0.0050}$	$r_{\text{drag}}$	$148.5 \pm 2.8$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.8$
$\Omega_\nu h^2$	$< 0.00245$	$k_{\text{D}}$	$0.1397 \pm 0.0020$	$f_{2000}^{217}$	$107.7 \pm 2.5$
$\Omega_m h^3$	$0.0924 \pm 0.0063$	$100\theta_{\text{D}}$	$0.16083 \pm 0.00069$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\sigma_8$	$0.777^{+0.054}_{-0.017}$	$z_{\text{eq}}$	$3445 \pm 73$	$\chi_{\text{lowl}}^2$	$24.9 \pm 2.6$
$S_8$	$0.835 \pm 0.026$	$k_{\text{eq}}$	$0.01041 \pm 0.00017$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.458 \pm 0.014$	$100\theta_{\text{eq}}$	$0.805 \pm 0.013$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$
$\sigma_8 \Omega_m^{0.25}$	$0.596^{+0.027}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4453 \pm 0.0068$		

Best-fit  $\chi_{\text{eff}}^2 = 7471.08$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.36$ ;  $\bar{\chi}_{\text{eff}}^2 = 7493.68$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.85$ ;  $R - 1 = 0.00504$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.79 ( $\Delta$  0.09) commander\_dx12\_v3.2.29: 24.32 ( $\Delta$  -0.23) CamSpec like\_10.7HM: 7048.88



## 9.2 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02188^{+0.00038}_{-0.00033}$	$\sigma_8/h^{0.5}$	$0.974^{+0.029}_{-0.013}$	$H(0.15)$	$69.7^{+3.5}_{-2.7}$
$\Omega_c h^2$	$0.1188 \pm 0.0040$	$r_{\text{drag}} h$	$95.4^{+4.8}_{-2.5}$	$D_M(0.15)$	$675^{+24}_{-39}$
$100\theta_{MC}$	$1.04089 \pm 0.00061$	$\langle d^2 \rangle^{1/2}$	$2.468^{+0.033}_{-0.040}$	$H(0.38)$	$80.2^{+3.0}_{-2.6}$
$\tau$	$0.0511 \pm 0.0080$	$z_{\text{re}}$	$7.41 \pm 0.84$	$D_M(0.38)$	$1601^{+53}_{-81}$
$\Sigma m_\nu$	$< 0.236$	$10^9 A_s$	$2.074 \pm 0.043$	$H(0.51)$	$87.2 \pm 2.6$
$N_{eff}$	$2.85 \pm 0.29$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.023$	$D_M(0.51)$	$2067^{+67}_{-98}$
$\ln(10^{10} A_s)$	$3.032 \pm 0.021$	$D_{40}$	$1245 \pm 21$	$H(0.61)$	$93.0 \pm 2.5$
$n_s$	$0.953 \pm 0.014$	$D_{220}$	$5706 \pm 42$	$D_M(0.61)$	$2401^{+75}_{-110}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2534 \pm 14$	$H(2.33)$	$235.4 \pm 3.7$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.0 \pm 5.3$	$D_M(2.33)$	$5900^{+140}_{-160}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.1 \pm 2.3$	$f\sigma_8(0.15)$	$0.4623 \pm 0.0082$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.953 \pm 0.014$	$\sigma_8(0.15)$	$0.718^{+0.043}_{-0.019}$
$A_{100}^{PS}$	$251 \pm 30$	$Y_P$	$0.2425 \pm 0.0041$	$f\sigma_8(0.38)$	$0.472^{+0.011}_{-0.0068}$
$A_{143}^{PS}$	$44 \pm 10$	$Y_P^{\text{BBN}}$	$0.2438 \pm 0.0041$	$\sigma_8(0.38)$	$0.633^{+0.041}_{-0.018}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.609 \pm 0.071$	$f\sigma_8(0.51)$	$0.467^{+0.014}_{-0.0068}$
$A^{kSZ}$	$< 5.56$	Age/Gyr	$14.12^{+0.33}_{-0.38}$	$\sigma_8(0.51)$	$0.591^{+0.040}_{-0.018}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1090.27^{+0.50}_{-0.58}$	$f\sigma_8(0.61)$	$0.460^{+0.016}_{-0.0071}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$r_*$	$146.1 \pm 2.6$	$\sigma_8(0.61)$	$0.562^{+0.039}_{-0.017}$
$H_0$	$64.1^{+3.8}_{-2.8}$	$100\theta_*$	$1.04131 \pm 0.00073$	$f\sigma_8(2.33)$	$0.284^{+0.019}_{-0.0086}$
$\Omega_\Lambda$	$0.650^{+0.046}_{-0.019}$	$D_M(z_*)/\text{Gpc}$	$14.03 \pm 0.24$	$\sigma_8(2.33)$	$0.290^{+0.022}_{-0.010}$
$\Omega_m$	$0.350^{+0.019}_{-0.046}$	$z_{\text{drag}}$	$1058.6 \pm 1.2$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m h^2$	$0.1427^{+0.0043}_{-0.0049}$	$r_{\text{drag}}$	$149.0 \pm 2.7$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.7$
$\Omega_\nu h^2$	$< 0.00237$	$k_D$	$0.1393 \pm 0.0019$	$f_{2000}^{217}$	$107.4 \pm 2.5$
$\Omega_m h^3$	$0.0915 \pm 0.0059$	$100\theta_D$	$0.16070 \pm 0.00067$	$\chi^2_{\text{lensing}}$	$9.2 \pm 1.1$
$\sigma_8$	$0.780^{+0.043}_{-0.019}$	$z_{\text{eq}}$	$3454^{+61}_{-74}$	$\chi^2_{\text{small}}$	$396.9 \pm 1.7$
$S_8$	$0.840 \pm 0.017$	$k_{\text{eq}}$	$0.01040^{+0.00015}_{-0.00016}$	$\chi^2_{\text{lowl}}$	$25.4 \pm 2.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4598 \pm 0.0094$	$100\theta_{\text{eq}}$	$0.803^{+0.013}_{-0.012}$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.599^{+0.016}_{-0.0095}$	$100\theta_{s,\text{eq}}$	$0.4444^{+0.0067}_{-0.0060}$	$\chi^2_{\text{CMB}}$	$4349 \pm 3000$

Best-fit  $\chi^2_{\text{eff}} = 7479.93$ ;  $\Delta\chi^2_{\text{eff}} = 6292.18$ ;  $\bar{\chi}^2_{\text{eff}} = 7502.27$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.92$ ;  $R - 1 = 0.00874$   
 $\chi^2_{\text{eff}}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.77 ( $\Delta$  0.03) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.68 ( $\Delta$  0.00) commander\_dx12\_v3.2\_29: 24.30 ( $\Delta$  -0.01) CamSpec like\_10.7HM: 7049.15



### 9.3 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00023$	$\sigma_8/h^{0.5}$	$0.978^{+0.027}_{-0.013}$	$H(0.15)$	$71.3^{+1.9}_{-1.7}$
$\Omega_c h^2$	$0.1180 \pm 0.0032$	$r_{\text{drag}} h$	$97.8^{+2.4}_{-1.4}$	$D_M(0.15)$	$658^{+15}_{-20}$
$100\theta_{MC}$	$1.04109 \pm 0.00047$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.032$	$H(0.38)$	$81.5 \pm 1.7$
$\tau$	$0.0529 \pm 0.0079$	$z_{\text{re}}$	$7.51 \pm 0.82$	$D_M(0.38)$	$1565^{+34}_{-43}$
$\Sigma m_\nu$	$< 0.136$	$10^9 A_s$	$2.080 \pm 0.040$	$H(0.51)$	$88.3 \pm 1.7$
$N_{eff}$	$2.90 \pm 0.21$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.019$	$D_M(0.51)$	$2024^{+42}_{-53}$
$\ln(10^{10} A_s)$	$3.035 \pm 0.019$	$D_{40}$	$1236 \pm 16$	$H(0.61)$	$94.0 \pm 1.7$
$n_s$	$0.9595 \pm 0.0092$	$D_{220}$	$5724 \pm 40$	$D_M(0.61)$	$2354^{+48}_{-59}$
$y_{\text{cal}}$	$1.0005 \pm 0.0026$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$234.9 \pm 3.0$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$817.2 \pm 5.1$	$D_M(2.33)$	$5841 \pm 99$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.2 \pm 2.0$	$f\sigma_8(0.15)$	$0.4570 \pm 0.0095$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9595 \pm 0.0092$	$\sigma_8(0.15)$	$0.732^{+0.029}_{-0.012}$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P$	$0.2434 \pm 0.0029$	$f\sigma_8(0.38)$	$0.472^{+0.011}_{-0.0078}$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.2447 \pm 0.0029$	$\sigma_8(0.38)$	$0.648^{+0.027}_{-0.011}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$10^5 D/H$	$2.570^{+0.048}_{-0.054}$	$f\sigma_8(0.51)$	$0.469^{+0.012}_{-0.0073}$
$A^{kSZ}$	$< 5.05$	Age/Gyr	$13.98 \pm 0.23$	$\sigma_8(0.51)$	$0.606^{+0.026}_{-0.011}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$z_*$	$1089.84 \pm 0.39$	$f\sigma_8(0.61)$	$0.463^{+0.013}_{-0.0070}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$r_*$	$145.8 \pm 2.0$	$\sigma_8(0.61)$	$0.576^{+0.025}_{-0.011}$
$H_0$	$65.9^{+2.1}_{-1.7}$	$100\theta_*$	$1.04141 \pm 0.00058$	$f\sigma_8(2.33)$	$0.291^{+0.012}_{-0.0053}$
$\Omega_\Lambda$	$0.673^{+0.021}_{-0.011}$	$D_M(z_*)/\text{Gpc}$	$14.00 \pm 0.19$	$\sigma_8(2.33)$	$0.299^{+0.014}_{-0.0060}$
$\Omega_m$	$0.327^{+0.011}_{-0.021}$	$z_{\text{drag}}$	$1059.27 \pm 0.84$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1415^{+0.0033}_{-0.0037}$	$r_{\text{drag}}$	$148.6 \pm 2.1$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$\Omega_\nu h^2$	$< 0.00140$	$k_D$	$0.1398 \pm 0.0015$	$f_{2000}^{217}$	$106.4 \pm 2.2$
$\Omega_m h^3$	$0.0932 \pm 0.0042$	$100\theta_D$	$0.16054 \pm 0.00048$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\sigma_8$	$0.794^{+0.030}_{-0.013}$	$z_{\text{eq}}$	$3417 \pm 39$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.5$
$S_8$	$0.827 \pm 0.018$	$k_{\text{eq}}$	$0.01033 \pm 0.00013$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4531 \pm 0.0099$	$100\theta_{\text{eq}}$	$0.8104 \pm 0.0074$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.600^{+0.016}_{-0.010}$	$100\theta_{s,\text{eq}}$	$0.4480 \pm 0.0038$		

Best-fit  $\chi_{\text{eff}}^2 = 11919.53$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.80$ ;  $\bar{\chi}_{\text{eff}}^2 = 11944.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.17$ ;  $R - 1 = 0.00883$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.79 ( $\Delta$  -0.22) commander\_dx12\_v3\_2\_29: 23.66 ( $\Delta$  -0.62) CamSpec like\_10.7HM\_1400\_unified: 11498.05



#### 9.4 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00023$	$\sigma_8/h^{0.5}$	$0.982^{+0.018}_{-0.011}$	$H(0.15)$	$71.2 \pm 1.8$
$\Omega_c h^2$	$0.1177 \pm 0.0031$	$r_{\text{drag}} h$	$97.9^{+2.2}_{-1.4}$	$D_M(0.15)$	$658^{+15}_{-19}$
$100\theta_{MC}$	$1.04114 \pm 0.00046$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.025$	$H(0.38)$	$81.4 \pm 1.6$
$\tau$	$0.0534 \pm 0.0076$	$z_{\text{re}}$	$7.55 \pm 0.78$	$D_M(0.38)$	$1566^{+34}_{-40}$
$\Sigma m_\nu$	$< 0.124$	$10^9 A_s$	$2.081 \pm 0.038$	$H(0.51)$	$88.2 \pm 1.6$
$N_{eff}$	$2.88 \pm 0.20$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.019$	$D_M(0.51)$	$2026^{+42}_{-49}$
$\ln(10^{10} A_s)$	$3.035 \pm 0.018$	$D_{40}$	$1239 \pm 16$	$H(0.61)$	$93.8 \pm 1.6$
$n_s$	$0.9583 \pm 0.0090$	$D_{220}$	$5727 \pm 40$	$D_M(0.61)$	$2356^{+48}_{-55}$
$y_{\text{cal}}$	$1.0006 \pm 0.0026$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$234.5 \pm 2.9$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{1420}$	$817.4 \pm 5.1$	$D_M(2.33)$	$5849 \pm 95$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$231.4 \pm 2.0$	$f\sigma_8(0.15)$	$0.4581 \pm 0.0066$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$n_{s,0.002}$	$0.9583 \pm 0.0090$	$\sigma_8(0.15)$	$0.735^{+0.022}_{-0.013}$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P$	$0.2430 \pm 0.0029$	$f\sigma_8(0.38)$	$0.4732^{+0.0072}_{-0.0061}$
$A_{143}^{PS}$	$41 \pm 9$	$Y_P^{\text{BBN}}$	$0.2443 \pm 0.0029$	$\sigma_8(0.38)$	$0.650^{+0.021}_{-0.012}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.562 \pm 0.051$	$f\sigma_8(0.51)$	$0.4703^{+0.0081}_{-0.0061}$
$A^{kSZ}$	$< 4.95$	Age/Gyr	$14.00 \pm 0.23$	$\sigma_8(0.51)$	$0.608^{+0.020}_{-0.012}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$z_*$	$1089.79 \pm 0.38$	$f\sigma_8(0.61)$	$0.4643^{+0.0088}_{-0.0061}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$r_*$	$146.1 \pm 2.0$	$\sigma_8(0.61)$	$0.578^{+0.020}_{-0.011}$
$H_0$	$65.8^{+1.9}_{-1.7}$	$100\theta_*$	$1.04147 \pm 0.00057$	$f\sigma_8(2.33)$	$0.2916^{+0.0091}_{-0.0057}$
$\Omega_\Lambda$	$0.674^{+0.020}_{-0.011}$	$D_M(z_*)/\text{Gpc}$	$14.03 \pm 0.18$	$\sigma_8(2.33)$	$0.300^{+0.011}_{-0.0064}$
$\Omega_m$	$0.326^{+0.011}_{-0.020}$	$z_{\text{drag}}$	$1059.18 \pm 0.82$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1409^{+0.0032}_{-0.0036}$	$r_{\text{drag}}$	$148.8 \pm 2.0$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.3$
$\Omega_\nu h^2$	$< 0.00126$	$k_D$	$0.1396 \pm 0.0015$	$f_{2000}^{217}$	$106.2 \pm 2.1$
$\Omega_m h^3$	$0.0928 \pm 0.0041$	$100\theta_D$	$0.16048 \pm 0.00047$	$\chi^2_{\text{lensing}}$	$9.14 \pm 0.87$
$\sigma_8$	$0.797^{+0.023}_{-0.013}$	$z_{\text{eq}}$	$3420 \pm 37$	$\chi^2_{\text{simall}}$	$397.0 \pm 1.7$
$S_8$	$0.829 \pm 0.013$	$k_{\text{eq}}$	$0.01032 \pm 0.00012$	$\chi^2_{\text{lowl}}$	$24.4 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4543 \pm 0.0071$	$100\theta_{\text{eq}}$	$0.8097 \pm 0.0070$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.602^{+0.011}_{-0.0081}$	$100\theta_{s,\text{eq}}$	$0.4477 \pm 0.0036$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$

Best-fit  $\chi^2_{\text{eff}} = 11928.16$ ;  $\Delta\chi^2_{\text{eff}} = 9155.56$ ;  $\bar{\chi}^2_{\text{eff}} = 11952.59$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9151.05$ ;  $R - 1 = 0.01252$   
 $\chi^2_{\text{eff}}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 8.57 ( $\Delta$  -0.09) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.68 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 24.10 ( $\Delta$  -0.15) CamSpec like\_10.7HM\_1400\_unified: 11497.75



## 9.5 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02225 \pm 0.00023$	$r_{\text{drag}} h$	$99.9 \pm 1.1$	$H(0.38)$	$83.4 \pm 1.5$
$\Omega_c h^2$	$0.1200 \pm 0.0040$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.033$	$D_{\text{M}}(0.38)$	$1522 \pm 30$
$100\theta_{MC}$	$1.04091 \pm 0.00058$	$z_{\text{re}}$	$7.63 \pm 0.83$	$H(0.51)$	$90.1 \pm 1.6$
$\tau$	$0.0537 \pm 0.0080$	$10^9 A_s$	$2.094 \pm 0.042$	$D_{\text{M}}(0.51)$	$1971 \pm 38$
$\Sigma m_\nu$	$< 0.0799$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.022$	$H(0.61)$	$95.7 \pm 1.6$
$N_{\text{eff}}$	$3.11 \pm 0.24$	$D_{40}$	$1222 \pm 16$	$D_{\text{M}}(0.61)$	$2294 \pm 44$
$\ln(10^{10} A_s)$	$3.042 \pm 0.020$	$D_{220}$	$5714 \pm 40$	$H(2.33)$	$236.7 \pm 3.5$
$n_s$	$0.9690 \pm 0.0089$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5741 \pm 96$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.8 \pm 5.3$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0097$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.5 \pm 2.3$	$\sigma_8(0.15)$	$0.749^{+0.018}_{-0.014}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9690 \pm 0.0089$	$f\sigma_8(0.38)$	$0.4741^{+0.0099}_{-0.0088}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.2462 \pm 0.0032$	$\sigma_8(0.38)$	$0.664^{+0.016}_{-0.013}$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P^{\text{BBN}}$	$0.2475 \pm 0.0033$	$f\sigma_8(0.51)$	$0.4730^{+0.0098}_{-0.0085}$
$A_{143}^{PS}$	$45 \pm 10$	$10^5 D/H$	$2.632 \pm 0.069$	$\sigma_8(0.51)$	$0.622^{+0.015}_{-0.012}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.74 \pm 0.23$	$f\sigma_8(0.61)$	$0.4683^{+0.0097}_{-0.0084}$
$A^{kSZ}$	$< 5.95$	$z_*$	$1090.13 \pm 0.50$	$\sigma_8(0.61)$	$0.592^{+0.014}_{-0.011}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.2 \pm 2.3$	$f\sigma_8(2.33)$	$0.2985^{+0.0066}_{-0.0057}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04107 \pm 0.00070$	$\sigma_8(2.33)$	$0.3078^{+0.0074}_{-0.0062}$
$H_0$	$68.0 \pm 1.5$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.85 \pm 0.21$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_\Lambda$	$0.6910 \pm 0.0084$	$z_{\text{drag}}$	$1059.70 \pm 0.89$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.6$
$\Omega_m$	$0.3090 \pm 0.0084$	$r_{\text{drag}}$	$146.9 \pm 2.4$	$f_{2000}^{217}$	$108.0 \pm 2.4$
$\Omega_m h^2$	$0.1430 \pm 0.0042$	$k_{\text{D}}$	$0.1407 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_\nu h^2$	$< 0.000846$	$100\theta_{\text{D}}$	$0.16117 \pm 0.00060$	$\chi_{\text{lowl}}^2$	$22.8 \pm 1.2$
$\Omega_m h^3$	$0.0973 \pm 0.0047$	$z_{\text{eq}}$	$3370 \pm 34$	$\chi_{6\text{DF}}^2$	$0.059 \pm 0.080$
$\sigma_8$	$0.810^{+0.019}_{-0.015}$	$k_{\text{eq}}$	$0.01033 \pm 0.00015$	$\chi_{\text{MGS}}^2$	$1.45 \pm 0.60$
$S_8$	$0.822 \pm 0.019$	$100\theta_{\text{eq}}$	$0.8189 \pm 0.0065$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.450 \pm 0.010$	$100\theta_{s,\text{eq}}$	$0.4524 \pm 0.0033$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.013}_{-0.011}$	$H(0.15)$	$73.3 \pm 1.5$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.982^{+0.020}_{-0.014}$	$D_{\text{M}}(0.15)$	$638 \pm 13$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7476.70$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.30$ ;  $\bar{\chi}_{\text{eff}}^2 = 7498.64$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.94$ ;  $R - 1 = 0.00711$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.54 ( $\Delta$  0.13) DR12BAO: 3.66 ( $\Delta$  -0.25) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.81 ( $\Delta$  -0.06) commander\_dx12\_v3\_2\_29: 23.10 ( $\Delta$  -0.22) CamSpec like\_10.7HM: 7050.23



## 9.6 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02227 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.422 \pm 0.032$	$H(0.51)$	$90.2 \pm 1.6$
$\Omega_c h^2$	$0.1201 \pm 0.0040$	$z_{\text{re}}$	$7.64 \pm 0.83$	$D_{\text{M}}(0.51)$	$1968 \pm 37$
$100\theta_{\text{MC}}$	$1.04091 \pm 0.00058$	$10^9 A_s$	$2.095 \pm 0.042$	$H(0.61)$	$95.9 \pm 1.6$
$\tau$	$0.0538 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.022$	$D_{\text{M}}(0.61)$	$2290 \pm 43$
$\Sigma m_\nu$	$< 0.0777$	$D_{40}$	$1221 \pm 15$	$H(2.33)$	$236.8 \pm 3.5$
$N_{\text{eff}}$	$3.13 \pm 0.24$	$D_{220}$	$5714 \pm 40$	$D_{\text{M}}(2.33)$	$5734 \pm 95$
$\ln(10^{10} A_s)$	$3.042 \pm 0.020$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4548 \pm 0.0095$
$n_s$	$0.9697 \pm 0.0087$	$D_{1420}$	$814.8 \pm 5.3$	$\sigma_8(0.15)$	$0.750^{+0.017}_{-0.014}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.5 \pm 2.3$	$f\sigma_8(0.38)$	$0.4740^{+0.0097}_{-0.0087}$
$A_{217}^{\text{CIB}}$	$45 \pm 8$	$n_{s,0.002}$	$0.9697 \pm 0.0087$	$\sigma_8(0.38)$	$0.665^{+0.016}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2464 \pm 0.0032$	$f\sigma_8(0.51)$	$0.4730^{+0.0096}_{-0.0085}$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2477 \pm 0.0032$	$\sigma_8(0.51)$	$0.623^{+0.015}_{-0.012}$
$A_{100}^{PS}$	$254 \pm 30$	$10^5 D/H$	$2.633 \pm 0.069$	$f\sigma_8(0.61)$	$0.4684^{+0.0096}_{-0.0083}$
$A_{143}^{PS}$	$45 \pm 10$	Age/Gyr	$13.73 \pm 0.23$	$\sigma_8(0.61)$	$0.592^{+0.014}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.13 \pm 0.50$	$f\sigma_8(2.33)$	$0.2990^{+0.0065}_{-0.0056}$
$A^{kSZ}$	$< 5.96$	$r_*$	$144.1 \pm 2.3$	$\sigma_8(2.33)$	$0.3083^{+0.0072}_{-0.0060}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04106 \pm 0.00070$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9998^{+0.0022}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.84 \pm 0.21$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.6$
$H_0$	$68.2 \pm 1.4$	$z_{\text{drag}}$	$1059.76 \pm 0.87$	$f_{2000}^{217}$	$108.0 \pm 2.4$
$\Omega_\Lambda$	$0.6922 \pm 0.0078$	$r_{\text{drag}}$	$146.8 \pm 2.3$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m$	$0.3078 \pm 0.0078$	$k_{\text{D}}$	$0.1408 \pm 0.0017$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.2$
$\Omega_m h^2$	$0.1430 \pm 0.0042$	$100\theta_{\text{D}}$	$0.16120 \pm 0.00060$	$\chi_{\text{JLA}}^2$	$1035.02 \pm 0.33$
$\Omega_\nu h^2$	$< 0.000824$	$z_{\text{eq}}$	$3366 \pm 33$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.065$
$\Omega_m h^3$	$0.0976 \pm 0.0046$	$k_{\text{eq}}$	$0.01033 \pm 0.00015$	$\chi_{\text{MGS}}^2$	$1.54 \pm 0.57$
$\sigma_8$	$0.811^{+0.019}_{-0.015}$	$100\theta_{\text{eq}}$	$0.8196 \pm 0.0062$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.4$
$S_8$	$0.821 \pm 0.018$	$100\theta_{\text{s,eq}}$	$0.4528 \pm 0.0032$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.450 \pm 0.010$	$H(0.15)$	$73.4 \pm 1.4$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.013}_{-0.011}$	$D_{\text{M}}(0.15)$	$636 \pm 13$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8/h^{0.5}$	$0.982^{+0.020}_{-0.014}$	$H(0.38)$	$83.5 \pm 1.5$		
$r_{\text{drag}} h$	$100.09 \pm 0.99$	$D_{\text{M}}(0.38)$	$1519 \pm 29$		

Best-fit  $\chi_{\text{eff}}^2 = 8511.44$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.17$ ;  $\bar{\chi}_{\text{eff}}^2 = 8533.53$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.04$ ;  $R - 1 = 0.00839$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.68 ( $\Delta$  0.20) DR12BAO: 3.50 ( $\Delta$  -0.28) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  -0.01) commander\_dx12\_v3\_2\_29: 22.77 ( $\Delta$  -0.45) CamSpec like\_10.7HM: 7050.67 SN - JLA Pantheon18: 1034.80 ( $\Delta$  -0.07)



9.7 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Aver15/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.032$	$H(0.51)$	$89.6 \pm 1.3$
$\Omega_c h^2$	$0.1188 \pm 0.0032$	$z_{\text{re}}$	$7.59 \pm 0.82$	$D_{\text{M}}(0.51)$	$1983 \pm 31$
$100\theta_{MC}$	$1.04103 \pm 0.00053$	$10^9 A_s$	$2.087 \pm 0.039$	$H(0.61)$	$95.2 \pm 1.3$
$\tau$	$0.0534 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.019$	$D_{\text{M}}(0.61)$	$2307 \pm 35$
$\Sigma m_\nu$	$< 0.0743$	$D_{40}$	$1224 \pm 15$	$H(2.33)$	$235.6 \pm 2.8$
$N_{eff}$	$3.04 \pm 0.19$	$D_{220}$	$5715 \pm 40$	$D_{\text{M}}(2.33)$	$5770 \pm 76$
$\ln(10^{10} A_s)$	$3.038 \pm 0.019$	$D_{810}$	$2534 \pm 14$	$f\sigma_8(0.15)$	$0.4544 \pm 0.0094$
$n_s$	$0.9665 \pm 0.0074$	$D_{1420}$	$815.2 \pm 5.2$	$\sigma_8(0.15)$	$0.747^{+0.016}_{-0.012}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.0 \pm 2.1$	$f\sigma_8(0.38)$	$0.4730^{+0.0094}_{-0.0082}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9665 \pm 0.0074$	$\sigma_8(0.38)$	$0.662^{+0.015}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2452 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4718^{+0.0093}_{-0.0078}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2465 \pm 0.0025$	$\sigma_8(0.51)$	$0.620^{+0.014}_{-0.010}$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.614 \pm 0.059$	$f\sigma_8(0.61)$	$0.4670^{+0.0091}_{-0.0076}$
$A_{143}^{PS}$	$44 \pm 10$	Age/Gyr	$13.81 \pm 0.18$	$\sigma_8(0.61)$	$0.590^{+0.013}_{-0.0098}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.01 \pm 0.44$	$f\sigma_8(2.33)$	$0.2974^{+0.0060}_{-0.0049}$
$A^{kSZ}$	$< 5.72$	$r_*$	$144.9 \pm 1.8$	$\sigma_8(2.33)$	$0.3066^{+0.0067}_{-0.0053}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04124 \pm 0.00061$	$f_{2000}^{143}$	$30.6 \pm 3.3$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.92 \pm 0.17$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.4$
$H_0$	$67.6 \pm 1.2$	$z_{\text{drag}}$	$1059.46 \pm 0.74$	$f_{2000}^{217}$	$107.6 \pm 2.3$
$\Omega_\Lambda$	$0.6900 \pm 0.0081$	$r_{\text{drag}}$	$147.7 \pm 1.9$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$\Omega_m$	$0.3100 \pm 0.0081$	$k_{\text{D}}$	$0.1402 \pm 0.0014$	$\chi_{\text{lowl}}^2$	$23.1 \pm 1.2$
$\Omega_m h^2$	$0.1417 \pm 0.0034$	$100\theta_{\text{D}}$	$0.16101 \pm 0.00050$	$\chi_{\text{Aver15}}^2$	$0.56 \pm 0.75$
$\Omega_\nu h^2$	$< 0.000783$	$z_{\text{eq}}$	$3374 \pm 33$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.082$
$\Omega_m h^3$	$0.0958 \pm 0.0036$	$k_{\text{eq}}$	$0.01029 \pm 0.00013$	$\chi_{\text{MGS}}^2$	$1.39 \pm 0.57$
$\sigma_8$	$0.808^{+0.018}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8180 \pm 0.0061$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.7$
$S_8$	$0.821 \pm 0.018$	$100\theta_{\text{s,eq}}$	$0.4519 \pm 0.0032$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0099$	$H(0.15)$	$72.9 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.013}_{-0.010}$	$D_{\text{M}}(0.15)$	$641 \pm 11$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8/h^{0.5}$	$0.982^{+0.019}_{-0.014}$	$H(0.38)$	$82.9 \pm 1.2$		
$r_{\text{drag}} h$	$99.8 \pm 1.0$	$D_{\text{M}}(0.38)$	$1530 \pm 25$		

Best-fit  $\chi_{\text{eff}}^2 = 7476.67$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.21$ ;  $\bar{\chi}_{\text{eff}}^2 = 7498.80$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.04$ ;  $R - 1 = 0.00899$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.05 ( $\Delta$  0.00) BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.47 ( $\Delta$  0.00) DR12BAO: 3.76 ( $\Delta$  -0.00) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  0.03) commander\_dx12.v3.2.29: 23.28 ( $\Delta$  -0.04) CamSpec like\_10.7HM: 7050.02



9.8 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Cooke17\_A

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.032$	$H(0.51)$	$89.7 \pm 1.2$
$\Omega_c h^2$	$0.1189 \pm 0.0029$	$z_{\text{re}}$	$7.59^{+0.83}_{-0.75}$	$D_{\text{M}}(0.51)$	$1982 \pm 29$
$100\theta_{MC}$	$1.04102 \pm 0.00050$	$10^9 A_s$	$2.087 \pm 0.039$	$H(0.61)$	$95.3 \pm 1.2$
$\tau$	$0.0534 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.018$	$D_{\text{M}}(0.61)$	$2307 \pm 34$
$\Sigma m_\nu$	$< 0.0740$	$D_{40}$	$1224 \pm 14$	$H(2.33)$	$235.6 \pm 2.6$
$N_{\text{eff}}$	$3.04 \pm 0.17$	$D_{220}$	$5714 \pm 40$	$D_{\text{M}}(2.33)$	$5769 \pm 71$
$\ln(10^{10} A_s)$	$3.038 \pm 0.018$	$D_{810}$	$2534 \pm 14$	$f\sigma_8(0.15)$	$0.4545 \pm 0.0092$
$n_s$	$0.9666 \pm 0.0072$	$D_{1420}$	$815.2 \pm 5.1$	$\sigma_8(0.15)$	$0.747^{+0.016}_{-0.012}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.9 \pm 1.9$	$f\sigma_8(0.38)$	$0.4731^{+0.0092}_{-0.0079}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9666 \pm 0.0072$	$\sigma_8(0.38)$	$0.662^{+0.014}_{-0.010}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2452 \pm 0.0023$	$f\sigma_8(0.51)$	$0.4719^{+0.0091}_{-0.0075}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2466 \pm 0.0023$	$\sigma_8(0.51)$	$0.620^{+0.014}_{-0.0098}$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.615 \pm 0.050$	$f\sigma_8(0.61)$	$0.4671^{+0.0090}_{-0.0072}$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.81 \pm 0.17$	$\sigma_8(0.61)$	$0.590^{+0.013}_{-0.0094}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.02 \pm 0.37$	$f\sigma_8(2.33)$	$0.2974^{+0.0059}_{-0.0047}$
$A^{kSZ}$	$< 5.73$	$r_*$	$144.9 \pm 1.7$	$\sigma_8(2.33)$	$0.3067^{+0.0066}_{-0.0051}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04123 \pm 0.00058$	$f_{2000}^{143}$	$30.7 \pm 3.2$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.92 \pm 0.15$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.3$
$H_0$	$67.6 \pm 1.1$	$z_{\text{drag}}$	$1059.47 \pm 0.73$	$f_{2000}^{217}$	$107.6 \pm 2.1$
$\Omega_\Lambda$	$0.6900 \pm 0.0081$	$r_{\text{drag}}$	$147.6 \pm 1.7$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$\Omega_m$	$0.3100 \pm 0.0081$	$k_{\text{D}}$	$0.1402 \pm 0.0013$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.2$
$\Omega_m h^2$	$0.1417 \pm 0.0031$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00043$	$\chi_{\text{Aver15}}^2$	$0.51 \pm 0.66$
$\Omega_\nu h^2$	$< 0.000783$	$z_{\text{eq}}$	$3374 \pm 32$	$\chi_{\text{Cooke17}}^2$	$0.28 \pm 0.40$
$\Omega_m h^3$	$0.0959 \pm 0.0034$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.082$
$\sigma_8$	$0.808^{+0.017}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8180 \pm 0.0061$	$\chi_{\text{MGS}}^2$	$1.39 \pm 0.57$
$S_8$	$0.821 \pm 0.018$	$100\theta_{\text{s,eq}}$	$0.4519 \pm 0.0031$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4498 \pm 0.0097$	$H(0.15)$	$72.9 \pm 1.1$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.013}_{-0.010}$	$D_{\text{M}}(0.15)$	$641 \pm 10$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.982^{+0.019}_{-0.013}$	$H(0.38)$	$83.0 \pm 1.1$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$99.8 \pm 1.0$	$D_{\text{M}}(0.38)$	$1530 \pm 23$	$\chi_{\text{Abund}}^2$	$0.79 \pm 0.87$

Best-fit  $\chi_{\text{eff}}^2 = 7476.77$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.26$ ;  $\bar{\chi}_{\text{eff}}^2 = 7498.82$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.07$ ;  $R - 1 = 0.00839$

$\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.05 ( $\Delta$  -0.04) D\_Cooke2017: 0.04 ( $\Delta$  0.02) BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.41 ( $\Delta$  0.00) DR12BAO: 3.88 ( $\Delta$  -0.01) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  -0.08) commander\_dx12\_v3.2.29: 23.35 ( $\Delta$  0.02) CamSpec like\_10.7HM: 7050.16



9.9 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02227 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.031$	$H(0.51)$	$90.3 \pm 1.6$
$\Omega_c h^2$	$0.1201 \pm 0.0040$	$z_{\text{re}}$	$7.79^{+0.59}_{-0.82}$	$D_{\text{M}}(0.51)$	$1967 \pm 37$
$100\theta_{MC}$	$1.04090 \pm 0.00058$	$10^9 A_s$	$2.101^{+0.033}_{-0.041}$	$H(0.61)$	$95.9 \pm 1.6$
$\tau$	$0.0552^{+0.0053}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.022$	$D_{\text{M}}(0.61)$	$2289 \pm 43$
$\Sigma m_\nu$	$< 0.0788$	$D_{40}$	$1221 \pm 15$	$H(2.33)$	$236.8 \pm 3.5$
$N_{eff}$	$3.13 \pm 0.24$	$D_{220}$	$5714 \pm 40$	$D_{\text{M}}(2.33)$	$5732 \pm 95$
$\ln(10^{10} A_s)$	$3.045^{+0.016}_{-0.019}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0094$
$n_s$	$0.9700 \pm 0.0087$	$D_{1420}$	$814.8 \pm 5.3$	$\sigma_8(0.15)$	$0.751^{+0.017}_{-0.014}$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.5 \pm 2.3$	$f\sigma_8(0.38)$	$0.4745^{+0.0096}_{-0.0085}$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9700 \pm 0.0087$	$\sigma_8(0.38)$	$0.666^{+0.015}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2464 \pm 0.0032$	$f\sigma_8(0.51)$	$0.4736^{+0.0095}_{-0.0083}$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2478 \pm 0.0032$	$\sigma_8(0.51)$	$0.623^{+0.014}_{-0.011}$
$A_{100}^{PS}$	$254 \pm 30$	$10^5 D/H$	$2.633 \pm 0.069$	$f\sigma_8(0.61)$	$0.4689^{+0.0094}_{-0.0082}$
$A_{143}^{PS}$	$45 \pm 10$	Age/Gyr	$13.72 \pm 0.23$	$\sigma_8(0.61)$	$0.593^{+0.014}_{-0.011}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.13 \pm 0.50$	$f\sigma_8(2.33)$	$0.2994^{+0.0063}_{-0.0055}$
$A^{kSZ}$	$< 5.94$	$r_*$	$144.1 \pm 2.3$	$\sigma_8(2.33)$	$0.3087^{+0.0071}_{-0.0059}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04105 \pm 0.00070$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997^{+0.0022}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.84 \pm 0.21$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.6$
$H_0$	$68.2 \pm 1.4$	$z_{\text{drag}}$	$1059.78 \pm 0.87$	$f_{2000}^{217}$	$108.0 \pm 2.4$
$\Omega_\Lambda$	$0.6924 \pm 0.0078$	$r_{\text{drag}}$	$146.8 \pm 2.3$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m$	$0.3076 \pm 0.0078$	$k_{\text{D}}$	$0.1408 \pm 0.0017$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.2$
$\Omega_m h^2$	$0.1431 \pm 0.0042$	$100\theta_{\text{D}}$	$0.16120 \pm 0.00060$	$\chi_{\text{JLA}}^2$	$1035.01 \pm 0.33$
$\Omega_\nu h^2$	$< 0.000835$	$z_{\text{eq}}$	$3365 \pm 33$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.064$
$\Omega_m h^3$	$0.0977 \pm 0.0046$	$k_{\text{eq}}$	$0.01033 \pm 0.00015$	$\chi_{\text{MGS}}^2$	$1.55 \pm 0.57$
$\sigma_8$	$0.812^{+0.018}_{-0.015}$	$100\theta_{\text{eq}}$	$0.8198 \pm 0.0062$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.3$
$S_8$	$0.822 \pm 0.018$	$100\theta_{\text{s,eq}}$	$0.4528 \pm 0.0032$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0099$	$H(0.15)$	$73.5 \pm 1.4$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.605^{+0.013}_{-0.011}$	$D_{\text{M}}(0.15)$	$636 \pm 13$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8/h^{0.5}$	$0.983^{+0.020}_{-0.013}$	$H(0.38)$	$83.6 \pm 1.5$		
$r_{\text{drag}} h$	$100.10 \pm 0.99$	$D_{\text{M}}(0.38)$	$1518 \pm 29$		

$\bar{\chi}_{\text{eff}}^2 = 8533.27$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6292.03$ ;  $R - 1 = 0.00802$



9.10 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$r_{\text{drag}} h$	$99.72 \pm 0.93$	$H(0.38)$	$82.7 \pm 1.3$
$\Omega_c h^2$	$0.1183 \pm 0.0032$	$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.029$	$D_{\text{M}}(0.38)$	$1534 \pm 26$
$100\theta_{MC}$	$1.04109 \pm 0.00046$	$z_{\text{re}}$	$7.62 \pm 0.81$	$H(0.51)$	$89.4 \pm 1.3$
$\tau$	$0.0542 \pm 0.0080$	$10^9 A_s$	$2.088 \pm 0.039$	$D_{\text{M}}(0.51)$	$1988 \pm 33$
$\Sigma m_\nu$	$< 0.0655$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.019$	$H(0.61)$	$95.0 \pm 1.4$
$N_{eff}$	$2.99 \pm 0.20$	$D_{40}$	$1228 \pm 14$	$D_{\text{M}}(0.61)$	$2313 \pm 38$
$\ln(10^{10} A_s)$	$3.039 \pm 0.019$	$D_{220}$	$5729 \pm 39$	$H(2.33)$	$235.1 \pm 2.9$
$n_s$	$0.9650 \pm 0.0076$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5783 \pm 81$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.2 \pm 5.0$	$f\sigma_8(0.15)$	$0.4551 \pm 0.0078$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.1 \pm 2.0$	$\sigma_8(0.15)$	$0.747^{+0.014}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9650 \pm 0.0076$	$f\sigma_8(0.38)$	$0.4736 \pm 0.0077$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2446 \pm 0.0027$	$\sigma_8(0.38)$	$0.662^{+0.013}_{-0.011}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.2459 \pm 0.0027$	$f\sigma_8(0.51)$	$0.4723^{+0.0079}_{-0.0072}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.573 \pm 0.052$	$\sigma_8(0.51)$	$0.620^{+0.012}_{-0.010}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.85 \pm 0.19$	$f\sigma_8(0.61)$	$0.4674^{+0.0079}_{-0.0071}$
$A^{kSZ}$	$< 5.13$	$z_*$	$1089.75 \pm 0.38$	$\sigma_8(0.61)$	$0.590^{+0.012}_{-0.0099}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$r_*$	$145.2 \pm 1.9$	$f\sigma_8(2.33)$	$0.2974^{+0.0055}_{-0.0050}$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04132 \pm 0.00057$	$\sigma_8(2.33)$	$0.3066^{+0.0061}_{-0.0054}$
$H_0$	$67.4 \pm 1.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.18$	$f_{2000}^{143}$	$29.0 \pm 3.2$
$\Omega_\Lambda$	$0.6894 \pm 0.0075$	$z_{\text{drag}}$	$1059.67 \pm 0.74$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.3$
$\Omega_m$	$0.3106 \pm 0.0075$	$r_{\text{drag}}$	$147.9 \pm 2.0$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_m h^2$	$0.1412 \pm 0.0034$	$k_{\text{D}}$	$0.1402 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_\nu h^2$	$< 0.000686$	$100\theta_{\text{D}}$	$0.16067 \pm 0.00046$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.2$
$\Omega_m h^3$	$0.0952 \pm 0.0038$	$z_{\text{eq}}$	$3387 \pm 28$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.079$
$\sigma_8$	$0.808^{+0.015}_{-0.013}$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{MGS}}^2$	$1.32 \pm 0.51$
$S_8$	$0.822 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8161 \pm 0.0053$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0082$	$100\theta_{s,\text{eq}}$	$0.4509 \pm 0.0027$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.011}_{-0.0094}$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.985^{+0.016}_{-0.012}$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11924.95$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.29$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.25$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.08$ ;  $R - 1 = 0.00978$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  -0.00) MGS: 1.47 ( $\Delta$  0.07) DR12BAO: 3.77 ( $\Delta$  -0.15) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.84 ( $\Delta$  -0.21) commander\_dx12\_v3\_2\_29: 23.33 ( $\Delta$  -0.38) CamSpec like\_10.7HM\_1400\_unified: 11498.54



9.11 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.028$	$H(0.51)$	$89.5 \pm 1.3$
$\Omega_c h^2$	$0.1184 \pm 0.0032$	$z_{\text{re}}$	$7.64 \pm 0.81$	$D_{\text{M}}(0.51)$	$1984 \pm 32$
$100\theta_{MC}$	$1.04108 \pm 0.00046$	$10^9 A_s$	$2.090 \pm 0.039$	$H(0.61)$	$95.1 \pm 1.3$
$\tau$	$0.0544^{+0.0073}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.019$	$D_{\text{M}}(0.61)$	$2309 \pm 37$
$\Sigma m_\nu$	$< 0.0624$	$D_{40}$	$1227 \pm 14$	$H(2.33)$	$235.3 \pm 2.9$
$N_{eff}$	$3.00 \pm 0.19$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5776 \pm 80$
$\ln(10^{10} A_s)$	$3.039 \pm 0.019$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4547 \pm 0.0077$
$n_s$	$0.9657 \pm 0.0074$	$D_{1420}$	$817.1 \pm 5.0$	$\sigma_8(0.15)$	$0.748^{+0.014}_{-0.012}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.0 \pm 2.0$	$f\sigma_8(0.38)$	$0.4735 \pm 0.0077$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9657 \pm 0.0074$	$\sigma_8(0.38)$	$0.663^{+0.013}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2448 \pm 0.0027$	$f\sigma_8(0.51)$	$0.4724 \pm 0.0076$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0027$	$\sigma_8(0.51)$	$0.621^{+0.012}_{-0.010}$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.574 \pm 0.052$	$f\sigma_8(0.61)$	$0.4676 \pm 0.0075$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.83 \pm 0.19$	$\sigma_8(0.61)$	$0.591^{+0.011}_{-0.0098}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.75 \pm 0.38$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0053$
$A^{kSZ}$	$< 5.13$	$r_*$	$145.1 \pm 1.9$	$\sigma_8(2.33)$	$0.3072^{+0.0059}_{-0.0053}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04130 \pm 0.00057$	$f_{2000}^{143}$	$29.1 \pm 3.2$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.18$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.3$
$H_0$	$67.6 \pm 1.2$	$z_{\text{drag}}$	$1059.73 \pm 0.73$	$f_{2000}^{217}$	$106.6 \pm 2.1$
$\Omega_\Lambda$	$0.6906 \pm 0.0070$	$r_{\text{drag}}$	$147.8 \pm 2.0$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3094 \pm 0.0070$	$k_{\text{D}}$	$0.1403 \pm 0.0014$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.2$
$\Omega_m h^2$	$0.1413 \pm 0.0034$	$100\theta_{\text{D}}$	$0.16069 \pm 0.00046$	$\chi_{\text{JLA}}^2$	$1035.06 \pm 0.33$
$\Omega_\nu h^2$	$< 0.000655$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.064$
$\Omega_m h^3$	$0.0955 \pm 0.0038$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{MGS}}^2$	$1.40 \pm 0.49$
$\sigma_8$	$0.809^{+0.015}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0051$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.4$
$S_8$	$0.822 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4501 \pm 0.0081$	$H(0.15)$	$72.8 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.011}_{-0.0094}$	$D_{\text{M}}(0.15)$	$642 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.984^{+0.016}_{-0.012}$	$H(0.38)$	$82.9 \pm 1.3$		
$r_{\text{drag}} h$	$99.87 \pm 0.88$	$D_{\text{M}}(0.38)$	$1531 \pm 25$		

Best-fit  $\chi_{\text{eff}}^2 = 12959.81$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.27$ ;  $\bar{\chi}_{\text{eff}}^2 = 12984.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.00$ ;  $R - 1 = 0.01027$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.01) MGS: 1.54 ( $\Delta$  0.13) DR12BAO: 3.67 ( $\Delta$  -0.25) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.79 ( $\Delta$  -0.07) commander\_dx12\_v3\_2\_29: 23.28 ( $\Delta$  -0.31) CamSpec like\_10.7HM\_1400\_unified: 11498.65 SN - JLA Pantheon18: 1034.85 ( $\Delta$  -0.06)



9.12 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.028$	$H(0.51)$	$89.3 \pm 1.1$
$\Omega_c h^2$	$0.1179 \pm 0.0027$	$z_{\text{re}}$	$7.61 \pm 0.80$	$D_{\text{M}}(0.51)$	$1991 \pm 28$
$100\theta_{\text{MC}}$	$1.04113 \pm 0.00042$	$10^9 A_s$	$2.086 \pm 0.038$	$H(0.61)$	$94.9 \pm 1.1$
$\tau$	$0.0541 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.017$	$D_{\text{M}}(0.61)$	$2317 \pm 32$
$\Sigma m_\nu$	$< 0.0642$	$D_{40}$	$1229 \pm 14$	$H(2.33)$	$234.8 \pm 2.4$
$N_{\text{eff}}$	$2.97 \pm 0.16$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5792 \pm 68$
$\ln(10^{10} A_s)$	$3.038 \pm 0.018$	$D_{810}$	$2535 \pm 14$	$f\sigma_8(0.15)$	$0.4548 \pm 0.0077$
$n_s$	$0.9642 \pm 0.0066$	$D_{1420}$	$817.3 \pm 4.9$	$\sigma_8(0.15)$	$0.746^{+0.014}_{-0.011}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.9$	$f\sigma_8(0.38)$	$0.4732^{+0.0077}_{-0.0070}$
$A_{217}^{\text{CIB}}$	$43 \pm 8$	$n_{s,0.002}$	$0.9642 \pm 0.0066$	$\sigma_8(0.38)$	$0.662^{+0.012}_{-0.0098}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2443 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4719^{+0.0076}_{-0.0068}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2456 \pm 0.0022$	$\sigma_8(0.51)$	$0.619^{+0.012}_{-0.0093}$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.567 \pm 0.046$	$f\sigma_8(0.61)$	$0.4670^{+0.0076}_{-0.0066}$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.87 \pm 0.16$	$\sigma_8(0.61)$	$0.589^{+0.011}_{-0.0089}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.72 \pm 0.34$	$f\sigma_8(2.33)$	$0.2970^{+0.0052}_{-0.0045}$
$A^{kSZ}$	$< 5.04$	$r_*$	$145.4 \pm 1.6$	$\sigma_8(2.33)$	$0.3062^{+0.0058}_{-0.0048}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04137 \pm 0.00050$	$f_{2000}^{143}$	$28.8 \pm 3.1$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.97 \pm 0.15$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.2$
$H_0$	$67.3 \pm 1.1$	$z_{\text{drag}}$	$1059.60 \pm 0.64$	$f_{2000}^{217}$	$106.4 \pm 2.0$
$\Omega_\Lambda$	$0.6890 \pm 0.0073$	$r_{\text{drag}}$	$148.1 \pm 1.6$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3110 \pm 0.0073$	$k_{\text{D}}$	$0.1401 \pm 0.0012$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.1$
$\Omega_m h^2$	$0.1408 \pm 0.0029$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00040$	$\chi_{\text{Aver15}}^2$	$0.34 \pm 0.48$
$\Omega_\nu h^2$	$< 0.000672$	$z_{\text{eq}}$	$3388 \pm 27$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.078$
$\Omega_m h^3$	$0.0948 \pm 0.0031$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.49$
$\sigma_8$	$0.808^{+0.015}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8158 \pm 0.0051$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$S_8$	$0.822 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4507 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0081$	$H(0.15)$	$72.5 \pm 1.1$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.603^{+0.010}_{-0.0090}$	$D_{\text{M}}(0.15)$	$644.4 \pm 9.8$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.984^{+0.016}_{-0.012}$	$H(0.38)$	$82.6 \pm 1.1$		
$r_{\text{drag}} h$	$99.68 \pm 0.90$	$D_{\text{M}}(0.38)$	$1537 \pm 22$		

Best-fit  $\chi_{\text{eff}}^2 = 11924.93$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.42$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.22$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.04$ ;  $R - 1 = 0.01005$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.00 ( $\Delta$  0.00) BAO - 6DF: 0.01 ( $\Delta$  -0.01) MGS: 1.41 ( $\Delta$  0.06) DR12BAO: 3.90 ( $\Delta$  -0.15) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.83 ( $\Delta$  -0.22) commander\_dx12\_v3.2\_29: 23.45 ( $\Delta$  -0.19) CamSpec like\_10.7HM\_1400\_unified: 11498.32



9.13 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_po

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.028$	$H(0.51)$	$89.4 \pm 1.1$
$\Omega_c h^2$	$0.1184 \pm 0.0026$	$z_{\text{re}}$	$7.61 \pm 0.80$	$D_{\text{M}}(0.51)$	$1988 \pm 27$
$100\theta_{MC}$	$1.04107 \pm 0.00040$	$10^9 A_s$	$2.088 \pm 0.038$	$H(0.61)$	$95.0 \pm 1.1$
$\tau$	$0.0540 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.016$	$D_{\text{M}}(0.61)$	$2313 \pm 30$
$\Sigma m_\nu$	$< 0.0646$	$D_{40}$	$1228 \pm 14$	$H(2.33)$	$235.2 \pm 2.3$
$N_{eff}$	$2.99 \pm 0.15$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(2.33)$	$5782 \pm 64$
$\ln(10^{10} A_s)$	$3.039 \pm 0.018$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4555 \pm 0.0076$
$n_s$	$0.9650 \pm 0.0065$	$D_{1420}$	$816.9 \pm 4.9$	$\sigma_8(0.15)$	$0.747^{+0.014}_{-0.011}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.0 \pm 1.8$	$f\sigma_8(0.38)$	$0.4739^{+0.0077}_{-0.0069}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9650 \pm 0.0065$	$\sigma_8(0.38)$	$0.663^{+0.012}_{-0.0095}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2446 \pm 0.0021$	$f\sigma_8(0.51)$	$0.4726^{+0.0076}_{-0.0066}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2460 \pm 0.0021$	$\sigma_8(0.51)$	$0.620^{+0.012}_{-0.0090}$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.577 \pm 0.041$	$f\sigma_8(0.61)$	$0.4677^{+0.0075}_{-0.0064}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.84 \pm 0.15$	$\sigma_8(0.61)$	$0.590^{+0.011}_{-0.0087}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.79 \pm 0.31$	$f\sigma_8(2.33)$	$0.2975^{+0.0051}_{-0.0043}$
$A^{kSZ}$	$< 5.14$	$r_*$	$145.2 \pm 1.5$	$\sigma_8(2.33)$	$0.3067^{+0.0058}_{-0.0047}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$100\theta_*$	$1.04130 \pm 0.00047$	$f_{2000}^{143}$	$29.2 \pm 3.0$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.14$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.1$
$H_0$	$67.4 \pm 1.0$	$z_{\text{drag}}$	$1059.65 \pm 0.63$	$f_{2000}^{217}$	$106.6 \pm 2.0$
$\Omega_\Lambda$	$0.6891 \pm 0.0072$	$r_{\text{drag}}$	$147.9 \pm 1.5$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3109 \pm 0.0072$	$k_{\text{D}}$	$0.1402 \pm 0.0011$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.1$
$\Omega_m h^2$	$0.1413 \pm 0.0027$	$100\theta_{\text{D}}$	$0.16070 \pm 0.00036$	$\chi_{\text{Aver15}}^2$	$0.34 \pm 0.47$
$\Omega_\nu h^2$	$< 0.000681$	$z_{\text{eq}}$	$3387 \pm 27$	$\chi_{\text{Cooke17}}^2$	$0.39 \pm 0.46$
$\Omega_m h^3$	$0.0953 \pm 0.0030$	$k_{\text{eq}}$	$0.01030 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.078$
$\sigma_8$	$0.809^{+0.015}_{-0.011}$	$100\theta_{\text{eq}}$	$0.8159 \pm 0.0051$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.49$
$S_8$	$0.823 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0026$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4509 \pm 0.0080$	$H(0.15)$	$72.7 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.010}_{-0.0088}$	$D_{\text{M}}(0.15)$	$643.2 \pm 9.4$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.985^{+0.016}_{-0.012}$	$H(0.38)$	$82.7 \pm 1.0$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.68 \pm 0.90$	$D_{\text{M}}(0.38)$	$1534 \pm 21$	$\chi_{\text{Abund}}^2$	$0.73 \pm 0.63$

Best-fit  $\chi_{\text{eff}}^2 = 11925.20$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.17$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.45$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.90$ ;  $R - 1 = 0.01051$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.02 ( $\Delta$  0.01) D\_Cooke2017: 0.18 ( $\Delta$  -0.21) BAO - 6DF: 0.01 ( $\Delta$  -0.01) MGS: 1.41 ( $\Delta$  0.06) DR12BAO: 3.90 ( $\Delta$  -0.16) CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  -0.18) commander\_dx12\_v3.2.29: 23.31 ( $\Delta$  -0.36) CamSpec like\_10.7HM\_1400\_unified: 11498.48



9.14 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.027$	$H(0.51)$	$89.6 \pm 1.3$
$\Omega_c h^2$	$0.1184 \pm 0.0032$	$z_{\text{re}}$	$7.76^{+0.57}_{-0.84}$	$D_{\text{M}}(0.51)$	$1983 \pm 32$
$100\theta_{MC}$	$1.04108 \pm 0.00046$	$10^9 A_s$	$2.095^{+0.031}_{-0.040}$	$H(0.61)$	$95.2 \pm 1.3$
$\tau$	$0.0556^{+0.0050}_{-0.0086}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.019$	$D_{\text{M}}(0.61)$	$2308 \pm 37$
$\Sigma m_\nu$	$< 0.0630$	$D_{40}$	$1227 \pm 14$	$H(2.33)$	$235.3 \pm 2.9$
$N_{eff}$	$3.00 \pm 0.19$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5775 \pm 80$
$\ln(10^{10} A_s)$	$3.042^{+0.015}_{-0.019}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0076$
$n_s$	$0.9659 \pm 0.0074$	$D_{1420}$	$817.1 \pm 5.0$	$\sigma_8(0.15)$	$0.749^{+0.014}_{-0.012}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.1 \pm 2.0$	$f\sigma_8(0.38)$	$0.4740 \pm 0.0075$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9659 \pm 0.0074$	$\sigma_8(0.38)$	$0.664^{+0.012}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2448 \pm 0.0027$	$f\sigma_8(0.51)$	$0.4728 \pm 0.0074$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0027$	$\sigma_8(0.51)$	$0.621^{+0.012}_{-0.010}$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.574 \pm 0.052$	$f\sigma_8(0.61)$	$0.4681 \pm 0.0074$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.83 \pm 0.19$	$\sigma_8(0.61)$	$0.591^{+0.011}_{-0.0096}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.75 \pm 0.38$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0051$
$A^{kSZ}$	$< 5.13$	$r_*$	$145.1 \pm 1.9$	$\sigma_8(2.33)$	$0.3075^{+0.0058}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04129 \pm 0.00056$	$f_{2000}^{143}$	$29.0 \pm 3.2$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.18$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.3$
$H_0$	$67.6 \pm 1.2$	$z_{\text{drag}}$	$1059.75 \pm 0.73$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_\Lambda$	$0.6907 \pm 0.0070$	$r_{\text{drag}}$	$147.8 \pm 2.0$	$\chi_{\text{simall}}^2$	$397.1 \pm 2.0$
$\Omega_m$	$0.3093 \pm 0.0070$	$k_{\text{D}}$	$0.1403 \pm 0.0014$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.2$
$\Omega_m h^2$	$0.1413 \pm 0.0034$	$100\theta_{\text{D}}$	$0.16069 \pm 0.00046$	$\chi_{\text{JLA}}^2$	$1035.05 \pm 0.33$
$\Omega_\nu h^2$	$< 0.000661$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.063$
$\Omega_m h^3$	$0.0955 \pm 0.0038$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{MGS}}^2$	$1.41 \pm 0.50$
$\sigma_8$	$0.810^{+0.015}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0051$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.3$
$S_8$	$0.822 \pm 0.014$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0079$	$H(0.15)$	$72.8 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.604^{+0.010}_{-0.0092}$	$D_{\text{M}}(0.15)$	$642 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.985^{+0.015}_{-0.012}$	$H(0.38)$	$82.9 \pm 1.3$		
$r_{\text{drag}} h$	$99.89 \pm 0.88$	$D_{\text{M}}(0.38)$	$1531 \pm 25$		
$\bar{\chi}_{\text{eff}}^2 = 12983.89$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.96$ ; $R - 1 = 0.01046$					



9.15 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_BAO/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00024$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.024$	$H(0.51)$	$89.8 \pm 1.6$
$\Omega_c h^2$	$0.1195 \pm 0.0038$	$z_{\text{re}}$	$7.72 \pm 0.77$	$D_{\text{M}}(0.51)$	$1978 \pm 39$
$100\theta_{MC}$	$1.04097 \pm 0.00058$	$10^9 A_s$	$2.096^{+0.036}_{-0.040}$	$H(0.61)$	$95.4 \pm 1.6$
$\tau$	$0.0546 \pm 0.0076$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.021$	$D_{\text{M}}(0.61)$	$2302 \pm 44$
$\Sigma m_\nu$	$< 0.0663$	$D_{40}$	$1226 \pm 15$	$H(2.33)$	$236.1 \pm 3.4$
$N_{\text{eff}}$	$3.07 \pm 0.24$	$D_{220}$	$5718 \pm 41$	$D_{\text{M}}(2.33)$	$5758 \pm 96$
$\ln(10^{10} A_s)$	$3.042 \pm 0.018$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4567 \pm 0.0068$
$n_s$	$0.9668 \pm 0.0088$	$D_{1420}$	$815.1 \pm 5.3$	$\sigma_8(0.15)$	$0.751 \pm 0.012$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 2.3$	$f\sigma_8(0.38)$	$0.4755 \pm 0.0066$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9668 \pm 0.0088$	$\sigma_8(0.38)$	$0.666 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2456 \pm 0.0032$	$f\sigma_8(0.51)$	$0.4743 \pm 0.0066$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2469 \pm 0.0032$	$\sigma_8(0.51)$	$0.623 \pm 0.011$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.620 \pm 0.068$	$f\sigma_8(0.61)$	$0.4694 \pm 0.0067$
$A_{143}^{PS}$	$45 \pm 10$	Age/Gyr	$13.78 \pm 0.23$	$\sigma_8(0.61)$	$0.593 \pm 0.011$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.07 \pm 0.48$	$f\sigma_8(2.33)$	$0.2990 \pm 0.0052$
$A^{kSZ}$	$< 5.80$	$r_*$	$144.6 \pm 2.2$	$\sigma_8(2.33)$	$0.3083 \pm 0.0058$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04116 \pm 0.00070$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.89 \pm 0.21$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.6$
$H_0$	$67.8 \pm 1.5$	$z_{\text{drag}}$	$1059.57 \pm 0.88$	$f_{2000}^{217}$	$107.7 \pm 2.4$
$\Omega_\Lambda$	$0.6902 \pm 0.0083$	$r_{\text{drag}}$	$147.3 \pm 2.3$	$\chi_{\text{lensing}}^2$	$9.52 \pm 0.91$
$\Omega_m$	$0.3098 \pm 0.0083$	$k_{\text{D}}$	$0.1404 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1423 \pm 0.0041$	$100\theta_{\text{D}}$	$0.16106 \pm 0.00059$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.3$
$\Omega_\nu h^2$	$< 0.000698$	$z_{\text{eq}}$	$3377 \pm 31$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.082$
$\Omega_m h^3$	$0.0965^{+0.0043}_{-0.0048}$	$k_{\text{eq}}$	$0.01032 \pm 0.00014$	$\chi_{\text{MGS}}^2$	$1.40 \pm 0.58$
$\sigma_8$	$0.812 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8175 \pm 0.0058$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.7$
$S_8$	$0.825 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4517 \pm 0.0030$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4520 \pm 0.0071$	$H(0.15)$	$73.0 \pm 1.5$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8 \Omega_m^{0.25}$	$0.6059 \pm 0.0088$	$D_{\text{M}}(0.15)$	$640 \pm 13$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.987^{+0.013}_{-0.010}$	$H(0.38)$	$83.1 \pm 1.5$		
$r_{\text{drag}} h$	$99.8 \pm 1.0$	$D_{\text{M}}(0.38)$	$1527 \pm 30$		

Best-fit  $\chi_{\text{eff}}^2 = 7485.59$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.37$ ;  $\bar{\chi}_{\text{eff}}^2 = 7507.28$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.66$ ;  $R - 1 = 0.00494$

$\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.47 ( $\Delta$  0.00) DR12BAO: 3.77 ( $\Delta$  0.01) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.90 ( $\Delta$  0.09) simall\_100x143\_offlike5\_EE\_Aplanck\_L  
395.85 ( $\Delta$  0.00) commander\_dx12\_v3\_2\_29: 23.31 ( $\Delta$  -0.01) CamSpec like\_10.7HM: 7049.94



9.16 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02224 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.024$	$H(0.51)$	$90.0 \pm 1.5$
$\Omega_c h^2$	$0.1196 \pm 0.0038$	$z_{\text{re}}$	$7.74 \pm 0.77$	$D_{\text{M}}(0.51)$	$1974 \pm 37$
$100\theta_{MC}$	$1.04096 \pm 0.00058$	$10^9 A_s$	$2.098 \pm 0.038$	$H(0.61)$	$95.6 \pm 1.6$
$\tau$	$0.0549 \pm 0.0076$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.021$	$D_{\text{M}}(0.61)$	$2297 \pm 43$
$\Sigma m_\nu$	$< 0.0636$	$D_{40}$	$1225 \pm 15$	$H(2.33)$	$236.2 \pm 3.4$
$N_{eff}$	$3.08 \pm 0.23$	$D_{220}$	$5718 \pm 41$	$D_{\text{M}}(2.33)$	$5750 \pm 94$
$\ln(10^{10} A_s)$	$3.043 \pm 0.018$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4563 \pm 0.0067$
$n_s$	$0.9677 \pm 0.0086$	$D_{1420}$	$815.1 \pm 5.3$	$\sigma_8(0.15)$	$0.752 \pm 0.012$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 2.3$	$f\sigma_8(0.38)$	$0.4754 \pm 0.0066$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9677 \pm 0.0086$	$\sigma_8(0.38)$	$0.667 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2458 \pm 0.0032$	$f\sigma_8(0.51)$	$0.4744 \pm 0.0066$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2471 \pm 0.0032$	$\sigma_8(0.51)$	$0.624 \pm 0.011$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.623 \pm 0.067$	$f\sigma_8(0.61)$	$0.4696 \pm 0.0066$
$A_{143}^{PS}$	$45 \pm 10$	Age/Gyr	$13.77 \pm 0.22$	$\sigma_8(0.61)$	$0.594 \pm 0.010$
$A_{217}^{PS}$	$108_{-10}^{+20}$	$z_*$	$1090.08 \pm 0.48$	$f\sigma_8(2.33)$	$0.2995 \pm 0.0051$
$A^{kSZ}$	$< 5.82$	$r_*$	$144.5 \pm 2.2$	$\sigma_8(2.33)$	$0.3089 \pm 0.0056$
$c_{100}$	$0.9986_{-0.0014}^{+0.0017}$	$100\theta_*$	$1.04113 \pm 0.00069$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997_{-0.0024}^{+0.0021}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.88 \pm 0.21$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.6$
$H_0$	$68.0 \pm 1.4$	$z_{\text{drag}}$	$1059.63 \pm 0.87$	$f_{2000}^{217}$	$107.8 \pm 2.4$
$\Omega_\Lambda$	$0.6916 \pm 0.0077$	$r_{\text{drag}}$	$147.2 \pm 2.3$	$\chi_{\text{lensing}}^2$	$9.54 \pm 0.91$
$\Omega_m$	$0.3084 \pm 0.0077$	$k_{\text{D}}$	$0.1405 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1424 \pm 0.0040$	$100\theta_{\text{D}}$	$0.16109 \pm 0.00059$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.2$
$\Omega_\nu h^2$	$< 0.000673$	$z_{\text{eq}}$	$3373 \pm 30$	$\chi_{\text{JLA}}^2$	$1035.04 \pm 0.35$
$\Omega_m h^3$	$0.0968 \pm 0.0045$	$k_{\text{eq}}$	$0.01032 \pm 0.00014$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.066$
$\sigma_8$	$0.813 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8182 \pm 0.0056$	$\chi_{\text{MGS}}^2$	$1.49 \pm 0.55$
$S_8$	$0.824 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4521 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0070$	$H(0.15)$	$73.2 \pm 1.4$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6060 \pm 0.0088$	$D_{\text{M}}(0.15)$	$638 \pm 13$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.987_{-0.010}^{+0.013}$	$H(0.38)$	$83.3 \pm 1.5$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$100.01 \pm 0.96$	$D_{\text{M}}(0.38)$	$1523 \pm 29$		

Best-fit  $\chi_{\text{eff}}^2 = 8520.27$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.12$ ;  $\bar{\chi}_{\text{eff}}^2 = 8542.17$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.67$ ;  $R - 1 = 0.00504$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.54 ( $\Delta$  0.00) DR12BAO: 3.65 ( $\Delta$  -0.01) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.87 ( $\Delta$  0.06) simall\_100x143\_offlike5\_EE\_Aplanck: 395.85 ( $\Delta$  -0.00) commander\_dx12\_v3.2\_29: 23.25 ( $\Delta$  -0.07) CamSpec like\_10.7HM: 7050.07 SN - JLA Pantheon18: 1034.86 ( $\Delta$  0.00)



9.17 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Aver15/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.023$	$H(0.51)$	$89.5 \pm 1.2$
$\Omega_c h^2$	$0.1186 \pm 0.0030$	$z_{\text{re}}$	$7.69 \pm 0.76$	$D_{\text{M}}(0.51)$	$1987 \pm 31$
$100\theta_{MC}$	$1.04106 \pm 0.00052$	$10^9 A_s$	$2.091 \pm 0.035$	$H(0.61)$	$95.1 \pm 1.3$
$\tau$	$0.0544 \pm 0.0076$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.018$	$D_{\text{M}}(0.61)$	$2312 \pm 36$
$\Sigma m_\nu$	$< 0.0626$	$D_{40}$	$1228 \pm 14$	$H(2.33)$	$235.2 \pm 2.7$
$N_{eff}$	$3.01 \pm 0.18$	$D_{220}$	$5718 \pm 41$	$D_{\text{M}}(2.33)$	$5780 \pm 76$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{810}$	$2535 \pm 14$	$f\sigma_8(0.15)$	$0.4562 \pm 0.0066$
$n_s$	$0.9649 \pm 0.0074$	$D_{1420}$	$815.4 \pm 5.2$	$\sigma_8(0.15)$	$0.749^{+0.012}_{-0.010}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.2 \pm 2.1$	$f\sigma_8(0.38)$	$0.4747 \pm 0.0063$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9649 \pm 0.0074$	$\sigma_8(0.38)$	$0.664^{+0.011}_{-0.0096}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2448 \pm 0.0025$	$f\sigma_8(0.51)$	$0.4734 \pm 0.0062$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2461 \pm 0.0025$	$\sigma_8(0.51)$	$0.621^{+0.010}_{-0.0091}$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.607 \pm 0.058$	$f\sigma_8(0.61)$	$0.4685 \pm 0.0061$
$A_{143}^{PS}$	$44 \pm 10$	Age/Gyr	$13.84 \pm 0.18$	$\sigma_8(0.61)$	$0.5913^{+0.0096}_{-0.0087}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.98 \pm 0.42$	$f\sigma_8(2.33)$	$0.2980 \pm 0.0046$
$A^{kSZ}$	$< 5.61$	$r_*$	$145.2 \pm 1.8$	$\sigma_8(2.33)$	$0.3073 \pm 0.0051$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04129 \pm 0.00061$	$f_{2000}^{143}$	$30.4 \pm 3.3$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.94 \pm 0.16$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.4$
$H_0$	$67.5 \pm 1.2$	$z_{\text{drag}}$	$1059.38 \pm 0.74$	$f_{2000}^{217}$	$107.4 \pm 2.2$
$\Omega_\Lambda$	$0.6893 \pm 0.0079$	$r_{\text{drag}}$	$147.9 \pm 1.8$	$\chi_{\text{lensing}}^2$	$9.40 \pm 0.86$
$\Omega_m$	$0.3107 \pm 0.0079$	$k_{\text{D}}$	$0.1400 \pm 0.0013$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1413 \pm 0.0032$	$100\theta_{\text{D}}$	$0.16093 \pm 0.00049$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.2$
$\Omega_\nu h^2$	$< 0.000658$	$z_{\text{eq}}$	$3381 \pm 29$	$\chi_{\text{Aver15}}^2$	$0.49 \pm 0.67$
$\Omega_m h^3$	$0.0953 \pm 0.0036$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{6\text{DF}}^2$	$0.063 \pm 0.083$
$\sigma_8$	$0.810^{+0.012}_{-0.011}$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0054$	$\chi_{\text{MGS}}^2$	$1.34 \pm 0.54$
$S_8$	$0.825 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0070$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6050 \pm 0.0083$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$\sigma_8/h^{0.5}$	$0.987^{+0.012}_{-0.010}$	$H(0.38)$	$82.8 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.4$
$r_{\text{drag}} h$	$99.74 \pm 0.98$	$D_{\text{M}}(0.38)$	$1534 \pm 25$		

Best-fit  $\chi_{\text{eff}}^2 = 7485.47$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.19$ ;  $\bar{\chi}_{\text{eff}}^2 = 7507.32$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.70$ ;  $R - 1 = 0.00578$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.01 ( $\Delta$  0.01) BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.41 ( $\Delta$  0.00) DR12BAO: 3.88 ( $\Delta$  -0.00) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.80 ( $\Delta$  0.10) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  0.00) commander\_dx12\_v3\_2\_29: 23.49 ( $\Delta$  -0.13) CamSpec like\_10.7HM: 7049.95



9.18 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00022$	$z_{\text{re}}$	$7.69 \pm 0.76$	$H(0.61)$	$95.1 \pm 1.2$
$\Omega_c h^2$	$0.1187 \pm 0.0028$	$10^9 A_s$	$2.091^{+0.033}_{-0.037}$	$D_{\text{M}}(0.61)$	$2311 \pm 34$
$100\theta_{MC}$	$1.04104 \pm 0.00050$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.017$	$H(2.33)$	$235.3 \pm 2.5$
$\tau$	$0.0544 \pm 0.0075$	$D_{40}$	$1228 \pm 14$	$D_{\text{M}}(2.33)$	$5778 \pm 71$
$\Sigma m_\nu$	$< 0.0627$	$D_{220}$	$5717 \pm 40$	$f\sigma_8(0.15)$	$0.4563 \pm 0.0065$
$N_{eff}$	$3.02 \pm 0.17$	$D_{810}$	$2535 \pm 14$	$\sigma_8(0.15)$	$0.749^{+0.011}_{-0.010}$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{1420}$	$815.3 \pm 5.0$	$f\sigma_8(0.38)$	$0.4749 \pm 0.0061$
$n_s$	$0.9651 \pm 0.0071$	$D_{2000}$	$230.1 \pm 1.9$	$\sigma_8(0.38)$	$0.664^{+0.010}_{-0.0092}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9651 \pm 0.0071$	$f\sigma_8(0.51)$	$0.4736 \pm 0.0059$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.2449 \pm 0.0023$	$\sigma_8(0.51)$	$0.6216^{+0.0098}_{-0.0087}$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.2462 \pm 0.0023$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0059$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.610 \pm 0.049$	$\sigma_8(0.61)$	$0.5915^{+0.0094}_{-0.0084}$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.83 \pm 0.17$	$f\sigma_8(2.33)$	$0.2982 \pm 0.0044$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1090.00 \pm 0.36$	$\sigma_8(2.33)$	$0.3075 \pm 0.0049$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$145.1 \pm 1.6$	$f_{2000}^{143}$	$30.5 \pm 3.2$
$A^{kSZ}$	$< 5.62$	$100\theta_*$	$1.04126 \pm 0.00057$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.93 \pm 0.15$	$f_{2000}^{217}$	$107.5 \pm 2.1$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.38 \pm 0.73$	$\chi^2_{\text{lensing}}$	$9.41 \pm 0.84$
$H_0$	$67.5 \pm 1.1$	$r_{\text{drag}}$	$147.8 \pm 1.7$	$\chi^2_{\text{simall}}$	$397.0 \pm 1.8$
$\Omega_\Lambda$	$0.6894 \pm 0.0079$	$k_{\text{D}}$	$0.1401 \pm 0.0013$	$\chi^2_{\text{lowl}}$	$23.3 \pm 1.1$
$\Omega_m$	$0.3106 \pm 0.0079$	$100\theta_{\text{D}}$	$0.16096 \pm 0.00042$	$\chi^2_{\text{Aver15}}$	$0.44 \pm 0.60$
$\Omega_m h^2$	$0.1414 \pm 0.0030$	$z_{\text{eq}}$	$3381 \pm 29$	$\chi^2_{\text{Cooke17}}$	$0.28 \pm 0.40$
$\Omega_\nu h^2$	$< 0.000662$	$k_{\text{eq}}$	$0.01030 \pm 0.00011$	$\chi^2_{6\text{DF}}$	$0.063 \pm 0.083$
$\Omega_m h^3$	$0.0955 \pm 0.0033$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0054$	$\chi^2_{\text{MGS}}$	$1.34 \pm 0.54$
$\sigma_8$	$0.811^{+0.012}_{-0.011}$	$100\theta_{s,\text{eq}}$	$0.4513 \pm 0.0027$	$\chi^2_{\text{DR12BAO}}$	$4.8 \pm 1.7$
$S_8$	$0.825 \pm 0.013$	$H(0.15)$	$72.7 \pm 1.1$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4518 \pm 0.0069$	$D_{\text{M}}(0.15)$	$643 \pm 10$	$\chi^2_{\text{CMB}}$	$4347 \pm 3000$
$\sigma_8 \Omega_m^{0.25}$	$0.6052 \pm 0.0081$	$H(0.38)$	$82.8 \pm 1.2$	$\chi^2_{\text{BAO}}$	$6.2 \pm 1.4$
$\sigma_8/h^{0.5}$	$0.987^{+0.012}_{-0.0099}$	$D_{\text{M}}(0.38)$	$1533 \pm 24$	$\chi^2_{\text{Abund}}$	$0.72 \pm 0.81$
$r_{\text{drag}} h$	$99.75 \pm 0.98$	$H(0.51)$	$89.5 \pm 1.2$		
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.023$	$D_{\text{M}}(0.51)$	$1986 \pm 30$		

Best-fit  $\chi^2_{\text{eff}} = 7485.51$ ;  $\Delta\chi^2_{\text{eff}} = 6292.18$ ;  $\bar{\chi}^2_{\text{eff}} = 7507.35$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.71$ ;  $R - 1 = 0.00593$   
 $\chi^2_{\text{eff}}$ : Abund - Yp\_Aver2015: 0.04 ( $\Delta$  0.01) D\_Cooke2017: 0.04 ( $\Delta$  -0.03) BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.47 ( $\Delta$  0.00) DR12BAO: 3.76 ( $\Delta$  0.00) CMB - smi-cadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.82 ( $\Delta$  0.05) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  -0.00) commander\_dx12\_v3\_2\_29: 23.32 ( $\Delta$  -0.00) CamSpec like\_10.7HM: 7049.98



9.19 base\_nnu\_mnu\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_mnu\_plikHM\_TT\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02225 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.023$	$H(0.51)$	$90.0 \pm 1.5$
$\Omega_c h^2$	$0.1196 \pm 0.0038$	$z_{\text{re}}$	$7.83^{+0.60}_{-0.79}$	$D_{\text{M}}(0.51)$	$1973 \pm 37$
$100\theta_{MC}$	$1.04096 \pm 0.00057$	$10^9 A_s$	$2.101^{+0.032}_{-0.039}$	$H(0.61)$	$95.6 \pm 1.6$
$\tau$	$0.0557^{+0.0055}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.021$	$D_{\text{M}}(0.61)$	$2297 \pm 43$
$\Sigma m_\nu$	$< 0.0650$	$D_{40}$	$1224 \pm 15$	$H(2.33)$	$236.2 \pm 3.4$
$N_{eff}$	$3.09 \pm 0.23$	$D_{220}$	$5718 \pm 41$	$D_{\text{M}}(2.33)$	$5749 \pm 94$
$\ln(10^{10} A_s)$	$3.045^{+0.015}_{-0.018}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4564 \pm 0.0067$
$n_s$	$0.9679 \pm 0.0086$	$D_{1420}$	$815.1 \pm 5.3$	$\sigma_8(0.15)$	$0.752 \pm 0.012$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 2.3$	$f\sigma_8(0.38)$	$0.4756 \pm 0.0066$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9679 \pm 0.0086$	$\sigma_8(0.38)$	$0.667 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2458 \pm 0.0032$	$f\sigma_8(0.51)$	$0.4746 \pm 0.0066$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.2471 \pm 0.0032$	$\sigma_8(0.51)$	$0.624 \pm 0.011$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.623 \pm 0.067$	$f\sigma_8(0.61)$	$0.4699 \pm 0.0066$
$A_{143}^{PS}$	$45 \pm 10$	Age/Gyr	$13.76 \pm 0.22$	$\sigma_8(0.61)$	$0.594 \pm 0.010$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.07 \pm 0.48$	$f\sigma_8(2.33)$	$0.2997 \pm 0.0050$
$A^{kSZ}$	$< 5.82$	$r_*$	$144.5 \pm 2.2$	$\sigma_8(2.33)$	$0.3091 \pm 0.0056$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04113 \pm 0.00069$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.88 \pm 0.21$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.6$
$H_0$	$68.0 \pm 1.4$	$z_{\text{drag}}$	$1059.65 \pm 0.87$	$f_{2000}^{217}$	$107.8 \pm 2.4$
$\Omega_\Lambda$	$0.6918 \pm 0.0077$	$r_{\text{drag}}$	$147.2 \pm 2.3$	$\chi_{\text{lensing}}^2$	$9.52 \pm 0.89$
$\Omega_m$	$0.3082 \pm 0.0077$	$k_{\text{D}}$	$0.1406 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1424 \pm 0.0040$	$100\theta_{\text{D}}$	$0.16109 \pm 0.00059$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.2$
$\Omega_\nu h^2$	$< 0.000686$	$z_{\text{eq}}$	$3372 \pm 29$	$\chi_{\text{JLA}}^2$	$1035.03 \pm 0.34$
$\Omega_m h^3$	$0.0969 \pm 0.0045$	$k_{\text{eq}}$	$0.01032 \pm 0.00014$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.065$
$\sigma_8$	$0.814 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8185 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$1.50 \pm 0.55$
$S_8$	$0.825 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4522 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.4 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0070$	$H(0.15)$	$73.2 \pm 1.4$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6062 \pm 0.0087$	$D_{\text{M}}(0.15)$	$638 \pm 13$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.987^{+0.013}_{-0.010}$	$H(0.38)$	$83.3 \pm 1.5$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$100.03 \pm 0.96$	$D_{\text{M}}(0.38)$	$1523 \pm 29$		

$\bar{\chi}_{\text{eff}}^2 = 8542.04$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.69$ ;  $R - 1 = 0.00589$



## 9.20 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.022$	$H(0.51)$	$89.3 \pm 1.3$
$\Omega_c h^2$	$0.1179 \pm 0.0031$	$z_{\text{re}}$	$7.68 \pm 0.75$	$D_{\text{M}}(0.51)$	$1991 \pm 32$
$100\theta_{MC}$	$1.04114 \pm 0.00046$	$10^9 A_s$	$2.090 \pm 0.036$	$H(0.61)$	$94.9 \pm 1.3$
$\tau$	$0.0549 \pm 0.0074$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.018$	$D_{\text{M}}(0.61)$	$2317 \pm 37$
$\Sigma m_\nu$	$< 0.0576$	$D_{40}$	$1231 \pm 13$	$H(2.33)$	$234.8 \pm 2.8$
$N_{eff}$	$2.96 \pm 0.19$	$D_{220}$	$5732 \pm 38$	$D_{\text{M}}(2.33)$	$5793 \pm 79$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4557 \pm 0.0060$
$n_s$	$0.9638 \pm 0.0074$	$D_{1420}$	$817.5 \pm 4.9$	$\sigma_8(0.15)$	$0.748 \pm 0.011$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$231.3 \pm 2.0$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0059$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9638 \pm 0.0074$	$\sigma_8(0.38)$	$0.663 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2442 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0059$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2455 \pm 0.0026$	$\sigma_8(0.51)$	$0.6206 \pm 0.0097$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.566^{+0.047}_{-0.053}$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0059$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.87 \pm 0.19$	$\sigma_8(0.61)$	$0.5906 \pm 0.0093$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.71 \pm 0.37$	$f\sigma_8(2.33)$	$0.2976 \pm 0.0046$
$A^{kSZ}$	$< 5.00$	$r_*$	$145.5 \pm 1.9$	$\sigma_8(2.33)$	$0.3069 \pm 0.0051$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04137 \pm 0.00056$	$f_{2000}^{143}$	$28.7 \pm 3.1$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.97 \pm 0.17$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.3$
$H_0$	$67.3 \pm 1.2$	$z_{\text{drag}}$	$1059.60 \pm 0.73$	$f_{2000}^{217}$	$106.3 \pm 2.1$
$\Omega_\Lambda$	$0.6892 \pm 0.0073$	$r_{\text{drag}}$	$148.2 \pm 1.9$	$\chi_{\text{lensing}}^2$	$9.19 \pm 0.76$
$\Omega_m$	$0.3108 \pm 0.0073$	$k_{\text{D}}$	$0.1400 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1407 \pm 0.0033$	$100\theta_{\text{D}}$	$0.16060 \pm 0.00045$	$\chi_{\text{lowl}}^2$	$23.6 \pm 1.2$
$\Omega_\nu h^2$	$< 0.000600$	$z_{\text{eq}}$	$3390 \pm 26$	$\chi_{6\text{DF}}^2$	$0.060 \pm 0.077$
$\Omega_m h^3$	$0.0947 \pm 0.0037$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{\text{MGS}}^2$	$1.31 \pm 0.49$
$\sigma_8$	$0.810 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0049$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0025$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0063$	$H(0.15)$	$72.5 \pm 1.2$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6044 \pm 0.0078$	$D_{\text{M}}(0.15)$	$644 \pm 11$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0095}$	$H(0.38)$	$82.6 \pm 1.3$		
$r_{\text{drag}} h$	$99.70 \pm 0.90$	$D_{\text{M}}(0.38)$	$1537 \pm 26$		

Best-fit  $\chi_{\text{eff}}^2 = 11933.58$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.42$ ;  $\bar{\chi}_{\text{eff}}^2 = 11957.66$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.85$ ;  $R - 1 = 0.00614$

$\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  -0.00) MGS: 1.41 ( $\Delta$  0.00) DR12BAO: 3.90 ( $\Delta$  -0.02) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consect8: 8.62 ( $\Delta$  -0.05) simall\_100x143\_offlike5\_EE\_Aplanc: 395.85 ( $\Delta$  -0.21) commander\_dx12\_v3.2\_29: 23.58 ( $\Delta$  -0.06) CamSpec like\_10.7HM\_1400\_unified: 11498.22



9.21 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.022$	$H(0.51)$	$89.4 \pm 1.3$
$\Omega_c h^2$	$0.1180 \pm 0.0031$	$z_{\text{re}}$	$7.71 \pm 0.75$	$D_{\text{M}}(0.51)$	$1988 \pm 31$
$100\theta_{MC}$	$1.04113 \pm 0.00045$	$10^9 A_s$	$2.092 \pm 0.035$	$H(0.61)$	$95.0 \pm 1.3$
$\tau$	$0.0551 \pm 0.0074$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.018$	$D_{\text{M}}(0.61)$	$2313 \pm 36$
$\Sigma m_\nu$	$< 0.0546$	$D_{40}$	$1230 \pm 13$	$H(2.33)$	$234.9 \pm 2.8$
$N_{eff}$	$2.97 \pm 0.19$	$D_{220}$	$5732 \pm 38$	$D_{\text{M}}(2.33)$	$5786 \pm 78$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4554 \pm 0.0059$
$n_s$	$0.9646 \pm 0.0073$	$D_{1420}$	$817.5 \pm 4.9$	$\sigma_8(0.15)$	$0.749 \pm 0.011$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$231.3 \pm 2.0$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0059$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9646 \pm 0.0073$	$\sigma_8(0.38)$	$0.664 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2444 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4730 \pm 0.0059$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0026$	$\sigma_8(0.51)$	$0.6216 \pm 0.0095$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.567^{+0.047}_{-0.054}$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0059$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.85 \pm 0.19$	$\sigma_8(0.61)$	$0.5915 \pm 0.0091$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.71 \pm 0.37$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0045$
$A^{kSZ}$	$< 5.01$	$r_*$	$145.4 \pm 1.8$	$\sigma_8(2.33)$	$0.3075 \pm 0.0050$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04135 \pm 0.00056$	$f_{2000}^{143}$	$28.8 \pm 3.1$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.17$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$H_0$	$67.4 \pm 1.2$	$z_{\text{drag}}$	$1059.65 \pm 0.72$	$f_{2000}^{217}$	$106.4 \pm 2.1$
$\Omega_\Lambda$	$0.6904 \pm 0.0069$	$r_{\text{drag}}$	$148.1 \pm 1.9$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.76$
$\Omega_m$	$0.3096 \pm 0.0069$	$k_{\text{D}}$	$0.1401 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1408 \pm 0.0033$	$100\theta_{\text{D}}$	$0.16062 \pm 0.00045$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_\nu h^2$	$< 0.000571$	$z_{\text{eq}}$	$3387 \pm 25$	$\chi_{\text{JLA}}^2$	$1035.06 \pm 0.33$
$\Omega_m h^3$	$0.0950 \pm 0.0037$	$k_{\text{eq}}$	$0.01029 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.063$
$\sigma_8$	$0.810 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8161 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.39 \pm 0.48$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4509 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4509 \pm 0.0062$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0078$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0094}$	$H(0.38)$	$82.7 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.1$
$r_{\text{drag}} h$	$99.84 \pm 0.85$	$D_{\text{M}}(0.38)$	$1534 \pm 25$		

Best-fit  $\chi_{\text{eff}}^2 = 12968.49$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.38$ ;  $\bar{\chi}_{\text{eff}}^2 = 12992.58$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.85$ ;  $R - 1 = 0.00612$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.47 ( $\Delta$  0.00) DR12BAO: 3.77 ( $\Delta$  -0.00) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.66 ( $\Delta$  0.05) simall\_100x143\_offlike5\_EE\_Aplanck: 395.86 ( $\Delta$  -0.06) commander\_dx12\_v3.2\_29: 23.43 ( $\Delta$  -0.09) CamSpec like\_10.7HM\_1400\_unified: 11498.34 SN - JLA Pantheon18: 1034.88 ( $\Delta$  0.00)



**9.22**    `base_nnu_mnu_CamSpecHM_TTTEEE_lowl_lowE_lensing_BAO_post_Aver15/base_nnu_mnu_plikHM_TTTEEE_lowl_lowE_lensing_B`

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.022$	$H(0.51)$	$89.2 \pm 1.1$
$\Omega_c h^2$	$0.1177 \pm 0.0026$	$z_{\text{re}}$	$7.68 \pm 0.75$	$D_{\text{M}}(0.51)$	$1993 \pm 28$
$100\theta_{MC}$	$1.04116 \pm 0.00041$	$10^9 A_s$	$2.088 \pm 0.034$	$H(0.61)$	$94.7 \pm 1.1$
$\tau$	$0.0548 \pm 0.0074$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.016$	$D_{\text{M}}(0.61)$	$2320 \pm 31$
$\Sigma m_\nu$	$< 0.0564$	$D_{40}$	$1231 \pm 13$	$H(2.33)$	$234.6 \pm 2.4$
$N_{eff}$	$2.95 \pm 0.16$	$D_{220}$	$5732 \pm 38$	$D_{\text{M}}(2.33)$	$5799 \pm 67$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$D_{810}$	$2536 \pm 13$	$f\sigma_8(0.15)$	$0.4556 \pm 0.0059$
$n_s$	$0.9634 \pm 0.0065$	$D_{1420}$	$817.5 \pm 4.9$	$\sigma_8(0.15)$	$0.748^{+0.011}_{-0.0096}$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$231.4 \pm 1.9$	$f\sigma_8(0.38)$	$0.4740 \pm 0.0057$
$A_{217}^{CIB}$	$42 \pm 8$	$n_{s,0.002}$	$0.9634 \pm 0.0065$	$\sigma_8(0.38)$	$0.6627^{+0.0098}_{-0.0087}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2440 \pm 0.0022$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0056$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2453 \pm 0.0022$	$\sigma_8(0.51)$	$0.6202^{+0.0093}_{-0.0083}$
$A_{100}^{PS}$	$246 \pm 30$	$10^5 D/H$	$2.562^{+0.042}_{-0.047}$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0056$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.88 \pm 0.16$	$\sigma_8(0.61)$	$0.5901^{+0.0089}_{-0.0080}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.69 \pm 0.33$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0042$
$A^{kSZ}$	$< 4.95$	$r_*$	$145.6 \pm 1.6$	$\sigma_8(2.33)$	$0.3067 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04141 \pm 0.00050$	$f_{2000}^{143}$	$28.6 \pm 3.0$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.98 \pm 0.14$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.2$
$H_0$	$67.2 \pm 1.1$	$z_{\text{drag}}$	$1059.55 \pm 0.64$	$f_{2000}^{217}$	$106.3 \pm 2.0$
$\Omega_\Lambda$	$0.6890 \pm 0.0070$	$r_{\text{drag}}$	$148.3 \pm 1.6$	$\chi_{\text{lensing}}^2$	$9.16 \pm 0.74$
$\Omega_m$	$0.3110 \pm 0.0070$	$k_{\text{D}}$	$0.1399 \pm 0.0012$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1405 \pm 0.0028$	$100\theta_{\text{D}}$	$0.16057 \pm 0.00039$	$\chi_{\text{lowl}}^2$	$23.6 \pm 1.1$
$\Omega_\nu h^2$	$< 0.000588$	$z_{\text{eq}}$	$3391 \pm 25$	$\chi_{\text{Aver15}}^2$	$0.31 \pm 0.44$
$\Omega_m h^3$	$0.0944 \pm 0.0031$	$k_{\text{eq}}$	$0.01028 \pm 0.00010$	$\chi_{6\text{DF}}^2$	$0.059 \pm 0.076$
$\sigma_8$	$0.809^{+0.011}_{-0.010}$	$100\theta_{\text{eq}}$	$0.8152 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.47$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0062$	$H(0.15)$	$72.5 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6041 \pm 0.0075$	$D_{\text{M}}(0.15)$	$645.2 \pm 9.7$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0095}$	$H(0.38)$	$82.5 \pm 1.1$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$r_{\text{drag}} h$	$99.67 \pm 0.87$	$D_{\text{M}}(0.38)$	$1539 \pm 22$		

Best-fit  $\chi_{\text{eff}}^2 = 11933.58$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.39$ ;  $\bar{\chi}_{\text{eff}}^2 = 11957.68$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.90$ ;  $R - 1 = 0.00718$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.01 ( $\Delta$  0.00) BAO - 6DF: 0.01 ( $\Delta$  -0.00) MGS: 1.41 ( $\Delta$  0.06) DR12BAO: 3.88 ( $\Delta$  -0.16) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.62 ( $\Delta$  -0.03) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  -0.01) commander\_dx12\_v3\_2\_29: 23.55 ( $\Delta$  -0.16) CamSpec like\_10.7HM\_1400\_unified: 11498.33



### 9.23 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Cooke17\_Aver15/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Cooke17\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00018$	$z_{\text{re}}$	$7.67 \pm 0.75$	$H(0.61)$	$94.9 \pm 1.1$
$\Omega_c h^2$	$0.1182 \pm 0.0025$	$10^9 A_s$	$2.090 \pm 0.034$	$D_{\text{M}}(0.61)$	$2315 \pm 30$
$100\theta_{\text{MC}}$	$1.04110 \pm 0.00040$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.015$	$H(2.33)$	$235.0 \pm 2.2$
$\tau$	$0.0547 \pm 0.0074$	$D_{40}$	$1230 \pm 13$	$D_{\text{M}}(2.33)$	$5788 \pm 64$
$\Sigma m_\nu$	$< 0.0572$	$D_{220}$	$5730 \pm 38$	$f\sigma_8(0.15)$	$0.4562 \pm 0.0058$
$N_{\text{eff}}$	$2.97 \pm 0.15$	$D_{810}$	$2536 \pm 13$	$\sigma_8(0.15)$	$0.749^{+0.011}_{-0.0093}$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{1420}$	$817.2 \pm 4.8$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0056$
$n_s$	$0.9642 \pm 0.0064$	$D_{2000}$	$231.1 \pm 1.8$	$\sigma_8(0.38)$	$0.6637^{+0.0098}_{-0.0085}$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$n_{s,0.002}$	$0.9642 \pm 0.0064$	$f\sigma_8(0.51)$	$0.4733 \pm 0.0055$
$A_{217}^{\text{CIB}}$	$43 \pm 8$	$Y_P$	$0.2444 \pm 0.0021$	$\sigma_8(0.51)$	$0.6211^{+0.0093}_{-0.0081}$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0021$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0055$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.572 \pm 0.041$	$\sigma_8(0.61)$	$0.5910^{+0.0089}_{-0.0078}$
$A_{100}^{PS}$	$247 \pm 30$	Age/Gyr	$13.86 \pm 0.15$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0042$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.76 \pm 0.31$	$\sigma_8(2.33)$	$0.3072^{+0.0048}_{-0.0043}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.3 \pm 1.5$	$f_{2000}^{143}$	$29.0 \pm 3.0$
$A^{kSZ}$	$< 5.06$	$100\theta_*$	$1.04133 \pm 0.00047$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.14$	$f_{2000}^{217}$	$106.5 \pm 2.0$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$z_{\text{drag}}$	$1059.60 \pm 0.63$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.73$
$H_0$	$67.3 \pm 1.0$	$r_{\text{drag}}$	$148.0 \pm 1.5$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_\Lambda$	$0.6891 \pm 0.0071$	$k_{\text{D}}$	$0.1401 \pm 0.0011$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_m$	$0.3109 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16065 \pm 0.00036$	$\chi_{\text{Aver15}}^2$	$0.31 \pm 0.43$
$\Omega_m h^2$	$0.1410 \pm 0.0026$	$z_{\text{eq}}$	$3390 \pm 24$	$\chi_{\text{Cooke17}}^2$	$0.43 \pm 0.49$
$\Omega_\nu h^2$	$< 0.000600$	$k_{\text{eq}}$	$0.010295 \pm 0.000098$	$\chi_{6\text{DF}}^2$	$0.059 \pm 0.076$
$\Omega_m h^3$	$0.0950 \pm 0.0030$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.48$
$\sigma_8$	$0.810^{+0.011}_{-0.0098}$	$100\theta_{s,\text{eq}}$	$0.4505 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$S_8$	$0.825 \pm 0.011$	$H(0.15)$	$72.6 \pm 1.0$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4517 \pm 0.0062$	$D_{\text{M}}(0.15)$	$643.9 \pm 9.4$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6049 \pm 0.0074$	$H(0.38)$	$82.7 \pm 1.0$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0095}$	$D_{\text{M}}(0.38)$	$1536 \pm 21$	$\chi_{\text{Abund}}^2$	$0.74 \pm 0.63$
$r_{\text{drag}} h$	$99.68 \pm 0.88$	$H(0.51)$	$89.3 \pm 1.1$		
$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.022$	$D_{\text{M}}(0.51)$	$1990 \pm 27$		

Best-fit  $\chi_{\text{eff}}^2 = 11933.95$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.14$ ;  $\bar{\chi}_{\text{eff}}^2 = 11957.95$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.69$ ;  $R - 1 = 0.00786$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.00 ( $\Delta$  -0.00) D\_Cooke2017: 0.27 ( $\Delta$  -0.16) BAO - 6DF: 0.01 ( $\Delta$  -0.01) MGS: 1.41 ( $\Delta$  0.06) DR12BAO: 3.89 ( $\Delta$  -0.17) CMB - smi-cadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.70 ( $\Delta$  -0.05) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  0.00) commander\_dx12\_v3\_2\_29: 23.46 ( $\Delta$  -0.16) CamSpec like\_10.7HM\_1400\_unified: 11498.26



9.24 base\_nnu\_mnu\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_BAO\_post\_Pantheon18\_zre6p5/base\_nnu\_mnu\_plikHM\_TTTEEE\_lowl\_low

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.022$	$H(0.51)$	$89.4 \pm 1.3$
$\Omega_c h^2$	$0.1180 \pm 0.0031$	$z_{\text{re}}$	$7.80^{+0.58}_{-0.76}$	$D_{\text{M}}(0.51)$	$1987 \pm 31$
$100\theta_{MC}$	$1.04112 \pm 0.00045$	$10^9 A_s$	$2.095^{+0.029}_{-0.036}$	$H(0.61)$	$95.0 \pm 1.3$
$\tau$	$0.0559^{+0.0054}_{-0.0078}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.018$	$D_{\text{M}}(0.61)$	$2313 \pm 36$
$\Sigma m_\nu$	$< 0.0557$	$D_{40}$	$1229 \pm 13$	$H(2.33)$	$234.9 \pm 2.8$
$N_{eff}$	$2.98 \pm 0.19$	$D_{220}$	$5732 \pm 38$	$D_{\text{M}}(2.33)$	$5785 \pm 78$
$\ln(10^{10} A_s)$	$3.042^{+0.014}_{-0.017}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4556 \pm 0.0059$
$n_s$	$0.9647 \pm 0.0072$	$D_{1420}$	$817.4 \pm 4.9$	$\sigma_8(0.15)$	$0.749 \pm 0.011$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{2000}$	$231.3 \pm 2.0$	$f\sigma_8(0.38)$	$0.4744 \pm 0.0058$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9647 \pm 0.0072$	$\sigma_8(0.38)$	$0.6645 \pm 0.0099$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2444 \pm 0.0026$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0058$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2457 \pm 0.0026$	$\sigma_8(0.51)$	$0.6220 \pm 0.0094$
$A_{100}^{PS}$	$247 \pm 30$	$10^5 D/H$	$2.567^{+0.047}_{-0.054}$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0058$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.85 \pm 0.19$	$\sigma_8(0.61)$	$0.5918 \pm 0.0090$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.71 \pm 0.37$	$f\sigma_8(2.33)$	$0.2983 \pm 0.0045$
$A^{kSZ}$	$< 5.02$	$r_*$	$145.4 \pm 1.8$	$\sigma_8(2.33)$	$0.3077 \pm 0.0049$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04135 \pm 0.00056$	$f_{2000}^{143}$	$28.8 \pm 3.1$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.96 \pm 0.17$	$f_{2000}^{143 \times 217}$	$31.5 \pm 2.3$
$H_0$	$67.5 \pm 1.2$	$z_{\text{drag}}$	$1059.66 \pm 0.72$	$f_{2000}^{217}$	$106.4 \pm 2.1$
$\Omega_\Lambda$	$0.6905 \pm 0.0068$	$r_{\text{drag}}$	$148.0 \pm 1.9$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.73$
$\Omega_m$	$0.3095 \pm 0.0068$	$k_{\text{D}}$	$0.1401 \pm 0.0014$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1408 \pm 0.0033$	$100\theta_{\text{D}}$	$0.16063 \pm 0.00045$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.1$
$\Omega_\nu h^2$	$< 0.000582$	$z_{\text{eq}}$	$3386 \pm 25$	$\chi_{\text{JLA}}^2$	$1035.05 \pm 0.33$
$\Omega_m h^3$	$0.0950 \pm 0.0037$	$k_{\text{eq}}$	$0.01028 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.046 \pm 0.062$
$\sigma_8$	$0.811 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8162 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.40 \pm 0.48$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4509 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4510 \pm 0.0062$	$H(0.15)$	$72.7 \pm 1.2$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6047 \pm 0.0077$	$D_{\text{M}}(0.15)$	$643 \pm 11$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987^{+0.011}_{-0.0093}$	$H(0.38)$	$82.7 \pm 1.2$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.0$
$r_{\text{drag}} h$	$99.86 \pm 0.85$	$D_{\text{M}}(0.38)$	$1534 \pm 25$		

$\bar{\chi}_{\text{eff}}^2 = 12992.45$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.89$ ;  $R - 1 = 0.00689$







## 11 nnu+yhe

### 11.1 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00023$	$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$H(0.15)$	$71.4 \pm 1.9$
$\Omega_c h^2$	$0.1168^{+0.0046}_{-0.0052}$	$r_{\text{drag}} h$	$98.6 \pm 1.3$	$D_M(0.15)$	$656 \pm 18$
$100\theta_{MC}$	$1.0416 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.447 \pm 0.032$	$H(0.38)$	$81.5^{+1.8}_{-2.0}$
$\tau$	$0.0531 \pm 0.0080$	$z_{\text{re}}$	$7.52 \pm 0.82$	$D_M(0.38)$	$1562 \pm 40$
$N_{\text{eff}}$	$2.83^{+0.29}_{-0.34}$	$10^9 A_s$	$2.079 \pm 0.041$	$H(0.51)$	$88.2^{+1.9}_{-2.1}$
$Y_{He}$	$0.251 \pm 0.021$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.021$	$D_M(0.51)$	$2022 \pm 51$
$\ln(10^{10} A_s)$	$3.034 \pm 0.020$	$D_{40}$	$1233 \pm 18$	$H(0.61)$	$93.8^{+1.9}_{-2.2}$
$n_s$	$0.9609 \pm 0.0092$	$D_{220}$	$5724 \pm 40$	$D_M(0.61)$	$2352 \pm 58$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$233.6 \pm 4.2$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.8 \pm 5.1$	$D_M(2.33)$	$5853 \pm 120$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.9^{+2.3}_{-2.0}$	$f\sigma_8(0.15)$	$0.4578 \pm 0.0088$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9609 \pm 0.0092$	$\sigma_8(0.15)$	$0.741 \pm 0.012$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.251 \pm 0.021$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0079$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.021$	$\sigma_8(0.38)$	$0.656 \pm 0.011$
$A_{217}^{PS}$	$109^{+20}_{-10}$	Age/Gyr	$14.01 \pm 0.30$	$f\sigma_8(0.51)$	$0.4717 \pm 0.0075$
$A^{kSZ}$	$< 5.14$	$z_*$	$1089.96^{+0.49}_{-0.57}$	$\sigma_8(0.51)$	$0.613 \pm 0.011$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$146.5 \pm 2.9$	$f\sigma_8(0.61)$	$0.4661 \pm 0.0073$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04170 \pm 0.00098$	$\sigma_8(0.61)$	$0.583 \pm 0.011$
$H_0$	$66.1 \pm 1.9$	$D_M(z_*)/\text{Gpc}$	$14.06 \pm 0.27$	$f\sigma_8(2.33)$	$0.2939 \pm 0.0055$
$\Omega_\Lambda$	$0.680 \pm 0.011$	$z_{\text{drag}}$	$1059.51 \pm 0.92$	$\sigma_8(2.33)$	$0.3026 \pm 0.0059$
$\Omega_m$	$0.320 \pm 0.011$	$r_{\text{drag}}$	$149.2 \pm 3.0$	$f_{2000}^{143}$	$29 \pm 4$
$\Omega_m h^2$	$0.1397^{+0.0046}_{-0.0052}$	$k_D$	$0.1390^{+0.0025}_{-0.0028}$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.6$
$\Omega_m h^3$	$0.0924^{+0.0050}_{-0.0061}$	$100\theta_D$	$0.16071^{+0.00054}_{-0.00066}$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\sigma_8$	$0.803 \pm 0.013$	$z_{\text{eq}}$	$3421 \pm 45$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$S_8$	$0.829 \pm 0.017$	$k_{\text{eq}}$	$0.01029 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4540 \pm 0.0094$	$100\theta_{\text{eq}}$	$0.8100 \pm 0.0079$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6036 \pm 0.0099$	$100\theta_{s,\text{eq}}$	$0.4478 \pm 0.0040$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11920.00$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.28$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.57$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.40$ ;  $R - 1 = 0.00989$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 23.44 ( $\Delta$  -0.82) CamSpec like\_10.7HM\_1400\_unified: 11498.75



## 11.2 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.027$	$H(0.51)$	$89.1 \pm 1.8$
$\Omega_c h^2$	$0.1175 \pm 0.0049$	$z_{\text{re}}$	$7.69 \pm 0.79$	$D_{\text{M}}(0.51)$	$1995 \pm 44$
$100\theta_{\text{MC}}$	$1.0414 \pm 0.0013$	$10^9 A_s$	$2.090 \pm 0.040$	$H(0.61)$	$94.7 \pm 1.9$
$\tau$	$0.0548 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.021$	$D_{\text{M}}(0.61)$	$2321 \pm 51$
$N_{\text{eff}}$	$2.94 \pm 0.30$	$D_{40}$	$1225 \pm 16$	$H(2.33)$	$234.6 \pm 4.2$
$Y_{\text{He}}$	$0.251 \pm 0.021$	$D_{220}$	$5729 \pm 40$	$D_{\text{M}}(2.33)$	$5801 \pm 110$
$\ln(10^{10} A_s)$	$3.039 \pm 0.019$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4535 \pm 0.0077$
$n_s$	$0.9662 \pm 0.0076$	$D_{1420}$	$816.9 \pm 5.1$	$\sigma_8(0.15)$	$0.744 \pm 0.012$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 2.2$	$f\sigma_8(0.38)$	$0.4718 \pm 0.0075$
$A_{217}^{\text{CIB}}$	$43 \pm 8$	$n_{s,0.002}$	$0.9662 \pm 0.0076$	$\sigma_8(0.38)$	$0.659 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.251 \pm 0.021$	$f\sigma_8(0.51)$	$0.4704 \pm 0.0074$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.252 \pm 0.021$	$\sigma_8(0.51)$	$0.617 \pm 0.011$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.89 \pm 0.27$	$f\sigma_8(0.61)$	$0.4655 \pm 0.0073$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.89^{+0.47}_{-0.58}$	$\sigma_8(0.61)$	$0.587 \pm 0.010$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$145.7 \pm 2.8$	$f\sigma_8(2.33)$	$0.2960 \pm 0.0052$
$A^{kSZ}$	$< 5.30$	$100\theta_*$	$1.04152 \pm 0.00096$	$\sigma_8(2.33)$	$0.3052 \pm 0.0055$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.99 \pm 0.26$	$f_{2000}^{143}$	$30 \pm 3$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.87 \pm 0.84$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.6$
$H_0$	$67.2 \pm 1.6$	$r_{\text{drag}}$	$148.3 \pm 2.9$	$f_{2000}^{217}$	$107.0 \pm 2.4$
$\Omega_{\Lambda}$	$0.6886 \pm 0.0073$	$k_{\text{D}}$	$0.1397 \pm 0.0027$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3114 \pm 0.0073$	$100\theta_{\text{D}}$	$0.16083^{+0.00053}_{-0.00064}$	$\chi_{\text{lowl}}^2$	$23.1 \pm 1.2$
$\Omega_m h^2$	$0.1405 \pm 0.0050$	$z_{\text{eq}}$	$3389 \pm 33$	$\chi_{6\text{DF}}^2$	$0.064 \pm 0.077$
$\Omega_m h^3$	$0.0945^{+0.0051}_{-0.0058}$	$k_{\text{eq}}$	$0.01027 \pm 0.00016$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.48$
$\sigma_8$	$0.805 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8159 \pm 0.0056$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$S_8$	$0.820 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0029$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4490 \pm 0.0079$	$H(0.15)$	$72.4 \pm 1.6$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6011 \pm 0.0096$	$D_{\text{M}}(0.15)$	$646 \pm 15$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$H(0.38)$	$82.5 \pm 1.8$		
$r_{\text{drag}} h$	$99.63 \pm 0.89$	$D_{\text{M}}(0.38)$	$1540 \pm 35$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.72; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.85; R - 1 = 0.01974$$



### 11.3 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00022$	$r_{\text{drag}} h$	$98.5 \pm 1.2$	$H(0.38)$	$81.3^{+1.7}_{-2.0}$
$\Omega_c h^2$	$0.1163^{+0.0042}_{-0.0049}$	$\langle d^2 \rangle^{1/2}$	$2.450 \pm 0.025$	$D_{\text{M}}(0.38)$	$1567 \pm 40$
$100\theta_{MC}$	$1.0417 \pm 0.0013$	$z_{\text{re}}$	$7.57 \pm 0.76$	$H(0.51)$	$88.0^{+1.8}_{-2.1}$
$\tau$	$0.0535 \pm 0.0075$	$10^9 A_s$	$2.079 \pm 0.037$	$D_{\text{M}}(0.51)$	$2028 \pm 50$
$N_{\text{eff}}$	$2.80^{+0.27}_{-0.33}$	$10^9 A_s e^{-2\tau}$	$1.867 \pm 0.020$	$H(0.61)$	$93.6^{+1.8}_{-2.1}$
$Y_{\text{He}}$	$0.251 \pm 0.021$	$D_{40}$	$1235 \pm 17$	$D_{\text{M}}(0.61)$	$2358 \pm 57$
$\ln(10^{10} A_s)$	$3.034 \pm 0.018$	$D_{220}$	$5726 \pm 39$	$H(2.33)$	$233.2^{+3.7}_{-4.3}$
$n_s$	$0.9598 \pm 0.0090$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5868 \pm 120$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{1420}$	$817.0 \pm 5.0$	$f\sigma_8(0.15)$	$0.4579 \pm 0.0068$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.1 \pm 2.1$	$\sigma_8(0.15)$	$0.740 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9598 \pm 0.0090$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0061$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.251 \pm 0.021$	$\sigma_8(0.38)$	$0.655 \pm 0.011$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.021$	$f\sigma_8(0.51)$	$0.4715 \pm 0.0060$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$14.05 \pm 0.29$	$\sigma_8(0.51)$	$0.613 \pm 0.010$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.93^{+0.48}_{-0.56}$	$f\sigma_8(0.61)$	$0.4658 \pm 0.0060$
$A^{kSZ}$	$< 5.04$	$r_*$	$146.8 \pm 2.8$	$\sigma_8(0.61)$	$0.5826 \pm 0.0098$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04178 \pm 0.00095$	$f\sigma_8(2.33)$	$0.2935 \pm 0.0052$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.09 \pm 0.26$	$\sigma_8(2.33)$	$0.3021 \pm 0.0057$
$H_0$	$65.9^{+1.7}_{-1.9}$	$z_{\text{drag}}$	$1059.44 \pm 0.92$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_{\Lambda}$	$0.679 \pm 0.011$	$r_{\text{drag}}$	$149.6 \pm 2.9$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.6$
$\Omega_m$	$0.321 \pm 0.011$	$k_{\text{D}}$	$0.1388^{+0.0024}_{-0.0027}$	$f_{2000}^{217}$	$106.7 \pm 2.4$
$\Omega_m h^2$	$0.1392^{+0.0042}_{-0.0050}$	$100\theta_{\text{D}}$	$0.16066^{+0.00054}_{-0.00063}$	$\chi^2_{\text{lensing}}$	$9.03 \pm 0.77$
$\Omega_m h^3$	$0.0918^{+0.0048}_{-0.0059}$	$z_{\text{eq}}$	$3424 \pm 43$	$\chi^2_{\text{small}}$	$396.9 \pm 1.6$
$\sigma_8$	$0.802 \pm 0.012$	$k_{\text{eq}}$	$0.01027^{+0.00014}_{-0.00015}$	$\chi^2_{\text{lowl}}$	$24.1 \pm 1.6$
$S_8$	$0.829 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8094 \pm 0.0075$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4541 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4475 \pm 0.0038$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6034 \pm 0.0077$	$H(0.15)$	$71.2^{+1.7}_{-2.0}$		
$\sigma_8/h^{0.5}$	$0.9879 \pm 0.0095$	$D_{\text{M}}(0.15)$	$658 \pm 18$		

$$\bar{\chi}^2_{\text{eff}} = 11952.22; \Delta\bar{\chi}^2_{\text{eff}} = 9150.58; R - 1 = 0.01363$$



# 11.4 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.022$	$H(0.51)$	$89.0 \pm 1.8$
$\Omega_c h^2$	$0.1173 \pm 0.0046$	$z_{\text{re}}$	$7.82 \pm 0.73$	$D_{\text{M}}(0.51)$	$1999 \pm 43$
$100\theta_{MC}$	$1.0415 \pm 0.0013$	$10^9 A_s$	$2.095 \pm 0.035$	$H(0.61)$	$94.6 \pm 1.8$
$\tau$	$0.0561 \pm 0.0073$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.019$	$D_{\text{M}}(0.61)$	$2326 \pm 50$
$N_{\text{eff}}$	$2.92^{+0.28}_{-0.31}$	$D_{40}$	$1228 \pm 15$	$H(2.33)$	$234.4 \pm 4.0$
$Y_{\text{He}}$	$0.251 \pm 0.021$	$D_{220}$	$5732 \pm 39$	$D_{\text{M}}(2.33)$	$5810 \pm 110$
$\ln(10^{10} A_s)$	$3.042 \pm 0.017$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.4546 \pm 0.0062$
$n_s$	$0.9652 \pm 0.0075$	$D_{1420}$	$817.3 \pm 5.1$	$\sigma_8(0.15)$	$0.744 \pm 0.011$
$y_{\text{cal}}$	$1.0008 \pm 0.0024$	$D_{2000}$	$230.9 \pm 2.2$	$f\sigma_8(0.38)$	$0.4727 \pm 0.0061$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9652 \pm 0.0075$	$\sigma_8(0.38)$	$0.6596 \pm 0.0098$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.251 \pm 0.021$	$f\sigma_8(0.51)$	$0.4712 \pm 0.0060$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.252 \pm 0.021$	$\sigma_8(0.51)$	$0.6172 \pm 0.0094$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.91 \pm 0.26$	$f\sigma_8(0.61)$	$0.4662 \pm 0.0060$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.87^{+0.47}_{-0.58}$	$\sigma_8(0.61)$	$0.5873 \pm 0.0090$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.8 \pm 2.7$	$f\sigma_8(2.33)$	$0.2961 \pm 0.0047$
$A^{kSZ}$	$< 5.15$	$100\theta_*$	$1.04156 \pm 0.00093$	$\sigma_8(2.33)$	$0.3052 \pm 0.0050$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.00 \pm 0.25$	$f_{2000}^{143}$	$30 \pm 3$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.82 \pm 0.84$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.6$
$H_0$	$67.0 \pm 1.6$	$r_{\text{drag}}$	$148.5 \pm 2.8$	$f_{2000}^{217}$	$106.9 \pm 2.4$
$\Omega_{\Lambda}$	$0.6876 \pm 0.0071$	$k_{\text{D}}$	$0.1396 \pm 0.0025$	$\chi_{\text{lensing}}^2$	$9.17 \pm 0.79$
$\Omega_m$	$0.3124 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16078^{+0.00053}_{-0.00064}$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^2$	$0.1403 \pm 0.0047$	$z_{\text{eq}}$	$3394 \pm 33$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.2$
$\Omega_m h^3$	$0.0941^{+0.0048}_{-0.0056}$	$k_{\text{eq}}$	$0.01027 \pm 0.00015$	$\chi_{6\text{DF}}^2$	$0.071 \pm 0.081$
$\sigma_8$	$0.805 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8152 \pm 0.0056$	$\chi_{\text{MGS}}^2$	$1.20 \pm 0.45$
$S_8$	$0.822 \pm 0.012$	$100\theta_{s,\text{eq}}$	$0.4504 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4501 \pm 0.0064$	$H(0.15)$	$72.3 \pm 1.6$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6021 \pm 0.0077$	$D_{\text{M}}(0.15)$	$647 \pm 15$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9839 \pm 0.0090$	$H(0.38)$	$82.3 \pm 1.7$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$
$r_{\text{drag}} h$	$99.50 \pm 0.86$	$D_{\text{M}}(0.38)$	$1543 \pm 34$		

$\bar{\chi}_{\text{eff}}^2 = 11958.81$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.35$ ;  $R - 1 = 0.01792$



11.5 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02224 \pm 0.00023$	$\sigma_8/h^{0.5}$	$0.989 \pm 0.012$	$H(0.15)$	$71.4 \pm 1.9$
$\Omega_c h^2$	$0.1168^{+0.0046}_{-0.0051}$	$r_{\text{drag}} h$	$98.7 \pm 1.3$	$D_{\text{M}}(0.15)$	$655 \pm 18$
$100\theta_{MC}$	$1.0416 \pm 0.0013$	$\langle d^2 \rangle^{1/2}$	$2.449 \pm 0.031$	$H(0.38)$	$81.6^{+1.8}_{-2.0}$
$\tau$	$0.0546^{+0.0047}_{-0.0084}$	$z_{\text{re}}$	$7.68^{+0.53}_{-0.84}$	$D_{\text{M}}(0.38)$	$1561 \pm 40$
$N_{\text{eff}}$	$2.84^{+0.29}_{-0.34}$	$10^9 A_s$	$2.085^{+0.033}_{-0.041}$	$H(0.51)$	$88.3^{+1.9}_{-2.1}$
$Y_{\text{He}}$	$0.252 \pm 0.021$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.021$	$D_{\text{M}}(0.51)$	$2021 \pm 51$
$\ln(10^{10} A_s)$	$3.037^{+0.016}_{-0.019}$	$D_{40}$	$1233 \pm 18$	$H(0.61)$	$93.9^{+1.9}_{-2.2}$
$n_s$	$0.9613 \pm 0.0092$	$D_{220}$	$5724 \pm 40$	$D_{\text{M}}(0.61)$	$2350 \pm 58$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$233.6 \pm 4.2$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.8 \pm 5.1$	$D_{\text{M}}(2.33)$	$5851 \pm 120$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.9^{+2.3}_{-2.0}$	$f\sigma_8(0.15)$	$0.4582 \pm 0.0088$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9613 \pm 0.0092$	$\sigma_8(0.15)$	$0.742 \pm 0.012$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.252 \pm 0.021$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0078$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.021$	$\sigma_8(0.38)$	$0.657 \pm 0.011$
$A_{217}^{PS}$	$109^{+20}_{-10}$	Age/Gyr	$14.01 \pm 0.29$	$f\sigma_8(0.51)$	$0.4723 \pm 0.0074$
$A^{kSZ}$	$< 5.12$	$z_*$	$1089.96^{+0.50}_{-0.57}$	$\sigma_8(0.51)$	$0.614 \pm 0.011$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$146.5 \pm 2.9$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0072$
$c_{217}$	$0.9996 \pm 0.0019$	$100\theta_*$	$1.04170 \pm 0.00098$	$\sigma_8(0.61)$	$0.584 \pm 0.010$
$H_0$	$66.1 \pm 1.8$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.06 \pm 0.27$	$f\sigma_8(2.33)$	$0.2944 \pm 0.0053$
$\Omega_{\Lambda}$	$0.680 \pm 0.011$	$z_{\text{drag}}$	$1059.55 \pm 0.92$	$\sigma_8(2.33)$	$0.3032 \pm 0.0057$
$\Omega_m$	$0.320 \pm 0.011$	$r_{\text{drag}}$	$149.2 \pm 3.0$	$f_{2000}^{143}$	$29 \pm 4$
$\Omega_m h^2$	$0.1397^{+0.0046}_{-0.0052}$	$k_{\text{D}}$	$0.1391^{+0.0025}_{-0.0028}$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.6$
$\Omega_m h^3$	$0.0925^{+0.0050}_{-0.0061}$	$100\theta_{\text{D}}$	$0.16072^{+0.00053}_{-0.00066}$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\sigma_8$	$0.804 \pm 0.013$	$z_{\text{eq}}$	$3420 \pm 44$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.8$
$S_8$	$0.829 \pm 0.017$	$k_{\text{eq}}$	$0.01029 \pm 0.00016$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4543 \pm 0.0093$	$100\theta_{\text{eq}}$	$0.8103 \pm 0.0078$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0098$	$100\theta_{\text{s,eq}}$	$0.4479 \pm 0.0040$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11943.30; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.41; R - 1 = 0.00937$$



11.6 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.026$	$H(0.51)$	$89.2 \pm 1.8$
$\Omega_c h^2$	$0.1175 \pm 0.0049$	$z_{\text{re}}$	$7.80^{+0.60}_{-0.81}$	$D_{\text{M}}(0.51)$	$1994 \pm 44$
$100\theta_{MC}$	$1.0414 \pm 0.0013$	$10^9 A_s$	$2.094^{+0.033}_{-0.040}$	$H(0.61)$	$94.7 \pm 1.9$
$\tau$	$0.0558^{+0.0055}_{-0.0082}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.021$	$D_{\text{M}}(0.61)$	$2321 \pm 51$
$N_{\text{eff}}$	$2.95^{+0.29}_{-0.32}$	$D_{40}$	$1225 \pm 16$	$H(2.33)$	$234.6 \pm 4.2$
$Y_{\text{He}}$	$0.251 \pm 0.021$	$D_{220}$	$5728 \pm 40$	$D_{\text{M}}(2.33)$	$5801 \pm 110$
$\ln(10^{10} A_s)$	$3.042^{+0.016}_{-0.019}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4539 \pm 0.0076$
$n_s$	$0.9664 \pm 0.0076$	$D_{1420}$	$816.9 \pm 5.1$	$\sigma_8(0.15)$	$0.744 \pm 0.012$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7^{+2.3}_{-2.1}$	$f\sigma_8(0.38)$	$0.4722 \pm 0.0074$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9664 \pm 0.0076$	$\sigma_8(0.38)$	$0.660 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.251 \pm 0.021$	$f\sigma_8(0.51)$	$0.4709 \pm 0.0073$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.252 \pm 0.021$	$\sigma_8(0.51)$	$0.618 \pm 0.010$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.89 \pm 0.27$	$f\sigma_8(0.61)$	$0.4660 \pm 0.0072$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.89^{+0.47}_{-0.58}$	$\sigma_8(0.61)$	$0.5876 \pm 0.0099$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$145.7 \pm 2.8$	$f\sigma_8(2.33)$	$0.2963 \pm 0.0051$
$A^{kSZ}$	$< 5.31$	$100\theta_*$	$1.04152 \pm 0.00096$	$\sigma_8(2.33)$	$0.3055 \pm 0.0054$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.98 \pm 0.26$	$f_{2000}^{143}$	$30 \pm 3$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.88 \pm 0.85$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.6$
$H_0$	$67.2 \pm 1.6$	$r_{\text{drag}}$	$148.3 \pm 2.9$	$f_{2000}^{217}$	$107.0 \pm 2.4$
$\Omega_{\Lambda}$	$0.6888 \pm 0.0072$	$k_{\text{D}}$	$0.1397 \pm 0.0027$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3112 \pm 0.0072$	$100\theta_{\text{D}}$	$0.16083^{+0.00053}_{-0.00065}$	$\chi_{\text{lowl}}^2$	$23.1 \pm 1.2$
$\Omega_m h^2$	$0.1405 \pm 0.0050$	$z_{\text{eq}}$	$3389 \pm 33$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.076$
$\Omega_m h^3$	$0.0945^{+0.0050}_{-0.0058}$	$k_{\text{eq}}$	$0.01027 \pm 0.00016$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.48$
$\sigma_8$	$0.806 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8160 \pm 0.0056$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$S_8$	$0.820 \pm 0.014$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0029$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4493 \pm 0.0078$	$H(0.15)$	$72.4 \pm 1.6$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6016 \pm 0.0094$	$D_{\text{M}}(0.15)$	$646 \pm 15$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.011$	$H(0.38)$	$82.5 \pm 1.7$		
$r_{\text{drag}} h$	$99.64 \pm 0.89$	$D_{\text{M}}(0.38)$	$1540 \pm 34$		

$\bar{\chi}_{\text{eff}}^2 = 11949.50$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.86$ ;  $R - 1 = 0.02228$



# 11.7 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00022$	$r_{\text{drag}} h$	$98.6 \pm 1.2$	$H(0.38)$	$81.3^{+1.7}_{-2.0}$
$\Omega_c h^2$	$0.1163^{+0.0042}_{-0.0049}$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.025$	$D_{\text{M}}(0.38)$	$1565 \pm 40$
$100\theta_{MC}$	$1.0417 \pm 0.0013$	$z_{\text{re}}$	$7.69^{+0.54}_{-0.78}$	$H(0.51)$	$88.0^{+1.8}_{-2.1}$
$\tau$	$0.0547^{+0.0049}_{-0.0078}$	$10^9 A_s$	$2.083^{+0.031}_{-0.037}$	$D_{\text{M}}(0.51)$	$2026 \pm 50$
$N_{\text{eff}}$	$2.80^{+0.27}_{-0.33}$	$10^9 A_s e^{-2\tau}$	$1.867 \pm 0.020$	$H(0.61)$	$93.6^{+1.8}_{-2.1}$
$Y_{\text{He}}$	$0.252 \pm 0.021$	$D_{40}$	$1234 \pm 16$	$D_{\text{M}}(0.61)$	$2357 \pm 57$
$\ln(10^{10} A_s)$	$3.036^{+0.015}_{-0.017}$	$D_{220}$	$5726 \pm 39$	$H(2.33)$	$233.2^{+3.7}_{-4.3}$
$n_s$	$0.9602 \pm 0.0089$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5865 \pm 120$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{1420}$	$817.0 \pm 5.0$	$f\sigma_8(0.15)$	$0.4579 \pm 0.0068$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.1 \pm 2.1$	$\sigma_8(0.15)$	$0.741 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9602 \pm 0.0089$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0060$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.252 \pm 0.021$	$\sigma_8(0.38)$	$0.656 \pm 0.010$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.021$	$f\sigma_8(0.51)$	$0.4718 \pm 0.0059$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$14.04 \pm 0.29$	$\sigma_8(0.51)$	$0.6134 \pm 0.0098$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.93^{+0.48}_{-0.56}$	$f\sigma_8(0.61)$	$0.4662 \pm 0.0059$
$A^{kSZ}$	$< 5.06$	$r_*$	$146.8 \pm 2.8$	$\sigma_8(0.61)$	$0.5834 \pm 0.0095$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04178 \pm 0.00095$	$f\sigma_8(2.33)$	$0.2939 \pm 0.0050$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.09 \pm 0.26$	$\sigma_8(2.33)$	$0.3026 \pm 0.0055$
$H_0$	$65.9^{+1.7}_{-1.9}$	$z_{\text{drag}}$	$1059.47 \pm 0.91$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_{\Lambda}$	$0.680 \pm 0.010$	$r_{\text{drag}}$	$149.5 \pm 2.9$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.6$
$\Omega_m$	$0.320 \pm 0.010$	$k_{\text{D}}$	$0.1388^{+0.0024}_{-0.0027}$	$f_{2000}^{217}$	$106.7 \pm 2.4$
$\Omega_m h^2$	$0.1392^{+0.0042}_{-0.0050}$	$100\theta_{\text{D}}$	$0.16067^{+0.00054}_{-0.00064}$	$\chi^2_{\text{lensing}}$	$9.01 \pm 0.75$
$\Omega_m h^3$	$0.0918^{+0.0048}_{-0.0059}$	$z_{\text{eq}}$	$3422 \pm 42$	$\chi^2_{\text{simall}}$	$396.9 \pm 1.7$
$\sigma_8$	$0.803 \pm 0.011$	$k_{\text{eq}}$	$0.01027 \pm 0.00015$	$\chi^2_{\text{lowl}}$	$24.0 \pm 1.5$
$S_8$	$0.829 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8098 \pm 0.0074$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4541 \pm 0.0072$	$100\theta_{\text{s,eq}}$	$0.4477 \pm 0.0038$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6037 \pm 0.0077$	$H(0.15)$	$71.2^{+1.7}_{-1.9}$		
$\sigma_8/h^{0.5}$	$0.9885 \pm 0.0094$	$D_{\text{M}}(0.15)$	$657 \pm 17$		

$$\bar{\chi}^2_{\text{eff}} = 11952.01; \Delta\bar{\chi}^2_{\text{eff}} = 9150.66; R - 1 = 0.01202$$



## 11.8 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.022$	$H(0.51)$	$89.0 \pm 1.8$
$\Omega_c h^2$	$0.1173 \pm 0.0046$	$z_{\text{re}}$	$7.88^{+0.63}_{-0.74}$	$D_{\text{M}}(0.51)$	$1999 \pm 43$
$100\theta_{MC}$	$1.0415 \pm 0.0013$	$10^9 A_s$	$2.097^{+0.031}_{-0.035}$	$H(0.61)$	$94.6 \pm 1.8$
$\tau$	$0.0566^{+0.0059}_{-0.0076}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.019$	$D_{\text{M}}(0.61)$	$2326 \pm 49$
$N_{\text{eff}}$	$2.92^{+0.28}_{-0.31}$	$D_{40}$	$1228 \pm 15$	$H(2.33)$	$234.3 \pm 4.0$
$Y_{\text{He}}$	$0.251 \pm 0.021$	$D_{220}$	$5732 \pm 39$	$D_{\text{M}}(2.33)$	$5810 \pm 110$
$\ln(10^{10} A_s)$	$3.043 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.4547 \pm 0.0062$
$n_s$	$0.9654 \pm 0.0075$	$D_{1420}$	$817.3 \pm 5.1$	$\sigma_8(0.15)$	$0.745 \pm 0.011$
$y_{\text{cal}}$	$1.0008 \pm 0.0024$	$D_{2000}$	$230.9 \pm 2.2$	$f\sigma_8(0.38)$	$0.4728 \pm 0.0060$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0075$	$\sigma_8(0.38)$	$0.6599 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.251 \pm 0.021$	$f\sigma_8(0.51)$	$0.4713 \pm 0.0060$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.252 \pm 0.021$	$\sigma_8(0.51)$	$0.6175 \pm 0.0093$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.91 \pm 0.26$	$f\sigma_8(0.61)$	$0.4663 \pm 0.0060$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.87^{+0.47}_{-0.58}$	$\sigma_8(0.61)$	$0.5876 \pm 0.0089$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$r_*$	$145.8 \pm 2.7$	$f\sigma_8(2.33)$	$0.2963 \pm 0.0046$
$A^{kSZ}$	$< 5.16$	$100\theta_*$	$1.04156 \pm 0.00093$	$\sigma_8(2.33)$	$0.3054 \pm 0.0050$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.00 \pm 0.25$	$f_{2000}^{143}$	$29 \pm 3$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.83 \pm 0.84$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.6$
$H_0$	$67.0 \pm 1.6$	$r_{\text{drag}}$	$148.5 \pm 2.8$	$f_{2000}^{217}$	$106.9 \pm 2.4$
$\Omega_{\Lambda}$	$0.6877 \pm 0.0071$	$k_{\text{D}}$	$0.1396 \pm 0.0025$	$\chi_{\text{lensing}}^2$	$9.13 \pm 0.74$
$\Omega_m$	$0.3123 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16079^{+0.00053}_{-0.00065}$	$\chi_{\text{small}}^2$	$397.2 \pm 1.9$
$\Omega_m h^2$	$0.1403 \pm 0.0047$	$z_{\text{eq}}$	$3393 \pm 33$	$\chi_{\text{lowl}}^2$	$23.3 \pm 1.2$
$\Omega_m h^3$	$0.0941^{+0.0048}_{-0.0056}$	$k_{\text{eq}}$	$0.01027 \pm 0.00015$	$\chi_{6\text{DF}}^2$	$0.069 \pm 0.079$
$\sigma_8$	$0.806 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8152 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$1.21 \pm 0.45$
$S_8$	$0.822 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4502 \pm 0.0063$	$H(0.15)$	$72.3 \pm 1.6$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6023 \pm 0.0077$	$D_{\text{M}}(0.15)$	$647 \pm 15$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9843 \pm 0.0088$	$H(0.38)$	$82.3 \pm 1.7$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$r_{\text{drag}} h$	$99.52 \pm 0.85$	$D_{\text{M}}(0.38)$	$1543 \pm 34$		

 $\bar{\chi}_{\text{eff}}^2 = 11958.67; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.36; R - 1 = 0.01939$



# 11.9 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00022$	$r_{\text{drag}} h$	$98.6 \pm 1.3$	$H(0.38)$	$81.8 \pm 1.7$
$\Omega_c h^2$	$0.1179 \pm 0.0037$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.031$	$D_{\text{M}}(0.38)$	$1555 \pm 35$
$100\theta_{MC}$	$1.04115 \pm 0.00064$	$z_{\text{re}}$	$7.47 \pm 0.80$	$H(0.51)$	$88.6 \pm 1.7$
$\tau$	$0.0526 \pm 0.0078$	$10^9 A_s$	$2.079 \pm 0.040$	$D_{\text{M}}(0.51)$	$2013 \pm 44$
$N_{\text{eff}}$	$2.90 \pm 0.24$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.020$	$H(0.61)$	$94.2 \pm 1.7$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{40}$	$1236 \pm 16$	$D_{\text{M}}(0.61)$	$2342 \pm 50$
$\ln(10^{10} A_s)$	$3.034 \pm 0.019$	$D_{220}$	$5725 \pm 40$	$H(2.33)$	$234.5 \pm 3.3$
$n_s$	$0.9600 \pm 0.0088$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5830 \pm 100$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$817.1 \pm 5.0$	$f\sigma_8(0.15)$	$0.4582 \pm 0.0085$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.2 \pm 1.9$	$\sigma_8(0.15)$	$0.742 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9600 \pm 0.0088$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0074$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0039$	$\sigma_8(0.38)$	$0.657 \pm 0.011$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0070$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.95 \pm 0.25$	$\sigma_8(0.51)$	$0.614 \pm 0.010$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.80 \pm 0.35$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0068$
$A^{kSZ}$	$< 4.97$	$r_*$	$145.9 \pm 2.3$	$\sigma_8(0.61)$	$0.5842 \pm 0.0099$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04143 \pm 0.00069$	$f\sigma_8(2.33)$	$0.2943 \pm 0.0052$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.01 \pm 0.21$	$\sigma_8(2.33)$	$0.3031 \pm 0.0056$
$H_0$	$66.4 \pm 1.7$	$z_{\text{drag}}$	$1059.32 \pm 0.76$	$f_{2000}^{143}$	$28.7 \pm 3.1$
$\Omega_{\Lambda}$	$0.680 \pm 0.011$	$r_{\text{drag}}$	$148.6 \pm 2.4$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.2$
$\Omega_m$	$0.320 \pm 0.011$	$k_{\text{D}}$	$0.1397 \pm 0.0018$	$f_{2000}^{217}$	$106.3 \pm 2.1$
$\Omega_m h^2$	$0.1407 \pm 0.0039$	$100\theta_{\text{D}}$	$0.16054 \pm 0.00043$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\Omega_m h^3$	$0.0935^{+0.0043}_{-0.0048}$	$z_{\text{eq}}$	$3414 \pm 41$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.5$
$\sigma_8$	$0.804 \pm 0.012$	$k_{\text{eq}}$	$0.01032 \pm 0.00014$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$S_8$	$0.830 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8109 \pm 0.0075$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4544 \pm 0.0090$	$100\theta_{\text{s,eq}}$	$0.4482 \pm 0.0038$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0093$	$H(0.15)$	$71.7 \pm 1.7$		
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$D_{\text{M}}(0.15)$	$653 \pm 16$		

Best-fit  $\chi_{\text{eff}}^2 = 11924.04$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.20$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.94$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.72$ ;  $R - 1 = 0.01231$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.01 ( $\Delta$  0.00) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 399.05 ( $\Delta$  3.02) commander\_dx12\_v3.2.29: 23.05 ( $\Delta$  -1.17) CamSpec like\_10.7HM\_1400\_unified: 11499.50



## 11.10 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.026$	$H(0.51)$	$89.5 \pm 1.5$
$\Omega_c h^2$	$0.1185 \pm 0.0037$	$z_{\text{re}}$	$7.62 \pm 0.79$	$D_{\text{M}}(0.51)$	$1987 \pm 36$
$100\theta_{MC}$	$1.04104 \pm 0.00063$	$10^9 A_s$	$2.089 \pm 0.039$	$H(0.61)$	$95.1 \pm 1.5$
$\tau$	$0.0542 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.020$	$D_{\text{M}}(0.61)$	$2312 \pm 41$
$N_{\text{eff}}$	$3.01 \pm 0.22$	$D_{40}$	$1227 \pm 14$	$H(2.33)$	$235.4 \pm 3.3$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5779 \pm 91$
$\ln(10^{10} A_s)$	$3.039 \pm 0.019$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4538 \pm 0.0074$
$n_s$	$0.9654 \pm 0.0071$	$D_{1420}$	$817.2 \pm 4.9$	$\sigma_8(0.15)$	$0.744 \pm 0.011$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.0 \pm 1.9$	$f\sigma_8(0.38)$	$0.4721 \pm 0.0071$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0071$	$\sigma_8(0.38)$	$0.660 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2439 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4708 \pm 0.0070$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$\sigma_8(0.51)$	$0.6175 \pm 0.0099$
$A_{100}^{PS}$	$248^{+26}_{-30}$	Age/Gyr	$13.84 \pm 0.22$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0069$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.74 \pm 0.35$	$\sigma_8(0.61)$	$0.5876 \pm 0.0095$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.1 \pm 2.2$	$f\sigma_8(2.33)$	$0.2963 \pm 0.0049$
$A^{kSZ}$	$< 5.13$	$100\theta_*$	$1.04128 \pm 0.00066$	$\sigma_8(2.33)$	$0.3055 \pm 0.0052$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.93 \pm 0.20$	$f_{2000}^{143}$	$29.1 \pm 3.0$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.69 \pm 0.68$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.2$
$H_0$	$67.4 \pm 1.4$	$r_{\text{drag}}$	$147.8 \pm 2.2$	$f_{2000}^{217}$	$106.6 \pm 2.1$
$\Omega_{\Lambda}$	$0.6889 \pm 0.0071$	$k_{\text{D}}$	$0.1403 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m$	$0.3111 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16067 \pm 0.00041$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^2$	$0.1415 \pm 0.0038$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$\Omega_m h^3$	$0.0954^{+0.0040}_{-0.0045}$	$k_{\text{eq}}$	$0.01030 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.077$
$\sigma_8$	$0.805 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0051$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.47$
$S_8$	$0.820 \pm 0.014$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0026$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4492 \pm 0.0076$	$H(0.15)$	$72.7 \pm 1.4$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6015 \pm 0.0090$	$D_{\text{M}}(0.15)$	$643 \pm 12$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$H(0.38)$	$82.8 \pm 1.4$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.63 \pm 0.87$	$D_{\text{M}}(0.38)$	$1534 \pm 29$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.82; R - 1 = 0.01509$$



11.11 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00022$	$r_{\text{drag}} h$	$98.5 \pm 1.2$	$H(0.38)$	$81.6 \pm 1.6$
$\Omega_c h^2$	$0.1173 \pm 0.0036$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.024$	$D_{\text{M}}(0.38)$	$1560 \pm 35$
$100\theta_{MC}$	$1.04123 \pm 0.00064$	$z_{\text{re}}$	$7.49 \pm 0.76$	$H(0.51)$	$88.3 \pm 1.7$
$\tau$	$0.0529 \pm 0.0075$	$10^9 A_s$	$2.077 \pm 0.037$	$D_{\text{M}}(0.51)$	$2020 \pm 44$
$N_{\text{eff}}$	$2.87 \pm 0.24$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.019$	$H(0.61)$	$93.9 \pm 1.7$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{40}$	$1237 \pm 15$	$D_{\text{M}}(0.61)$	$2349 \pm 50$
$\ln(10^{10} A_s)$	$3.034 \pm 0.018$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$234.0 \pm 3.2$
$n_s$	$0.9588 \pm 0.0086$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5845 \pm 100$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.3 \pm 4.9$	$f\sigma_8(0.15)$	$0.4581 \pm 0.0065$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.4 \pm 1.9$	$\sigma_8(0.15)$	$0.741 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9588 \pm 0.0086$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0058$
$A_{143}^{tSZ}$	$4.8 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0039$	$\sigma_8(0.38)$	$0.656 \pm 0.010$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.2453 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4718 \pm 0.0057$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.99 \pm 0.24$	$\sigma_8(0.51)$	$0.6132 \pm 0.0097$
$A_{217}^{PS}$	$109_{-10}^{+10}$	$z_*$	$1089.77 \pm 0.33$	$f\sigma_8(0.61)$	$0.4662 \pm 0.0057$
$A^{kSZ}$	$< 4.89$	$r_*$	$146.2 \pm 2.2$	$\sigma_8(0.61)$	$0.5832 \pm 0.0094$
$c_{100}$	$0.9986_{-0.0014}^{+0.0017}$	$100\theta_*$	$1.04152 \pm 0.00068$	$f\sigma_8(2.33)$	$0.2937 \pm 0.0050$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.04 \pm 0.21$	$\sigma_8(2.33)$	$0.3024 \pm 0.0054$
$H_0$	$66.1 \pm 1.6$	$z_{\text{drag}}$	$1059.23 \pm 0.76$	$f_{2000}^{143}$	$28.5 \pm 3.0$
$\Omega_{\Lambda}$	$0.679 \pm 0.010$	$r_{\text{drag}}$	$149.0 \pm 2.3$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.2$
$\Omega_m$	$0.321 \pm 0.010$	$k_{\text{D}}$	$0.1395 \pm 0.0018$	$f_{2000}^{217}$	$106.2 \pm 2.0$
$\Omega_m h^2$	$0.1402 \pm 0.0037$	$100\theta_{\text{D}}$	$0.16048 \pm 0.00042$	$\chi_{\text{lensing}}^2$	$9.02 \pm 0.73$
$\Omega_m h^3$	$0.0928_{-0.0047}^{+0.0042}$	$z_{\text{eq}}$	$3418 \pm 38$	$\chi_{\text{small}}^2$	$396.8 \pm 1.5$
$\sigma_8$	$0.803 \pm 0.011$	$k_{\text{eq}}$	$0.01030 \pm 0.00012$	$\chi_{\text{lowl}}^2$	$24.3 \pm 1.4$
$S_8$	$0.829 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8103 \pm 0.0070$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4543 \pm 0.0070$	$100\theta_{\text{s,eq}}$	$0.4479 \pm 0.0035$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6038 \pm 0.0074$	$H(0.15)$	$71.5 \pm 1.6$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9868 \pm 0.0090$	$D_{\text{M}}(0.15)$	$655 \pm 16$		

$\bar{\chi}_{\text{eff}}^2 = 11952.31$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.44$ ;  $R - 1 = 0.01285$



## 11.12 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_lensing/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_po

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.021$	$H(0.51)$	$89.3 \pm 1.5$
$\Omega_c h^2$	$0.1182 \pm 0.0035$	$z_{\text{re}}$	$7.75 \pm 0.72$	$D_{\text{M}}(0.51)$	$1991 \pm 36$
$100\theta_{MC}$	$1.04108 \pm 0.00061$	$10^9 A_s$	$2.094 \pm 0.034$	$H(0.61)$	$94.9 \pm 1.5$
$\tau$	$0.0555 \pm 0.0073$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.018$	$D_{\text{M}}(0.61)$	$2317 \pm 41$
$N_{\text{eff}}$	$2.98 \pm 0.22$	$D_{40}$	$1230 \pm 13$	$H(2.33)$	$235.1 \pm 3.1$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5789 \pm 89$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.4549 \pm 0.0060$
$n_s$	$0.9644 \pm 0.0070$	$D_{1420}$	$817.5 \pm 4.9$	$\sigma_8(0.15)$	$0.745 \pm 0.010$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.9$	$f\sigma_8(0.38)$	$0.4730 \pm 0.0058$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9644 \pm 0.0070$	$\sigma_8(0.38)$	$0.6602 \pm 0.0093$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2439 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4715 \pm 0.0057$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$\sigma_8(0.51)$	$0.6178 \pm 0.0089$
$A_{100}^{PS}$	$247^{+26}_{-30}$	Age/Gyr	$13.86 \pm 0.21$	$f\sigma_8(0.61)$	$0.4665 \pm 0.0057$
$A_{143}^{PS}$	$41 \pm 9$	$z_*$	$1089.73 \pm 0.34$	$\sigma_8(0.61)$	$0.5878 \pm 0.0086$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.3 \pm 2.1$	$f\sigma_8(2.33)$	$0.2964 \pm 0.0044$
$A^{kSZ}$	$< 5.07$	$100\theta_*$	$1.04132 \pm 0.00065$	$\sigma_8(2.33)$	$0.3055 \pm 0.0048$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.19$	$f_{2000}^{143}$	$28.9 \pm 3.0$
$c_{217}$	$0.9996 \pm 0.0019$	$z_{\text{drag}}$	$1059.64 \pm 0.67$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.2$
$H_0$	$67.3 \pm 1.3$	$r_{\text{drag}}$	$148.0 \pm 2.2$	$f_{2000}^{217}$	$106.5 \pm 2.0$
$\Omega_{\Lambda}$	$0.6878 \pm 0.0070$	$k_{\text{D}}$	$0.1402 \pm 0.0017$	$\chi_{\text{lensing}}^2$	$9.15 \pm 0.76$
$\Omega_m$	$0.3122 \pm 0.0070$	$100\theta_{\text{D}}$	$0.16063 \pm 0.00041$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1412 \pm 0.0036$	$z_{\text{eq}}$	$3387 \pm 26$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.1$
$\Omega_m h^3$	$0.0950^{+0.0039}_{-0.0043}$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$\sigma_8$	$0.806 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8159 \pm 0.0049$	$\chi_{6\text{DF}}^2$	$0.070 \pm 0.081$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0025$	$\chi_{\text{MGS}}^2$	$1.20 \pm 0.45$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0062$	$H(0.15)$	$72.5 \pm 1.4$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6025 \pm 0.0074$	$D_{\text{M}}(0.15)$	$645 \pm 12$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9829 \pm 0.0085$	$H(0.38)$	$82.6 \pm 1.4$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.50 \pm 0.85$	$D_{\text{M}}(0.38)$	$1537 \pm 28$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.4$

$$\bar{\chi}_{\text{eff}}^2 = 11958.76; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.14; R - 1 = 0.01459$$



## 11.13 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_zre

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00022$	$r_{\text{drag}} h$	$98.7 \pm 1.3$	$H(0.38)$	$81.9 \pm 1.7$
$\Omega_c h^2$	$0.1180 \pm 0.0037$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.030$	$D_{\text{M}}(0.38)$	$1554 \pm 35$
$100\theta_{MC}$	$1.04114 \pm 0.00064$	$z_{\text{re}}$	$7.64^{+0.51}_{-0.80}$	$H(0.51)$	$88.6 \pm 1.7$
$\tau$	$0.0542^{+0.0046}_{-0.0080}$	$10^9 A_s$	$2.086^{+0.030}_{-0.038}$	$D_{\text{M}}(0.51)$	$2011 \pm 44$
$N_{\text{eff}}$	$2.91 \pm 0.24$	$10^9 A_s e^{-2\tau}$	$1.871 \pm 0.020$	$H(0.61)$	$94.3 \pm 1.7$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{40}$	$1235 \pm 16$	$D_{\text{M}}(0.61)$	$2340 \pm 50$
$\ln(10^{10} A_s)$	$3.037^{+0.015}_{-0.018}$	$D_{220}$	$5724 \pm 40$	$H(2.33)$	$234.6 \pm 3.3$
$n_s$	$0.9604 \pm 0.0087$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5826 \pm 100$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$817.0 \pm 5.0$	$f\sigma_8(0.15)$	$0.4587 \pm 0.0083$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$231.2 \pm 1.9$	$\sigma_8(0.15)$	$0.743 \pm 0.011$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9604 \pm 0.0087$	$f\sigma_8(0.38)$	$0.4752 \pm 0.0072$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0039$	$\sigma_8(0.38)$	$0.658 \pm 0.010$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0068$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.94 \pm 0.24$	$\sigma_8(0.51)$	$0.6154 \pm 0.0097$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.80 \pm 0.35$	$f\sigma_8(0.61)$	$0.4674 \pm 0.0066$
$A^{kSZ}$	$< 4.95$	$r_*$	$145.8 \pm 2.3$	$\sigma_8(0.61)$	$0.5854 \pm 0.0094$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04141 \pm 0.00068$	$f\sigma_8(2.33)$	$0.2949 \pm 0.0049$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.00 \pm 0.21$	$\sigma_8(2.33)$	$0.3037 \pm 0.0053$
$H_0$	$66.4 \pm 1.7$	$z_{\text{drag}}$	$1059.35 \pm 0.76$	$f_{2000}^{143}$	$28.7 \pm 3.1$
$\Omega_{\Lambda}$	$0.681 \pm 0.011$	$r_{\text{drag}}$	$148.5 \pm 2.4$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.2$
$\Omega_m$	$0.319 \pm 0.011$	$k_{\text{D}}$	$0.1398 \pm 0.0018$	$f_{2000}^{217}$	$106.3 \pm 2.1$
$\Omega_m h^2$	$0.1408 \pm 0.0039$	$100\theta_{\text{D}}$	$0.16055 \pm 0.00043$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.7$
$\Omega_m h^3$	$0.0936^{+0.0043}_{-0.0048}$	$z_{\text{eq}}$	$3412 \pm 40$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.5$
$\sigma_8$	$0.805 \pm 0.012$	$k_{\text{eq}}$	$0.01032 \pm 0.00014$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$S_8$	$0.830 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8113 \pm 0.0074$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4548 \pm 0.0089$	$100\theta_{\text{s,eq}}$	$0.4484 \pm 0.0038$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8 \Omega_m^{0.25}$	$0.6050 \pm 0.0091$	$H(0.15)$	$71.8 \pm 1.6$		
$\sigma_8/h^{0.5}$	$0.988 \pm 0.011$	$D_{\text{M}}(0.15)$	$652 \pm 16$		

 $\bar{\chi}_{\text{eff}}^2 = 11943.65; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.72; R - 1 = 0.01349$



## 11.14 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_po

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.024$	$H(0.51)$	$89.5 \pm 1.5$
$\Omega_c h^2$	$0.1185 \pm 0.0037$	$z_{\text{re}}$	$7.75^{+0.57}_{-0.81}$	$D_{\text{M}}(0.51)$	$1986 \pm 36$
$100\theta_{MC}$	$1.04103 \pm 0.00063$	$10^9 A_s$	$2.094^{+0.031}_{-0.039}$	$H(0.61)$	$95.1 \pm 1.5$
$\tau$	$0.0553^{+0.0053}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.020$	$D_{\text{M}}(0.61)$	$2311 \pm 41$
$N_{\text{eff}}$	$3.01 \pm 0.23$	$D_{40}$	$1227 \pm 14$	$H(2.33)$	$235.4 \pm 3.3$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5778 \pm 91$
$\ln(10^{10} A_s)$	$3.041^{+0.015}_{-0.018}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4543 \pm 0.0072$
$n_s$	$0.9656 \pm 0.0071$	$D_{1420}$	$817.2 \pm 4.9$	$\sigma_8(0.15)$	$0.745 \pm 0.011$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$231.1 \pm 1.9$	$f\sigma_8(0.38)$	$0.4727 \pm 0.0069$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9656 \pm 0.0071$	$\sigma_8(0.38)$	$0.661 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2439 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4713 \pm 0.0067$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$\sigma_8(0.51)$	$0.6183 \pm 0.0095$
$A_{100}^{PS}$	$248^{+26}_{-30}$	Age/Gyr	$13.83 \pm 0.22$	$f\sigma_8(0.61)$	$0.4664 \pm 0.0066$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.74 \pm 0.35$	$\sigma_8(0.61)$	$0.5884 \pm 0.0091$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$r_*$	$145.1 \pm 2.2$	$f\sigma_8(2.33)$	$0.2967 \pm 0.0047$
$A^{kSZ}$	$< 5.13$	$100\theta_*$	$1.04127 \pm 0.00066$	$\sigma_8(2.33)$	$0.3059^{+0.0047}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.93 \pm 0.20$	$f_{2000}^{143}$	$29.0 \pm 3.0$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.70 \pm 0.68$	$f_{2000}^{143 \times 217}$	$31.7 \pm 2.2$
$H_0$	$67.5 \pm 1.4$	$r_{\text{drag}}$	$147.7 \pm 2.2$	$f_{2000}^{217}$	$106.5 \pm 2.1$
$\Omega_{\Lambda}$	$0.6890 \pm 0.0071$	$k_{\text{D}}$	$0.1404 \pm 0.0017$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m$	$0.3110 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16067 \pm 0.00041$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^2$	$0.1415 \pm 0.0038$	$z_{\text{eq}}$	$3383 \pm 27$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$\Omega_m h^3$	$0.0955^{+0.0040}_{-0.0045}$	$k_{\text{eq}}$	$0.01030 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.061 \pm 0.076$
$\sigma_8$	$0.806 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0051$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.47$
$S_8$	$0.821 \pm 0.014$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0026$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0074$	$H(0.15)$	$72.7 \pm 1.4$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6022 \pm 0.0087$	$D_{\text{M}}(0.15)$	$643 \pm 12$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.010$	$H(0.38)$	$82.8 \pm 1.4$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.65 \pm 0.87$	$D_{\text{M}}(0.38)$	$1533 \pm 29$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.59; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.76; R - 1 = 0.01728$$



11.15 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00021$	$r_{\text{drag}} h$	$98.6 \pm 1.2$	$H(0.38)$	$81.7 \pm 1.6$
$\Omega_c h^2$	$0.1174 \pm 0.0036$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.024$	$D_{\text{M}}(0.38)$	$1558 \pm 34$
$100\theta_{MC}$	$1.04122 \pm 0.00063$	$z_{\text{re}}$	$7.64^{+0.52}_{-0.75}$	$H(0.51)$	$88.4 \pm 1.7$
$\tau$	$0.0542^{+0.0048}_{-0.0076}$	$10^9 A_s$	$2.083^{+0.029}_{-0.035}$	$D_{\text{M}}(0.51)$	$2017 \pm 43$
$N_{\text{eff}}$	$2.88 \pm 0.24$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.019$	$H(0.61)$	$94.0 \pm 1.7$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{40}$	$1237 \pm 14$	$D_{\text{M}}(0.61)$	$2346 \pm 49$
$\ln(10^{10} A_s)$	$3.036^{+0.014}_{-0.017}$	$D_{220}$	$5726 \pm 39$	$H(2.33)$	$234.1 \pm 3.2$
$n_s$	$0.9593 \pm 0.0084$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5840 \pm 100$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$817.2 \pm 4.9$	$f\sigma_8(0.15)$	$0.4582 \pm 0.0065$
$A_{217}^{CIB}$	$42 \pm 8$	$D_{2000}$	$231.4 \pm 1.9$	$\sigma_8(0.15)$	$0.742 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9593 \pm 0.0084$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0057$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2439 \pm 0.0039$	$\sigma_8(0.38)$	$0.6566 \pm 0.0096$
$A_{100}^{PS}$	$246 \pm 30$	$Y_P^{\text{BBN}}$	$0.2453 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0056$
$A_{143}^{PS}$	$41 \pm 9$	Age/Gyr	$13.98 \pm 0.24$	$\sigma_8(0.51)$	$0.6141 \pm 0.0092$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.76 \pm 0.33$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0055$
$A^{kSZ}$	$< 4.89$	$r_*$	$146.1 \pm 2.2$	$\sigma_8(0.61)$	$0.5842 \pm 0.0090$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04151 \pm 0.00068$	$f\sigma_8(2.33)$	$0.2942 \pm 0.0047$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$14.03 \pm 0.21$	$\sigma_8(2.33)$	$0.3030 \pm 0.0052$
$H_0$	$66.2^{+1.5}_{-1.7}$	$z_{\text{drag}}$	$1059.26 \pm 0.75$	$f_{2000}^{143}$	$28.5 \pm 3.0$
$\Omega_{\Lambda}$	$0.680 \pm 0.010$	$r_{\text{drag}}$	$148.9 \pm 2.3$	$f_{2000}^{143 \times 217}$	$31.3 \pm 2.2$
$\Omega_m$	$0.320 \pm 0.010$	$k_{\text{D}}$	$0.1395 \pm 0.0018$	$f_{2000}^{217}$	$106.2 \pm 2.1$
$\Omega_m h^2$	$0.1402 \pm 0.0037$	$100\theta_{\text{D}}$	$0.16049 \pm 0.00042$	$\chi^2_{\text{lensing}}$	$9.00 \pm 0.71$
$\Omega_m h^3$	$0.0930^{+0.0041}_{-0.0047}$	$z_{\text{eq}}$	$3415 \pm 37$	$\chi^2_{\text{simall}}$	$396.8 \pm 1.6$
$\sigma_8$	$0.804 \pm 0.011$	$k_{\text{eq}}$	$0.01030 \pm 0.00012$	$\chi^2_{\text{lowl}}$	$24.2 \pm 1.4$
$S_8$	$0.830 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8108 \pm 0.0068$	$\chi^2_{\text{Aver15}}$	$0.97 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4543 \pm 0.0070$	$100\theta_{\text{s,eq}}$	$0.4482 \pm 0.0034$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6042 \pm 0.0073$	$H(0.15)$	$71.6^{+1.5}_{-1.7}$	$\chi^2_{\text{CMB}}$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9874 \pm 0.0088$	$D_{\text{M}}(0.15)$	$654 \pm 15$		

$\bar{\chi}^2_{\text{eff}} = 11952.02$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.40$ ;  $R - 1 = 0.01312$



## 11.16 base\_nnu\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_lensing\_zre6p5/base\_nnu\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Av

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00019$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.021$	$H(0.51)$	$89.3 \pm 1.5$
$\Omega_c h^2$	$0.1182 \pm 0.0035$	$z_{\text{re}}$	$7.82^{+0.60}_{-0.74}$	$D_{\text{M}}(0.51)$	$1991 \pm 36$
$100\theta_{MC}$	$1.04108 \pm 0.00062$	$10^9 A_s$	$2.096^{+0.029}_{-0.034}$	$H(0.61)$	$94.9 \pm 1.5$
$\tau$	$0.0561^{+0.0056}_{-0.0076}$	$10^9 A_s e^{-2\tau}$	$1.874 \pm 0.018$	$D_{\text{M}}(0.61)$	$2317 \pm 41$
$N_{\text{eff}}$	$2.99 \pm 0.22$	$D_{40}$	$1230 \pm 13$	$H(2.33)$	$235.1 \pm 3.1$
$Y_{\text{He}}$	$0.2439 \pm 0.0039$	$D_{220}$	$5732 \pm 38$	$D_{\text{M}}(2.33)$	$5788 \pm 89$
$\ln(10^{10} A_s)$	$3.043^{+0.014}_{-0.016}$	$D_{810}$	$2536 \pm 13$	$f\sigma_8(0.15)$	$0.4550 \pm 0.0059$
$n_s$	$0.9645 \pm 0.0070$	$D_{1420}$	$817.5 \pm 4.9$	$\sigma_8(0.15)$	$0.7453 \pm 0.0099$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$231.2 \pm 1.9$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0057$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9645 \pm 0.0070$	$\sigma_8(0.38)$	$0.6606 \pm 0.0092$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2439 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4717 \pm 0.0057$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2452 \pm 0.0039$	$\sigma_8(0.51)$	$0.6182 \pm 0.0087$
$A_{100}^{PS}$	$247^{+26}_{-29}$	Age/Gyr	$13.86 \pm 0.21$	$f\sigma_8(0.61)$	$0.4667 \pm 0.0056$
$A_{143}^{PS}$	$41 \pm 9$	$z_*$	$1089.73 \pm 0.33$	$\sigma_8(0.61)$	$0.5882 \pm 0.0084$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$145.3 \pm 2.1$	$f\sigma_8(2.33)$	$0.2966 \pm 0.0044$
$A^{kSZ}$	$< 5.07$	$100\theta_*$	$1.04132 \pm 0.00065$	$\sigma_8(2.33)$	$0.3057 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.95 \pm 0.19$	$f_{2000}^{143}$	$28.9 \pm 3.0$
$c_{217}$	$0.9996 \pm 0.0019$	$z_{\text{drag}}$	$1059.64 \pm 0.67$	$f_{2000}^{143 \times 217}$	$31.6 \pm 2.2$
$H_0$	$67.3 \pm 1.3$	$r_{\text{drag}}$	$148.0 \pm 2.2$	$f_{2000}^{217}$	$106.5 \pm 2.0$
$\Omega_{\Lambda}$	$0.6880 \pm 0.0069$	$k_{\text{D}}$	$0.1402 \pm 0.0017$	$\chi_{\text{lensing}}^2$	$9.11 \pm 0.71$
$\Omega_m$	$0.3120 \pm 0.0069$	$100\theta_{\text{D}}$	$0.16063 \pm 0.00040$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1412 \pm 0.0036$	$z_{\text{eq}}$	$3387 \pm 26$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.1$
$\Omega_m h^3$	$0.0951^{+0.0039}_{-0.0043}$	$k_{\text{eq}}$	$0.01029 \pm 0.00012$	$\chi_{\text{Aver15}}^2$	$0.97 \pm 1.4$
$\sigma_8$	$0.807 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8160 \pm 0.0049$	$\chi_{6\text{DF}}^2$	$0.068 \pm 0.079$
$S_8$	$0.822 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0025$	$\chi_{\text{MGS}}^2$	$1.21 \pm 0.45$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0061$	$H(0.15)$	$72.5 \pm 1.4$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0073$	$D_{\text{M}}(0.15)$	$645 \pm 12$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9833 \pm 0.0082$	$H(0.38)$	$82.6 \pm 1.4$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.52 \pm 0.84$	$D_{\text{M}}(0.38)$	$1537 \pm 28$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$

$$\bar{\chi}_{\text{eff}}^2 = 11958.57; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.10; R - 1 = 0.01608$$



## 12 nrun

### 12.1 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE/base\_nrun\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02216 \pm 0.00023$	$r_{\text{drag}} h$	$98.5 \pm 1.6$	$H(0.15)$	$72.30 \pm 0.79$
$\Omega_c h^2$	$0.1207 \pm 0.0021$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.038$	$D_{\text{M}}(0.15)$	$647.2 \pm 8.0$
$100\theta_{MC}$	$1.04081 \pm 0.00048$	$z_{\text{re}}$	$7.60 \pm 0.85$	$H(0.38)$	$82.56 \pm 0.57$
$\tau$	$0.0532 \pm 0.0084$	$10^9 A_s$	$2.097 \pm 0.037$	$D_{\text{M}}(0.38)$	$1541 \pm 16$
$\ln(10^{10} A_s)$	$3.043 \pm 0.018$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.015$	$H(0.51)$	$89.37 \pm 0.45$
$n_s$	$0.9625 \pm 0.0060$	$D_{40}$	$1224 \pm 21$	$D_{\text{M}}(0.51)$	$1995 \pm 19$
$n_{\text{run}}$	$-0.0038 \pm 0.0076$	$D_{220}$	$5708 \pm 41$	$H(0.61)$	$95.05 \pm 0.36$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2321 \pm 20$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$813.7 \pm 5.3$	$H(2.33)$	$236.8 \pm 1.3$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.1 \pm 2.0$	$D_{\text{M}}(2.33)$	$5775 \pm 17$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.975 \pm 0.023$	$f\sigma_8(0.15)$	$0.463 \pm 0.012$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P$	$0.24530^{+0.00011}_{-0.000088}$	$\sigma_8(0.15)$	$0.7493 \pm 0.0076$
$A_{143}^{PS}$	$46 \pm 9$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00011}_{-0.000088}$	$f\sigma_8(0.38)$	$0.4797 \pm 0.0097$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$10^5 D/H$	$2.626 \pm 0.045$	$\sigma_8(0.38)$	$0.6633 \pm 0.0061$
$A^{kSZ}$	$< 6.16$	Age/Gyr	$13.824 \pm 0.037$	$f\sigma_8(0.51)$	$0.4773 \pm 0.0083$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$z_*$	$1090.25 \pm 0.42$	$\sigma_8(0.51)$	$0.6203 \pm 0.0056$
$c_{217}$	$0.9998^{+0.0022}_{-0.0024}$	$r_*$	$144.43 \pm 0.49$	$f\sigma_8(0.61)$	$0.4716 \pm 0.0073$
$H_0$	$66.93 \pm 0.93$	$100\theta_*$	$1.04101 \pm 0.00047$	$\sigma_8(0.61)$	$0.5900 \pm 0.0052$
$\Omega_\Lambda$	$0.679^{+0.014}_{-0.013}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.874 \pm 0.046$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0026$
$\Omega_m$	$0.321 \pm 0.013$	$z_{\text{drag}}$	$1059.49 \pm 0.50$	$\sigma_8(2.33)$	$0.3060 \pm 0.0027$
$\Omega_m h^2$	$0.1435 \pm 0.0020$	$r_{\text{drag}}$	$147.16 \pm 0.50$	$f_{2000}^{143}$	$31.8 \pm 3.3$
$\Omega_m h^3$	$0.09599 \pm 0.00049$	$k_{\text{D}}$	$0.14063 \pm 0.00057$	$f_{2000}^{143 \times 217}$	$33.9 \pm 2.3$
$\sigma_8$	$0.8119 \pm 0.0091$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00029$	$f_{2000}^{217}$	$108.3 \pm 2.2$
$S_8$	$0.839 \pm 0.024$	$z_{\text{eq}}$	$3413 \pm 49$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.013$	$k_{\text{eq}}$	$0.01042 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$23.1 \pm 2.1$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8109 \pm 0.0090$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4483 \pm 0.0046$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7471.52$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.07$ ;  $\bar{\chi}_{\text{eff}}^2 = 7492.14$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.92$ ;  $R - 1 = 0.00818$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.90 ( $\Delta$  -0.01) commander\_dx12\_v3\_2\_29: 22.73 ( $\Delta$  -0.01) CamSpec like\_10.7HM: 7050.50



## 12.2 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02225 \pm 0.00021$	$z_{\text{re}}$	$7.72 \pm 0.84$	$H(0.51)$	$89.70 \pm 0.29$
$\Omega_c h^2$	$0.1190 \pm 0.0012$	$10^9 A_s$	$2.095 \pm 0.038$	$D_{\text{M}}(0.51)$	$1981 \pm 11$
$100\theta_{MC}$	$1.04103 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.012$	$H(0.61)$	$95.30 \pm 0.25$
$\tau$	$0.0548 \pm 0.0083$	$D_{40}$	$1217 \pm 20$	$D_{\text{M}}(0.61)$	$2305 \pm 12$
$\ln(10^{10} A_s)$	$3.042 \pm 0.018$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.77 \pm 0.80$
$n_s$	$0.9664 \pm 0.0046$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 13$
$n_{\text{run}}$	$-0.0031 \pm 0.0075$	$D_{1420}$	$814.7 \pm 5.2$	$f\sigma_8(0.15)$	$0.4541 \pm 0.0077$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.6 \pm 1.9$	$\sigma_8(0.15)$	$0.7461 \pm 0.0070$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.976 \pm 0.023$	$f\sigma_8(0.38)$	$0.4727 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245344^{+0.000094}_{-0.000079}$	$\sigma_8(0.38)$	$0.6615 \pm 0.0060$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246671^{+0.000095}_{-0.000079}$	$f\sigma_8(0.51)$	$0.4715 \pm 0.0059$
$A_{100}^{PS}$	$254 \pm 30$	$10^5 D/H$	$2.608 \pm 0.040$	$\sigma_8(0.51)$	$0.6192 \pm 0.0055$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.801 \pm 0.029$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0054$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_*$	$1089.98 \pm 0.31$	$\sigma_8(0.61)$	$0.5892 \pm 0.0052$
$A^{kSZ}$	$< 6.08$	$r_*$	$144.79 \pm 0.33$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0026$
$c_{100}$	$0.9985^{+0.0018}_{-0.0016}$	$100\theta_*$	$1.04123 \pm 0.00042$	$\sigma_8(2.33)$	$0.3064 \pm 0.0027$
$c_{217}$	$0.9998 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.906 \pm 0.032$	$f_{2000}^{143}$	$31.3 \pm 3.3$
$H_0$	$67.67 \pm 0.54$	$z_{\text{drag}}$	$1059.59 \pm 0.49$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.3$
$\Omega_{\Lambda}$	$0.6901 \pm 0.0073$	$r_{\text{drag}}$	$147.50 \pm 0.36$	$f_{2000}^{217}$	$108.0 \pm 2.2$
$\Omega_m$	$0.3099 \pm 0.0073$	$k_{\text{D}}$	$0.14035 \pm 0.00048$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16097 \pm 0.00028$	$\chi_{\text{lowl}}^2$	$22.6 \pm 1.8$
$\Omega_m h^3$	$0.09598 \pm 0.00049$	$z_{\text{eq}}$	$3374 \pm 29$	$\chi_{6\text{DF}}^2$	$0.056 \pm 0.074$
$\sigma_8$	$0.8072 \pm 0.0079$	$k_{\text{eq}}$	$0.010299 \pm 0.000088$	$\chi_{\text{MGS}}^2$	$1.37 \pm 0.52$
$S_8$	$0.820 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8181 \pm 0.0053$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4494 \pm 0.0082$	$100\theta_{\text{s,eq}}$	$0.4520 \pm 0.0027$	$\chi_{\text{prior}}^2$	$7.6 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6023 \pm 0.0080$	$H(0.15)$	$72.93 \pm 0.47$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.012$	$D_{\text{M}}(0.15)$	$640.8 \pm 4.6$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$r_{\text{drag}} h$	$99.81 \pm 0.94$	$H(0.38)$	$83.00 \pm 0.36$		
$\langle d^2 \rangle^{1/2}$	$2.423 \pm 0.029$	$D_{\text{M}}(0.38)$	$1528.8 \pm 9.4$		

$\bar{\chi}_{\text{eff}}^2 = 7498.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.68$ ;  $R - 1 = 0.01937$



### 12.3 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00023$	$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.027$	$H(0.38)$	$82.66 \pm 0.46$
$\Omega_c h^2$	$0.1202 \pm 0.0016$	$z_{\text{re}}$	$7.60^{+0.84}_{-0.75}$	$D_{\text{M}}(0.38)$	$1538 \pm 13$
$100\theta_{MC}$	$1.04084 \pm 0.00045$	$10^9 A_s$	$2.095 \pm 0.033$	$H(0.51)$	$89.43 \pm 0.37$
$\tau$	$0.0533 \pm 0.0082$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.51)$	$1992 \pm 15$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{40}$	$1225 \pm 20$	$H(0.61)$	$95.10 \pm 0.31$
$n_s$	$0.9634 \pm 0.0051$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(0.61)$	$2317 \pm 16$
$n_{\text{run}}$	$-0.0027 \pm 0.0074$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$236.50 \pm 0.98$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{1420}$	$813.9 \pm 5.3$	$D_{\text{M}}(2.33)$	$5773 \pm 15$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.3 \pm 2.0$	$f\sigma_8(0.15)$	$0.4610 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.972 \pm 0.023$	$\sigma_8(0.15)$	$0.7483 \pm 0.0056$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$Y_P$	$0.24531^{+0.00011}_{-0.000085}$	$f\sigma_8(0.38)$	$0.4779 \pm 0.0064$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00011}_{-0.000085}$	$\sigma_8(0.38)$	$0.6627 \pm 0.0049$
$A_{143}^{PS}$	$46 \pm 9$	$10^5 D/H$	$2.623 \pm 0.043$	$f\sigma_8(0.51)$	$0.4757 \pm 0.0054$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$13.820 \pm 0.034$	$\sigma_8(0.51)$	$0.6199 \pm 0.0047$
$A^{kSZ}$	$< 6.10$	$z_*$	$1090.19 \pm 0.37$	$f\sigma_8(0.61)$	$0.4703 \pm 0.0048$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$r_*$	$144.53 \pm 0.38$	$\sigma_8(0.61)$	$0.5897 \pm 0.0045$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_*$	$1.04105 \pm 0.00045$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0024$
$H_0$	$67.10 \pm 0.73$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.883 \pm 0.036$	$\sigma_8(2.33)$	$0.3060 \pm 0.0026$
$\Omega_\Lambda$	$0.682 \pm 0.010$	$z_{\text{drag}}$	$1059.49 \pm 0.50$	$f_{2000}^{143}$	$31.6 \pm 3.3$
$\Omega_m$	$0.318 \pm 0.010$	$r_{\text{drag}}$	$147.26 \pm 0.40$	$f_{2000}^{143 \times 217}$	$33.7 \pm 2.3$
$\Omega_m h^2$	$0.1430 \pm 0.0015$	$k_{\text{D}}$	$0.14054 \pm 0.00049$	$f_{2000}^{217}$	$108.2 \pm 2.1$
$\Omega_m h^3$	$0.09596 \pm 0.00049$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00029$	$\chi^2_{\text{lensing}}$	$9.60 \pm 0.94$
$\sigma_8$	$0.8105 \pm 0.0063$	$z_{\text{eq}}$	$3403 \pm 36$	$\chi^2_{\text{simall}}$	$397.0 \pm 1.7$
$S_8$	$0.834 \pm 0.016$	$k_{\text{eq}}$	$0.01039 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$23.2 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4569 \pm 0.0090$	$100\theta_{\text{eq}}$	$0.8127 \pm 0.0068$	$\chi^2_{\text{prior}}$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6086 \pm 0.0078$	$100\theta_{\text{s,eq}}$	$0.4492 \pm 0.0035$	$\chi^2_{\text{CMB}}$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$H(0.15)$	$72.44 \pm 0.63$		
$r_{\text{drag}} h$	$98.8 \pm 1.2$	$D_{\text{M}}(0.15)$	$645.7 \pm 6.3$		

$\bar{\chi}^2_{\text{eff}} = 7501.08$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.80$ ;  $R - 1 = 0.01225$



12.4 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02225 \pm 0.00021$	$z_{\text{re}}$	$7.86 \pm 0.76$	$H(0.51)$	$89.67 \pm 0.28$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s$	$2.103 \pm 0.033$	$D_{\text{M}}(0.51)$	$1982 \pm 10$
$100\theta_{MC}$	$1.04101 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.28 \pm 0.25$
$\tau$	$0.0562 \pm 0.0077$	$D_{40}$	$1221 \pm 19$	$D_{\text{M}}(0.61)$	$2306 \pm 11$
$\ln(10^{10} A_s)$	$3.046 \pm 0.016$	$D_{220}$	$5720 \pm 40$	$H(2.33)$	$235.86 \pm 0.71$
$n_s$	$0.9660 \pm 0.0044$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 13$
$n_{\text{run}}$	$-0.0026 \pm 0.0074$	$D_{1420}$	$815.0 \pm 5.1$	$f\sigma_8(0.15)$	$0.4557 \pm 0.0061$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$229.7 \pm 1.9$	$\sigma_8(0.15)$	$0.7477 \pm 0.0057$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.974 \pm 0.023$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0051$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245343^{+0.000094}_{-0.000079}$	$\sigma_8(0.38)$	$0.6629 \pm 0.0050$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246669^{+0.000094}_{-0.000079}$	$f\sigma_8(0.51)$	$0.4728 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.609 \pm 0.040$	$\sigma_8(0.51)$	$0.6204 \pm 0.0047$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.803 \pm 0.029$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0042$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.00 \pm 0.30$	$\sigma_8(0.61)$	$0.5903 \pm 0.0045$
$A^{kSZ}$	$< 6.00$	$r_*$	$144.76 \pm 0.30$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0023$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04121 \pm 0.00041$	$\sigma_8(2.33)$	$0.3069 \pm 0.0025$
$c_{217}$	$0.9998 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.903 \pm 0.029$	$f_{2000}^{143}$	$31.2 \pm 3.3$
$H_0$	$67.60 \pm 0.50$	$z_{\text{drag}}$	$1059.59 \pm 0.48$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.3$
$\Omega_{\Lambda}$	$0.6892 \pm 0.0066$	$r_{\text{drag}}$	$147.46 \pm 0.34$	$f_{2000}^{217}$	$107.9 \pm 2.2$
$\Omega_m$	$0.3108 \pm 0.0066$	$k_{\text{D}}$	$0.14038 \pm 0.00046$	$\chi_{\text{lensing}}^2$	$9.41 \pm 0.79$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16097 \pm 0.00028$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\Omega_m h^3$	$0.09599 \pm 0.00048$	$z_{\text{eq}}$	$3378 \pm 26$	$\chi_{\text{lowl}}^2$	$22.8 \pm 1.9$
$\sigma_8$	$0.8091 \pm 0.0063$	$k_{\text{eq}}$	$0.010310 \pm 0.000078$	$\chi_{6\text{DF}}^2$	$0.056 \pm 0.070$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8174 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.46$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0065$	$100\theta_{s,\text{eq}}$	$0.4516 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6041 \pm 0.0062$	$H(0.15)$	$72.87 \pm 0.44$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9841 \pm 0.0090$	$D_{\text{M}}(0.15)$	$641.4 \pm 4.3$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$r_{\text{drag}} h$	$99.69 \pm 0.84$	$H(0.38)$	$82.97 \pm 0.33$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.023$	$D_{\text{M}}(0.38)$	$1529.8 \pm 8.7$		

$$\bar{\chi}_{\text{eff}}^2 = 7507.23; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.89; R - 1 = 0.02103$$



12.5 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00023$	$r_{\text{drag}} h$	$98.5 \pm 1.6$	$H(0.15)$	$72.33 \pm 0.78$
$\Omega_c h^2$	$0.1206 \pm 0.0021$	$\langle d^2 \rangle^{1/2}$	$2.450 \pm 0.038$	$D_{\text{M}}(0.15)$	$646.9 \pm 8.0$
$100\theta_{MC}$	$1.04082 \pm 0.00047$	$z_{\text{re}}$	$7.76^{+0.58}_{-0.84}$	$H(0.38)$	$82.59 \pm 0.56$
$\tau$	$0.0548^{+0.0052}_{-0.0086}$	$10^9 A_s$	$2.103^{+0.027}_{-0.037}$	$D_{\text{M}}(0.38)$	$1541 \pm 16$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.017}$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.015$	$H(0.51)$	$89.39 \pm 0.44$
$n_s$	$0.9627 \pm 0.0060$	$D_{40}$	$1223 \pm 21$	$D_{\text{M}}(0.51)$	$1995 \pm 18$
$n_{\text{run}}$	$-0.0041 \pm 0.0076$	$D_{220}$	$5709 \pm 41$	$H(0.61)$	$95.07 \pm 0.36$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2320 \pm 20$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{1420}$	$813.7 \pm 5.3$	$H(2.33)$	$236.7 \pm 1.3$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.2 \pm 2.0$	$D_{\text{M}}(2.33)$	$5775 \pm 17$
$A_{143}^{tSZ}$	$4.3 \pm 2.1$	$n_{s,0.002}$	$0.976 \pm 0.023$	$f\sigma_8(0.15)$	$0.464 \pm 0.012$
$A_{100}^{PS}$	$255^{+27}_{-30}$	$Y_P$	$0.24531^{+0.00011}_{-0.000088}$	$\sigma_8(0.15)$	$0.7503 \pm 0.0071$
$A_{143}^{PS}$	$46 \pm 9$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00011}_{-0.000088}$	$f\sigma_8(0.38)$	$0.4801 \pm 0.0096$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$10^5 D/H$	$2.624 \pm 0.044$	$\sigma_8(0.38)$	$0.6641 \pm 0.0056$
$A^{kSZ}$	$< 6.15$	Age/Gyr	$13.823 \pm 0.037$	$f\sigma_8(0.51)$	$0.4777 \pm 0.0082$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$z_*$	$1090.23 \pm 0.41$	$\sigma_8(0.51)$	$0.6212^{+0.0046}_{-0.0053}$
$c_{217}$	$0.9998 \pm 0.0019$	$r_*$	$144.44 \pm 0.49$	$f\sigma_8(0.61)$	$0.4720 \pm 0.0072$
$H_0$	$66.96 \pm 0.92$	$100\theta_*$	$1.04103 \pm 0.00047$	$\sigma_8(0.61)$	$0.5908^{+0.0042}_{-0.0050}$
$\Omega_\Lambda$	$0.680^{+0.014}_{-0.012}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.874 \pm 0.046$	$f\sigma_8(2.33)$	$0.2976^{+0.0019}_{-0.0025}$
$\Omega_m$	$0.320 \pm 0.013$	$z_{\text{drag}}$	$1059.51 \pm 0.50$	$\sigma_8(2.33)$	$0.3064^{+0.0020}_{-0.0027}$
$\Omega_m h^2$	$0.1434 \pm 0.0020$	$r_{\text{drag}}$	$147.16 \pm 0.50$	$f_{2000}^{143}$	$31.7 \pm 3.3$
$\Omega_m h^3$	$0.09601 \pm 0.00049$	$k_{\text{D}}$	$0.14063 \pm 0.00057$	$f_{2000}^{143 \times 217}$	$33.8 \pm 2.3$
$\sigma_8$	$0.8128 \pm 0.0086$	$100\theta_{\text{D}}$	$0.16101 \pm 0.00029$	$f_{2000}^{217}$	$108.3 \pm 2.2$
$S_8$	$0.840 \pm 0.024$	$z_{\text{eq}}$	$3411 \pm 48$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.460 \pm 0.013$	$k_{\text{eq}}$	$0.01041 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$23.0 \pm 2.0$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8112 \pm 0.0090$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$100\theta_{\text{s,eq}}$	$0.4484 \pm 0.0046$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7491.87$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.89$ ;  $R - 1 = 0.00915$



12.6 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00021$	$z_{\text{re}}$	$7.85^{+0.63}_{-0.84}$	$H(0.51)$	$89.71 \pm 0.29$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$10^9 A_s$	$2.100^{+0.028}_{-0.038}$	$D_{\text{M}}(0.51)$	$1980 \pm 11$
$100\theta_{MC}$	$1.04104 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.012$	$H(0.61)$	$95.31 \pm 0.25$
$\tau$	$0.0560^{+0.0057}_{-0.0086}$	$D_{40}$	$1217 \pm 20$	$D_{\text{M}}(0.61)$	$2305 \pm 12$
$\ln(10^{10} A_s)$	$3.045^{+0.014}_{-0.018}$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.76 \pm 0.79$
$n_s$	$0.9665 \pm 0.0046$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5764 \pm 13$
$n_{\text{run}}$	$-0.0034 \pm 0.0075$	$D_{1420}$	$814.7 \pm 5.2$	$f\sigma_8(0.15)$	$0.4545 \pm 0.0076$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.6 \pm 1.9$	$\sigma_8(0.15)$	$0.7469^{+0.0059}_{-0.0069}$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.977 \pm 0.023$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245347^{+0.000094}_{-0.000079}$	$\sigma_8(0.38)$	$0.6623^{+0.0049}_{-0.0060}$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246673^{+0.000095}_{-0.000079}$	$f\sigma_8(0.51)$	$0.4719 \pm 0.0057$
$A_{100}^{PS}$	$254 \pm 30$	$10^5 D/H$	$2.607 \pm 0.040$	$\sigma_8(0.51)$	$0.6198^{+0.0044}_{-0.0056}$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.801 \pm 0.029$	$f\sigma_8(0.61)$	$0.4671 \pm 0.0052$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_*$	$1089.97 \pm 0.31$	$\sigma_8(0.61)$	$0.5898^{+0.0042}_{-0.0053}$
$A^{kSZ}$	$< 6.09$	$r_*$	$144.79 \pm 0.33$	$f\sigma_8(2.33)$	$0.2975^{+0.0020}_{-0.0027}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04123 \pm 0.00042$	$\sigma_8(2.33)$	$0.3068^{+0.0021}_{-0.0028}$
$c_{217}$	$0.9998 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.906 \pm 0.032$	$f_{2000}^{143}$	$31.3 \pm 3.3$
$H_0$	$67.68 \pm 0.54$	$z_{\text{drag}}$	$1059.60 \pm 0.49$	$f_{2000}^{143 \times 217}$	$33.5 \pm 2.3$
$\Omega_{\Lambda}$	$0.6902 \pm 0.0073$	$r_{\text{drag}}$	$147.50 \pm 0.36$	$f_{2000}^{217}$	$108.0 \pm 2.2$
$\Omega_m$	$0.3098 \pm 0.0073$	$k_{\text{D}}$	$0.14035 \pm 0.00048$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16097 \pm 0.00028$	$\chi_{\text{lowl}}^2$	$22.5 \pm 1.8$
$\Omega_m h^3$	$0.09599 \pm 0.00049$	$z_{\text{eq}}$	$3374 \pm 29$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.073$
$\sigma_8$	$0.8081^{+0.0068}_{-0.0078}$	$k_{\text{eq}}$	$0.010299 \pm 0.000088$	$\chi_{\text{MGS}}^2$	$1.38 \pm 0.52$
$S_8$	$0.821 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8181 \pm 0.0053$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4498 \pm 0.0080$	$100\theta_{\text{s,eq}}$	$0.4520 \pm 0.0027$	$\chi_{\text{prior}}^2$	$7.6 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6029 \pm 0.0078$	$H(0.15)$	$72.94 \pm 0.47$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$640.8 \pm 4.6$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$99.82 \pm 0.93$	$H(0.38)$	$83.01 \pm 0.35$		
$\langle d^2 \rangle^{1/2}$	$2.425 \pm 0.028$	$D_{\text{M}}(0.38)$	$1528.6 \pm 9.4$		

$$\bar{\chi}_{\text{eff}}^2 = 7497.95; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.73; R - 1 = 0.02138$$



## 12.7 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00022$	$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.027$	$H(0.38)$	$82.70 \pm 0.45$
$\Omega_c h^2$	$0.1201 \pm 0.0015$	$z_{\text{re}}$	$7.75^{+0.59}_{-0.81}$	$D_{\text{M}}(0.38)$	$1537 \pm 12$
$100\theta_{MC}$	$1.04086 \pm 0.00045$	$10^9 A_s$	$2.100^{+0.025}_{-0.033}$	$H(0.51)$	$89.47 \pm 0.36$
$\tau$	$0.0548^{+0.0053}_{-0.0085}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.51)$	$1991 \pm 14$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{40}$	$1224 \pm 20$	$H(0.61)$	$95.12 \pm 0.30$
$n_s$	$0.9637 \pm 0.0050$	$D_{220}$	$5712 \pm 41$	$D_{\text{M}}(0.61)$	$2316 \pm 15$
$n_{\text{run}}$	$-0.0029 \pm 0.0074$	$D_{810}$	$2536 \pm 14$	$H(2.33)$	$236.42 \pm 0.95$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{1420}$	$813.9 \pm 5.3$	$D_{\text{M}}(2.33)$	$5772 \pm 15$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.3 \pm 2.0$	$f\sigma_8(0.15)$	$0.4608 \pm 0.0082$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.973 \pm 0.023$	$\sigma_8(0.15)$	$0.7490 \pm 0.0052$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$Y_P$	$0.24532^{+0.00010}_{-0.000084}$	$f\sigma_8(0.38)$	$0.4779 \pm 0.0064$
$A_{100}^{PS}$	$254 \pm 30$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000085}$	$\sigma_8(0.38)$	$0.6634^{+0.0041}_{-0.0048}$
$A_{143}^{PS}$	$46 \pm 9$	$10^5 D/H$	$2.621 \pm 0.042$	$f\sigma_8(0.51)$	$0.4759 \pm 0.0054$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$13.818 \pm 0.033$	$\sigma_8(0.51)$	$0.6206^{+0.0037}_{-0.0045}$
$A^{kSZ}$	$< 6.10$	$z_*$	$1090.16 \pm 0.36$	$f\sigma_8(0.61)$	$0.4704 \pm 0.0048$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$r_*$	$144.55 \pm 0.37$	$\sigma_8(0.61)$	$0.5903^{+0.0035}_{-0.0044}$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_*$	$1.04107 \pm 0.00044$	$f\sigma_8(2.33)$	$0.2974^{+0.0018}_{-0.0023}$
$H_0$	$67.16 \pm 0.70$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.035$	$\sigma_8(2.33)$	$0.3064^{+0.0020}_{-0.0026}$
$\Omega_\Lambda$	$0.6830 \pm 0.0097$	$z_{\text{drag}}$	$1059.51 \pm 0.49$	$f_{2000}^{143}$	$31.5 \pm 3.3$
$\Omega_m$	$0.3170 \pm 0.0097$	$r_{\text{drag}}$	$147.28 \pm 0.39$	$f_{2000}^{143 \times 217}$	$33.7 \pm 2.3$
$\Omega_m h^2$	$0.1429 \pm 0.0015$	$k_{\text{D}}$	$0.14053 \pm 0.00049$	$f_{2000}^{217}$	$108.1 \pm 2.1$
$\Omega_m h^3$	$0.09597 \pm 0.00048$	$100\theta_{\text{D}}$	$0.16101 \pm 0.00029$	$\chi_{\text{lensing}}^2$	$9.58 \pm 0.94$
$\sigma_8$	$0.8112 \pm 0.0060$	$z_{\text{eq}}$	$3400 \pm 35$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$S_8$	$0.834 \pm 0.016$	$k_{\text{eq}}$	$0.01038 \pm 0.00011$	$\chi_{\text{lowl}}^2$	$23.1 \pm 2.0$
$\sigma_8 \Omega_m^{0.5}$	$0.4567 \pm 0.0090$	$100\theta_{\text{eq}}$	$0.8133 \pm 0.0066$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6086 \pm 0.0078$	$100\theta_{\text{s,eq}}$	$0.4495 \pm 0.0034$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$H(0.15)$	$72.50 \pm 0.60$		
$r_{\text{drag}} h$	$98.9 \pm 1.2$	$D_{\text{M}}(0.15)$	$645.2 \pm 6.1$		

$$\bar{\chi}_{\text{eff}}^2 = 7500.82; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.79; R - 1 = 0.01490$$



12.8 base\_nrun\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_nrun\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02225 \pm 0.00021$	$z_{\text{re}}$	$7.93^{+0.65}_{-0.76}$	$H(0.51)$	$89.68 \pm 0.28$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s$	$2.105^{+0.027}_{-0.033}$	$D_{\text{M}}(0.51)$	$1982 \pm 10$
$100\theta_{MC}$	$1.04102 \pm 0.00042$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.29 \pm 0.24$
$\tau$	$0.0568^{+0.0061}_{-0.0079}$	$D_{40}$	$1220 \pm 19$	$D_{\text{M}}(0.61)$	$2306 \pm 11$
$\ln(10^{10} A_s)$	$3.047^{+0.013}_{-0.016}$	$D_{220}$	$5720 \pm 40$	$H(2.33)$	$235.84 \pm 0.71$
$n_s$	$0.9661 \pm 0.0044$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 12$
$n_{\text{run}}$	$-0.0028 \pm 0.0074$	$D_{1420}$	$815.0 \pm 5.1$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0061$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$229.7 \pm 1.9$	$\sigma_8(0.15)$	$0.7481^{+0.0050}_{-0.0057}$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.975 \pm 0.023$	$f\sigma_8(0.38)$	$0.4743 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245344^{+0.000094}_{-0.000079}$	$\sigma_8(0.38)$	$0.6632^{+0.0043}_{-0.0051}$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246670^{+0.000094}_{-0.000079}$	$f\sigma_8(0.51)$	$0.4730 \pm 0.0045$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.608 \pm 0.040$	$\sigma_8(0.51)$	$0.6207^{+0.0040}_{-0.0048}$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.802 \pm 0.029$	$f\sigma_8(0.61)$	$0.4681 \pm 0.0041$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_*$	$1089.99 \pm 0.30$	$\sigma_8(0.61)$	$0.5906^{+0.0038}_{-0.0046}$
$A^{kSZ}$	$< 6.01$	$r_*$	$144.76 \pm 0.30$	$f\sigma_8(2.33)$	$0.2978^{+0.0020}_{-0.0024}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04121 \pm 0.00041$	$\sigma_8(2.33)$	$0.3071^{+0.0021}_{-0.0025}$
$c_{217}$	$0.9998 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.903 \pm 0.029$	$f_{2000}^{143}$	$31.2 \pm 3.3$
$H_0$	$67.62 \pm 0.50$	$z_{\text{drag}}$	$1059.60 \pm 0.48$	$f_{2000}^{143 \times 217}$	$33.4 \pm 2.3$
$\Omega_{\Lambda}$	$0.6894 \pm 0.0065$	$r_{\text{drag}}$	$147.47 \pm 0.33$	$f_{2000}^{217}$	$107.9 \pm 2.1$
$\Omega_m$	$0.3106 \pm 0.0065$	$k_{\text{D}}$	$0.14038 \pm 0.00046$	$\chi_{\text{lensing}}^2$	$9.38 \pm 0.74$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16097 \pm 0.00028$	$\chi_{\text{small}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09599 \pm 0.00048$	$z_{\text{eq}}$	$3377 \pm 25$	$\chi_{\text{lowl}}^2$	$22.8 \pm 1.9$
$\sigma_8$	$0.8095^{+0.0056}_{-0.0063}$	$k_{\text{eq}}$	$0.010308 \pm 0.000078$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.067$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8175 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.31 \pm 0.46$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4517 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0062$	$H(0.15)$	$72.88 \pm 0.43$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.9844 \pm 0.0088$	$D_{\text{M}}(0.15)$	$641.3 \pm 4.3$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$r_{\text{drag}} h$	$99.71 \pm 0.84$	$H(0.38)$	$82.97 \pm 0.33$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.023$	$D_{\text{M}}(0.38)$	$1529.6 \pm 8.6$		

$$\bar{\chi}_{\text{eff}}^2 = 7507.10; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.93; R - 1 = 0.02288$$



## 12.9 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00016$	$r_{\text{drag}} h$	$99.1 \pm 1.1$	$H(0.15)$	$72.65 \pm 0.52$
$\Omega_c h^2$	$0.1200 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.030$	$D_{\text{M}}(0.15)$	$643.7 \pm 5.2$
$100\theta_{MC}$	$1.04089 \pm 0.00032$	$z_{\text{re}}$	$7.66 \pm 0.83$	$H(0.38)$	$82.84 \pm 0.37$
$\tau$	$0.0543 \pm 0.0082$	$10^9 A_s$	$2.099 \pm 0.038$	$D_{\text{M}}(0.38)$	$1534 \pm 10$
$\ln(10^{10} A_s)$	$3.044 \pm 0.018$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.013$	$H(0.51)$	$89.60 \pm 0.29$
$n_s$	$0.9646 \pm 0.0048$	$D_{40}$	$1222 \pm 18$	$D_{\text{M}}(0.51)$	$1987 \pm 12$
$n_{\text{run}}$	$-0.0033 \pm 0.0071$	$D_{220}$	$5725 \pm 40$	$H(0.61)$	$95.25 \pm 0.24$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(0.61)$	$2311 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.8 \pm 5.0$	$H(2.33)$	$236.51 \pm 0.88$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.1 \pm 1.8$	$D_{\text{M}}(2.33)$	$5765 \pm 11$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.975 \pm 0.021$	$f\sigma_8(0.15)$	$0.4594 \pm 0.0087$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P$	$0.245381^{+0.000070}_{-0.000060}$	$\sigma_8(0.15)$	$0.7484 \pm 0.0071$
$A_{143}^{PS}$	$44 \pm 9$	$Y_P^{\text{BBN}}$	$0.246707^{+0.000070}_{-0.000060}$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0072$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.592 \pm 0.031$	$\sigma_8(0.38)$	$0.6630 \pm 0.0059$
$A^{kSZ}$	$< 5.64$	Age/Gyr	$13.801 \pm 0.025$	$f\sigma_8(0.51)$	$0.4749 \pm 0.0064$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$z_*$	$1089.96 \pm 0.28$	$\sigma_8(0.51)$	$0.6203 \pm 0.0055$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.46 \pm 0.34$	$f\sigma_8(0.61)$	$0.4697 \pm 0.0058$
$H_0$	$67.33 \pm 0.61$	$100\theta_*$	$1.04107 \pm 0.00031$	$\sigma_8(0.61)$	$0.5901 \pm 0.0052$
$\Omega_\Lambda$	$0.6845 \pm 0.0086$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.876 \pm 0.032$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0026$
$\Omega_m$	$0.3155 \pm 0.0086$	$z_{\text{drag}}$	$1059.86 \pm 0.36$	$\sigma_8(2.33)$	$0.3064 \pm 0.0027$
$\Omega_m h^2$	$0.1430 \pm 0.0014$	$r_{\text{drag}}$	$147.13 \pm 0.35$	$f_{2000}^{143}$	$30.4 \pm 3.2$
$\Omega_m h^3$	$0.09625 \pm 0.00036$	$k_{\text{D}}$	$0.14080 \pm 0.00040$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.3$
$\sigma_8$	$0.8103 \pm 0.0081$	$100\theta_{\text{D}}$	$0.16080^{+0.00019}_{-0.00022}$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$S_8$	$0.831 \pm 0.017$	$z_{\text{eq}}$	$3401 \pm 33$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4552 \pm 0.0093$	$k_{\text{eq}}$	$0.010380 \pm 0.000099$	$\chi_{\text{lowl}}^2$	$22.8 \pm 1.8$
$\sigma_8 \Omega_m^{0.25}$	$0.6073 \pm 0.0088$	$100\theta_{\text{eq}}$	$0.8135 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4495 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11920.76$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.36$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.38$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.16$ ;  $R - 1 = 0.00835$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  -0.19) commander\_dx12\_v3\_2\_29: 22.85 ( $\Delta$  0.60) CamSpec like\_10.7HM\_1400\_unified: 11499.86



12.10 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$z_{\text{re}}$	$7.73 \pm 0.83$	$H(0.51)$	$89.76 \pm 0.23$
$\Omega_c h^2$	$0.1192 \pm 0.0010$	$10^9 A_s$	$2.099^{+0.035}_{-0.039}$	$D_{\text{M}}(0.51)$	$1979.6 \pm 9.1$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.38 \pm 0.20$
$\tau$	$0.0552^{+0.0075}_{-0.0084}$	$D_{40}$	$1220 \pm 18$	$D_{\text{M}}(0.61)$	$2303.7 \pm 9.8$
$\ln(10^{10} A_s)$	$3.044 \pm 0.018$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$236.04 \pm 0.66$
$n_s$	$0.9666 \pm 0.0042$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5760.0 \pm 9.6$
$n_{\text{run}}$	$-0.0027 \pm 0.0071$	$D_{1420}$	$816.4 \pm 4.9$	$f\sigma_8(0.15)$	$0.4550 \pm 0.0069$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.4 \pm 1.8$	$\sigma_8(0.15)$	$0.7469 \pm 0.0068$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.975 \pm 0.022$	$f\sigma_8(0.38)$	$0.4735 \pm 0.0060$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245401^{+0.000067}_{-0.000055}$	$\sigma_8(0.38)$	$0.6622 \pm 0.0059$
$A_{143}^{tSZ}$	$4.6 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246728^{+0.000067}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0055$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.582^{+0.027}_{-0.031}$	$\sigma_8(0.51)$	$0.6198 \pm 0.0054$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.790 \pm 0.022$	$f\sigma_8(0.61)$	$0.4673 \pm 0.0051$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.82 \pm 0.24$	$\sigma_8(0.61)$	$0.5897 \pm 0.0052$
$A^{kSZ}$	$< 5.54$	$r_*$	$144.63 \pm 0.27$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0026$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3066 \pm 0.0027$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.891 \pm 0.026$	$f_{2000}^{143}$	$30.1 \pm 3.2$
$H_0$	$67.69 \pm 0.45$	$z_{\text{drag}}$	$1059.92^{+0.37}_{-0.34}$	$f_{2000}^{143 \times 217}$	$32.5 \pm 2.2$
$\Omega_{\Lambda}$	$0.6895 \pm 0.0061$	$r_{\text{drag}}$	$147.29 \pm 0.29$	$f_{2000}^{217}$	$107.2 \pm 2.1$
$\Omega_m$	$0.3105 \pm 0.0061$	$k_{\text{D}}$	$0.14067^{+0.00039}_{-0.00034}$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16077^{+0.00019}_{-0.00022}$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.7$
$\Omega_m h^3$	$0.09625 \pm 0.00036$	$z_{\text{eq}}$	$3383 \pm 24$	$\chi_{6\text{DF}}^2$	$0.052 \pm 0.063$
$\sigma_8$	$0.8082 \pm 0.0076$	$k_{\text{eq}}$	$0.010325 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.44$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0045$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0023$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6033 \pm 0.0074$	$H(0.15)$	$72.96 \pm 0.39$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_{\text{M}}(0.15)$	$640.6 \pm 3.8$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.69 \pm 0.79$	$H(0.38)$	$83.05 \pm 0.29$		
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.026$	$D_{\text{M}}(0.38)$	$1528.0 \pm 7.7$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.15; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.67; R - 1 = 0.01377$$



12.11 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.023$	$H(0.38)$	$82.86 \pm 0.34$
$\Omega_c h^2$	$0.1199 \pm 0.0012$	$z_{\text{re}}$	$7.68 \pm 0.76$	$D_{\text{M}}(0.38)$	$1533.4 \pm 9.1$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$10^9 A_s$	$2.100 \pm 0.032$	$H(0.51)$	$89.62 \pm 0.27$
$\tau$	$0.0545 \pm 0.0076$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.51)$	$1986 \pm 11$
$\ln(10^{10} A_s)$	$3.044 \pm 0.015$	$D_{40}$	$1224 \pm 18$	$H(0.61)$	$95.26 \pm 0.22$
$n_s$	$0.9648 \pm 0.0045$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(0.61)$	$2310 \pm 12$
$n_{\text{run}}$	$-0.0025 \pm 0.0069$	$D_{810}$	$2538 \pm 14$	$H(2.33)$	$236.45 \pm 0.74$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.0 \pm 5.0$	$D_{\text{M}}(2.33)$	$5765 \pm 11$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.2 \pm 1.8$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.973 \pm 0.021$	$\sigma_8(0.15)$	$0.7483 \pm 0.0055$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.245383^{+0.000070}_{-0.000058}$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0053$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246709^{+0.000071}_{-0.000059}$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.591^{+0.029}_{-0.032}$	$f\sigma_8(0.51)$	$0.4747 \pm 0.0047$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.800 \pm 0.024$	$\sigma_8(0.51)$	$0.6203 \pm 0.0045$
$A^{kSZ}$	$< 5.59$	$z_*$	$1089.94 \pm 0.26$	$f\sigma_8(0.61)$	$0.4694 \pm 0.0043$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.49 \pm 0.29$	$\sigma_8(0.61)$	$0.5901 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04108 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0022$
$H_0$	$67.37 \pm 0.53$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.027$	$\sigma_8(2.33)$	$0.3065 \pm 0.0024$
$\Omega_\Lambda$	$0.6852 \pm 0.0073$	$z_{\text{drag}}$	$1059.87 \pm 0.35$	$f_{2000}^{143}$	$30.2 \pm 3.2$
$\Omega_m$	$0.3148 \pm 0.0073$	$r_{\text{drag}}$	$147.16 \pm 0.30$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.3$
$\Omega_m h^2$	$0.1429 \pm 0.0011$	$k_{\text{D}}$	$0.14078 \pm 0.00036$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$\Omega_m h^3$	$0.09624 \pm 0.00035$	$100\theta_{\text{D}}$	$0.16080^{+0.00019}_{-0.00022}$	$\chi_{\text{lensing}}^2$	$9.38 \pm 0.76$
$\sigma_8$	$0.8102 \pm 0.0061$	$z_{\text{eq}}$	$3398 \pm 27$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010372 \pm 0.000084$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0051$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6069 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0026$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9871 \pm 0.0092$	$H(0.15)$	$72.69 \pm 0.46$		
$r_{\text{drag}} h$	$99.14 \pm 0.92$	$D_{\text{M}}(0.15)$	$643.3 \pm 4.6$		

$\bar{\chi}_{\text{eff}}^2 = 11952.22$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.95$ ;  $R - 1 = 0.01144$



**12.12 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$z_{\text{re}}$	$7.83 \pm 0.74$	$H(0.51)$	$89.75 \pm 0.22$
$\Omega_c h^2$	$0.11923 \pm 0.00094$	$10^9 A_s$	$2.104^{+0.030}_{-0.034}$	$D_{\text{M}}(0.51)$	$1980.1 \pm 8.5$
$100\theta_{MC}$	$1.04097 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.37 \pm 0.19$
$\tau$	$0.0561^{+0.0068}_{-0.0077}$	$D_{40}$	$1223 \pm 18$	$D_{\text{M}}(0.61)$	$2304.3 \pm 9.2$
$\ln(10^{10} A_s)$	$3.046 \pm 0.015$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$236.08 \pm 0.60$
$n_s$	$0.9664 \pm 0.0041$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5760.4 \pm 9.5$
$n_{\text{run}}$	$-0.0022 \pm 0.0070$	$D_{1420}$	$816.6 \pm 4.9$	$f\sigma_8(0.15)$	$0.4559 \pm 0.0055$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.5 \pm 1.8$	$\sigma_8(0.15)$	$0.7479 \pm 0.0055$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.973 \pm 0.021$	$f\sigma_8(0.38)$	$0.4743 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245400^{+0.000067}_{-0.000055}$	$\sigma_8(0.38)$	$0.6631 \pm 0.0049$
$A_{143}^{tSZ}$	$4.6 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246727^{+0.000067}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4730 \pm 0.0043$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.583^{+0.027}_{-0.031}$	$\sigma_8(0.51)$	$0.6206 \pm 0.0045$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.791 \pm 0.022$	$f\sigma_8(0.61)$	$0.4681 \pm 0.0040$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.83 \pm 0.23$	$\sigma_8(0.61)$	$0.5905 \pm 0.0043$
$A^{kSZ}$	$< 5.46$	$r_*$	$144.62 \pm 0.24$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0022$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3070 \pm 0.0023$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.890 \pm 0.023$	$f_{2000}^{143}$	$29.9 \pm 3.2$
$H_0$	$67.66 \pm 0.42$	$z_{\text{drag}}$	$1059.92^{+0.37}_{-0.33}$	$f_{2000}^{143 \times 217}$	$32.4 \pm 2.2$
$\Omega_\Lambda$	$0.6892 \pm 0.0056$	$r_{\text{drag}}$	$147.28^{+0.25}_{-0.27}$	$f_{2000}^{217}$	$107.2 \pm 2.1$
$\Omega_m$	$0.3108 \pm 0.0056$	$k_{\text{D}}$	$0.14069^{+0.00037}_{-0.00032}$	$\chi_{\text{lensing}}^2$	$9.28 \pm 0.70$
$\Omega_m h^2$	$0.14227 \pm 0.00091$	$100\theta_{\text{D}}$	$0.16077^{+0.00019}_{-0.00022}$	$\chi_{\text{small}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09625 \pm 0.00035$	$z_{\text{eq}}$	$3384 \pm 22$	$\chi_{\text{lowl}}^2$	$22.9 \pm 1.8$
$\sigma_8$	$0.8093 \pm 0.0061$	$k_{\text{eq}}$	$0.010329 \pm 0.000066$	$\chi_{6\text{DF}}^2$	$0.051 \pm 0.059$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8166 \pm 0.0040$	$\chi_{\text{MGS}}^2$	$1.26 \pm 0.39$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0059$	$100\theta_{\text{s,eq}}$	$0.4511 \pm 0.0021$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6043 \pm 0.0058$	$H(0.15)$	$72.93 \pm 0.36$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.9840 \pm 0.0085$	$D_{\text{M}}(0.15)$	$640.8 \pm 3.6$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.64 \pm 0.72$	$H(0.38)$	$83.04 \pm 0.27$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.022$	$D_{\text{M}}(0.38)$	$1528.5 \pm 7.2$		

$$\bar{\chi}_{\text{eff}}^2 = 11958.12; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.80; R - 1 = 0.01586$$



12.13 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.029$	$H(0.38)$	$83.30 \pm 0.37$
$\Omega_c h^2$	$0.1184 \pm 0.0013$	$z_{\text{re}}$	$7.82 \pm 0.83$	$D_{\text{M}}(0.38)$	$1521.6 \pm 9.9$
$100\theta_{MC}$	$1.04109 \pm 0.00031$	$10^9 A_s$	$2.100^{+0.034}_{-0.040}$	$H(0.51)$	$89.95 \pm 0.29$
$\tau$	$0.0564^{+0.0074}_{-0.0087}$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.013$	$D_{\text{M}}(0.51)$	$1972 \pm 12$
$\ln(10^{10} A_s)$	$3.044^{+0.017}_{-0.019}$	$D_{40}$	$1216 \pm 19$	$H(0.61)$	$95.53 \pm 0.24$
$n_s$	$0.9686 \pm 0.0047$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(0.61)$	$2295 \pm 13$
$n_{\text{run}}$	$-0.0027 \pm 0.0072$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$235.61 \pm 0.83$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.1 \pm 4.8$	$D_{\text{M}}(2.33)$	$5753 \pm 11$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.8$	$f\sigma_8(0.15)$	$0.4506 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.977 \pm 0.022$	$\sigma_8(0.15)$	$0.7455^{+0.0067}_{-0.0075}$
$A_{143}^{tSZ}$	$4.6 \pm 2.1$	$Y_P$	$0.245431^{+0.000065}_{-0.000058}$	$f\sigma_8(0.38)$	$0.4702 \pm 0.0070$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.246758^{+0.000065}_{-0.000058}$	$\sigma_8(0.38)$	$0.6615^{+0.0056}_{-0.0064}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.568 \pm 0.030$	$f\sigma_8(0.51)$	$0.4695 \pm 0.0063$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.775 \pm 0.025$	$\sigma_8(0.51)$	$0.6193^{+0.0051}_{-0.0058}$
$A^{kSZ}$	$< 5.43$	$z_*$	$1089.66 \pm 0.27$	$f\sigma_8(0.61)$	$0.4650 \pm 0.0058$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$r_*$	$144.77 \pm 0.33$	$\sigma_8(0.61)$	$0.5895^{+0.0048}_{-0.0055}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04127 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2974^{+0.0024}_{-0.0027}$
$H_0$	$68.07 \pm 0.59$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.031$	$\sigma_8(2.33)$	$0.3069^{+0.0024}_{-0.0028}$
$\Omega_\Lambda$	$0.6945 \pm 0.0079$	$z_{\text{drag}}$	$1060.05 \pm 0.36$	$f_{2000}^{143}$	$29.7 \pm 3.2$
$\Omega_m$	$0.3055 \pm 0.0079$	$r_{\text{drag}}$	$147.41 \pm 0.34$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.2$
$\Omega_m h^2$	$0.1415 \pm 0.0013$	$k_{\text{D}}$	$0.14060^{+0.00042}_{-0.00037}$	$f_{2000}^{217}$	$107.0 \pm 2.1$
$\Omega_m h^3$	$0.09631 \pm 0.00036$	$100\theta_{\text{D}}$	$0.16070^{+0.00019}_{-0.00022}$	$\chi_{\text{small}}^2$	$397.3 \pm 2.2$
$\sigma_8$	$0.8061 \pm 0.0081$	$z_{\text{eq}}$	$3366 \pm 31$	$\chi_{\text{lowl}}^2$	$22.4 \pm 1.6$
$S_8$	$0.814 \pm 0.016$	$k_{\text{eq}}$	$0.010274 \pm 0.000094$	$\chi_{\text{H073p45}}^2$	$10.6 \pm 2.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4456 \pm 0.0089$	$100\theta_{\text{eq}}$	$0.8203 \pm 0.0058$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.5993 \pm 0.0086$	$100\theta_{\text{s,eq}}$	$0.4530 \pm 0.0030$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.977 \pm 0.012$	$H(0.15)$	$73.28 \pm 0.50$		
$r_{\text{drag}} h$	$100.3 \pm 1.0$	$D_{\text{M}}(0.15)$	$637.4 \pm 4.9$		

$\bar{\chi}_{\text{eff}}^2 = 11955.07$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.43$ ;  $R - 1 = 0.04651$



12.14 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00016$	$r_{\text{drag}} h$	$99.1 \pm 1.1$	$H(0.15)$	$72.67 \pm 0.52$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.440 \pm 0.029$	$D_{\text{M}}(0.15)$	$643.5 \pm 5.2$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$z_{\text{re}}$	$7.80^{+0.58}_{-0.84}$	$H(0.38)$	$82.85 \pm 0.37$
$\tau$	$0.0556^{+0.0052}_{-0.0087}$	$10^9 A_s$	$2.105^{+0.027}_{-0.038}$	$D_{\text{M}}(0.38)$	$1534 \pm 10$
$\ln(10^{10} A_s)$	$3.047^{+0.013}_{-0.018}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.013$	$H(0.51)$	$89.61 \pm 0.29$
$n_s$	$0.9647 \pm 0.0048$	$D_{40}$	$1222 \pm 18$	$D_{\text{M}}(0.51)$	$1986 \pm 12$
$n_{\text{run}}$	$-0.0034 \pm 0.0071$	$D_{220}$	$5724 \pm 40$	$H(0.61)$	$95.26 \pm 0.24$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(0.61)$	$2311 \pm 13$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$815.7 \pm 5.0$	$H(2.33)$	$236.50 \pm 0.88$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.1 \pm 1.8$	$D_{\text{M}}(2.33)$	$5765 \pm 11$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$n_{s,0.002}$	$0.976 \pm 0.021$	$f\sigma_8(0.15)$	$0.4598 \pm 0.0086$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P$	$0.245383^{+0.000070}_{-0.000059}$	$\sigma_8(0.15)$	$0.7492^{+0.0060}_{-0.0070}$
$A_{143}^{PS}$	$44 \pm 9$	$Y_P^{\text{BBN}}$	$0.246709^{+0.000070}_{-0.000059}$	$f\sigma_8(0.38)$	$0.4772 \pm 0.0070$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.591 \pm 0.030$	$\sigma_8(0.38)$	$0.6637^{+0.0048}_{-0.0059}$
$A^{kSZ}$	$< 5.62$	Age/Gyr	$13.801 \pm 0.025$	$f\sigma_8(0.51)$	$0.4754 \pm 0.0062$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$z_*$	$1089.95 \pm 0.28$	$\sigma_8(0.51)$	$0.6210^{+0.0043}_{-0.0054}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_*$	$144.47 \pm 0.34$	$f\sigma_8(0.61)$	$0.4701 \pm 0.0056$
$H_0$	$67.34 \pm 0.61$	$100\theta_*$	$1.04108 \pm 0.00031$	$\sigma_8(0.61)$	$0.5908^{+0.0040}_{-0.0051}$
$\Omega_\Lambda$	$0.6847 \pm 0.0085$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.877 \pm 0.032$	$f\sigma_8(2.33)$	$0.2977^{+0.0019}_{-0.0025}$
$\Omega_m$	$0.3153 \pm 0.0085$	$z_{\text{drag}}$	$1059.87 \pm 0.35$	$\sigma_8(2.33)$	$0.3068^{+0.0020}_{-0.0026}$
$\Omega_m h^2$	$0.1429 \pm 0.0014$	$r_{\text{drag}}$	$147.14 \pm 0.35$	$f_{2000}^{143}$	$30.4 \pm 3.2$
$\Omega_m h^3$	$0.09625 \pm 0.00035$	$k_{\text{D}}$	$0.14080 \pm 0.00040$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.3$
$\sigma_8$	$0.8112^{+0.0071}_{-0.0079}$	$100\theta_{\text{D}}$	$0.16079^{+0.00019}_{-0.00022}$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$S_8$	$0.832 \pm 0.017$	$z_{\text{eq}}$	$3400 \pm 33$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4555 \pm 0.0092$	$k_{\text{eq}}$	$0.010378 \pm 0.000099$	$\chi_{\text{lowl}}^2$	$22.8 \pm 1.8$
$\sigma_8 \Omega_m^{0.25}$	$0.6078 \pm 0.0086$	$100\theta_{\text{eq}}$	$0.8136 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4495 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11943.05$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.03$ ;  $R - 1 = 0.00888$



12.15 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$z_{\text{re}}$	$7.84^{+0.60}_{-0.86}$	$H(0.51)$	$89.77 \pm 0.23$
$\Omega_c h^2$	$0.1192 \pm 0.0010$	$10^9 A_s$	$2.103^{+0.028}_{-0.039}$	$D_{\text{M}}(0.51)$	$1979.4 \pm 9.0$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.38 \pm 0.20$
$\tau$	$0.0563^{+0.0054}_{-0.0088}$	$D_{40}$	$1220 \pm 18$	$D_{\text{M}}(0.61)$	$2303.5 \pm 9.8$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.018}$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$236.03 \pm 0.66$
$n_s$	$0.9666 \pm 0.0042$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5759.8 \pm 9.6$
$n_{\text{run}}$	$-0.0028 \pm 0.0071$	$D_{1420}$	$816.3 \pm 4.9$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0067$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.4 \pm 1.8$	$\sigma_8(0.15)$	$0.7476^{+0.0056}_{-0.0068}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.976 \pm 0.021$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0058$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245402^{+0.000067}_{-0.000055}$	$\sigma_8(0.38)$	$0.6628^{+0.0047}_{-0.0059}$
$A_{143}^{tSZ}$	$4.6 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246729^{+0.000067}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0052$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.582^{+0.027}_{-0.031}$	$\sigma_8(0.51)$	$0.6204^{+0.0043}_{-0.0055}$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.790 \pm 0.022$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0048$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.82 \pm 0.24$	$\sigma_8(0.61)$	$0.5903^{+0.0040}_{-0.0052}$
$A^{kSZ}$	$< 5.54$	$r_*$	$144.63 \pm 0.27$	$f\sigma_8(2.33)$	$0.2977^{+0.0020}_{-0.0026}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04117 \pm 0.00029$	$\sigma_8(2.33)$	$0.3070^{+0.0020}_{-0.0027}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.891 \pm 0.026$	$f_{2000}^{143}$	$30.0 \pm 3.2$
$H_0$	$67.69 \pm 0.45$	$z_{\text{drag}}$	$1059.93^{+0.37}_{-0.33}$	$f_{2000}^{143 \times 217}$	$32.5 \pm 2.2$
$\Omega_{\Lambda}$	$0.6896 \pm 0.0061$	$r_{\text{drag}}$	$147.29 \pm 0.29$	$f_{2000}^{217}$	$107.2 \pm 2.1$
$\Omega_m$	$0.3104 \pm 0.0061$	$k_{\text{D}}$	$0.14068^{+0.00039}_{-0.00034}$	$\chi_{\text{small}}^2$	$397.1 \pm 2.0$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16076^{+0.00019}_{-0.00022}$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.7$
$\Omega_m h^3$	$0.09625 \pm 0.00036$	$z_{\text{eq}}$	$3383 \pm 24$	$\chi_{6\text{DF}}^2$	$0.052 \pm 0.062$
$\sigma_8$	$0.8090^{+0.0064}_{-0.0076}$	$k_{\text{eq}}$	$0.010324 \pm 0.000074$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.44$
$S_8$	$0.823 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8170 \pm 0.0045$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0071$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0023$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6038 \pm 0.0071$	$H(0.15)$	$72.96 \pm 0.39$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$D_{\text{M}}(0.15)$	$640.5 \pm 3.8$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.71 \pm 0.79$	$H(0.38)$	$83.06 \pm 0.29$		
$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.025$	$D_{\text{M}}(0.38)$	$1527.9 \pm 7.7$		

$$\bar{\chi}_{\text{eff}}^2 = 11948.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.54; R - 1 = 0.01438$$



**12.16 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.440 \pm 0.023$	$H(0.38)$	$82.88 \pm 0.33$
$\Omega_c h^2$	$0.1198 \pm 0.0012$	$z_{\text{re}}$	$7.78^{+0.57}_{-0.78}$	$D_{\text{M}}(0.38)$	$1532.9 \pm 9.0$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s$	$2.103^{+0.025}_{-0.033}$	$H(0.51)$	$89.63 \pm 0.26$
$\tau$	$0.0555^{+0.0052}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.51)$	$1985 \pm 11$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.016}$	$D_{40}$	$1224 \pm 18$	$H(0.61)$	$95.27 \pm 0.22$
$n_s$	$0.9649 \pm 0.0044$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(0.61)$	$2310 \pm 11$
$n_{\text{run}}$	$-0.0026 \pm 0.0069$	$D_{810}$	$2538 \pm 14$	$H(2.33)$	$236.41 \pm 0.73$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$815.9 \pm 5.0$	$D_{\text{M}}(2.33)$	$5764 \pm 10$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.2 \pm 1.8$	$f\sigma_8(0.15)$	$0.4590 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.973 \pm 0.021$	$\sigma_8(0.15)$	$0.7489^{+0.0048}_{-0.0054}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$Y_P$	$0.245385^{+0.000069}_{-0.000058}$	$f\sigma_8(0.38)$	$0.4766 \pm 0.0052$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246712^{+0.000070}_{-0.000058}$	$\sigma_8(0.38)$	$0.6635^{+0.0040}_{-0.0048}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.590^{+0.028}_{-0.032}$	$f\sigma_8(0.51)$	$0.4749 \pm 0.0046$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.799 \pm 0.024$	$\sigma_8(0.51)$	$0.6208^{+0.0037}_{-0.0045}$
$A^{kSZ}$	$< 5.59$	$z_*$	$1089.93 \pm 0.26$	$f\sigma_8(0.61)$	$0.4697 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$r_*$	$144.50 \pm 0.28$	$\sigma_8(0.61)$	$0.5906^{+0.0035}_{-0.0043}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04108 \pm 0.00030$	$f\sigma_8(2.33)$	$0.2977^{+0.0018}_{-0.0023}$
$H_0$	$67.40 \pm 0.52$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.879 \pm 0.027$	$\sigma_8(2.33)$	$0.3068^{+0.0019}_{-0.0024}$
$\Omega_\Lambda$	$0.6855 \pm 0.0072$	$z_{\text{drag}}$	$1059.87 \pm 0.35$	$f_{2000}^{143}$	$30.2 \pm 3.2$
$\Omega_m$	$0.3145 \pm 0.0072$	$r_{\text{drag}}$	$147.17 \pm 0.30$	$f_{2000}^{143 \times 217}$	$32.6 \pm 2.3$
$\Omega_m h^2$	$0.1428 \pm 0.0011$	$k_{\text{D}}$	$0.14077^{+0.00038}_{-0.00034}$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$\Omega_m h^3$	$0.09624 \pm 0.00035$	$100\theta_{\text{D}}$	$0.16079^{+0.00019}_{-0.00022}$	$\chi^2_{\text{lensing}}$	$9.35 \pm 0.74$
$\sigma_8$	$0.8107 \pm 0.0058$	$z_{\text{eq}}$	$3397 \pm 27$	$\chi^2_{\text{small}}$	$397.0 \pm 1.7$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010369 \pm 0.000082$	$\chi^2_{\text{lowl}}$	$23.0 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0070$	$100\theta_{\text{eq}}$	$0.8142 \pm 0.0050$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6071 \pm 0.0064$	$100\theta_{\text{s,eq}}$	$0.4498 \pm 0.0026$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9876 \pm 0.0090$	$H(0.15)$	$72.71 \pm 0.45$		
$r_{\text{drag}} h$	$99.19 \pm 0.91$	$D_{\text{M}}(0.15)$	$643.1 \pm 4.5$		

$\bar{\chi}^2_{\text{eff}} = 11951.93$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.82$ ;  $R - 1 = 0.01119$



12.17 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$z_{\text{re}}$	$7.89^{+0.60}_{-0.76}$	$H(0.51)$	$89.75 \pm 0.22$
$\Omega_c h^2$	$0.11921 \pm 0.00093$	$10^9 A_s$	$2.106^{+0.026}_{-0.034}$	$D_{\text{M}}(0.51)$	$1979.9 \pm 8.5$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.37 \pm 0.19$
$\tau$	$0.0567^{+0.0056}_{-0.0079}$	$D_{40}$	$1222 \pm 18$	$D_{\text{M}}(0.61)$	$2304.0 \pm 9.2$
$\ln(10^{10} A_s)$	$3.047^{+0.013}_{-0.016}$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$236.07 \pm 0.59$
$n_s$	$0.9664 \pm 0.0040$	$D_{810}$	$2538 \pm 14$	$D_{\text{M}}(2.33)$	$5760.2 \pm 9.4$
$n_{\text{run}}$	$-0.0022 \pm 0.0069$	$D_{1420}$	$816.6 \pm 4.9$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0055$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$230.5 \pm 1.8$	$\sigma_8(0.15)$	$0.7483^{+0.0049}_{-0.0056}$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.974 \pm 0.021$	$f\sigma_8(0.38)$	$0.4745 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245401^{+0.000067}_{-0.000055}$	$\sigma_8(0.38)$	$0.6634^{+0.0042}_{-0.0050}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246728^{+0.000067}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0042$
$A_{100}^{PS}$	$251 \pm 30$	$10^5 D/H$	$2.582^{+0.027}_{-0.031}$	$\sigma_8(0.51)$	$0.6209^{+0.0039}_{-0.0047}$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.790 \pm 0.022$	$f\sigma_8(0.61)$	$0.4683 \pm 0.0039$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.83 \pm 0.23$	$\sigma_8(0.61)$	$0.5908^{+0.0037}_{-0.0045}$
$A^{kSZ}$	$< 5.45$	$r_*$	$144.62 \pm 0.24$	$f\sigma_8(2.33)$	$0.2979^{+0.0018}_{-0.0023}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3072^{+0.0019}_{-0.0024}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.890 \pm 0.023$	$f_{2000}^{143}$	$29.9 \pm 3.2$
$H_0$	$67.67 \pm 0.42$	$z_{\text{drag}}$	$1059.93 \pm 0.35$	$f_{2000}^{143 \times 217}$	$32.4 \pm 2.2$
$\Omega_\Lambda$	$0.6893 \pm 0.0056$	$r_{\text{drag}}$	$147.28^{+0.24}_{-0.27}$	$f_{2000}^{217}$	$107.2 \pm 2.1$
$\Omega_m$	$0.3107 \pm 0.0056$	$k_{\text{D}}$	$0.14069^{+0.00037}_{-0.00032}$	$\chi_{\text{lensing}}^2$	$9.25 \pm 0.66$
$\Omega_m h^2$	$0.14225 \pm 0.00091$	$100\theta_{\text{D}}$	$0.16077^{+0.00019}_{-0.00022}$	$\chi_{\text{small}}^2$	$397.2 \pm 1.9$
$\Omega_m h^3$	$0.09625 \pm 0.00035$	$z_{\text{eq}}$	$3384 \pm 22$	$\chi_{\text{lowl}}^2$	$22.9 \pm 1.8$
$\sigma_8$	$0.8097^{+0.0055}_{-0.0061}$	$k_{\text{eq}}$	$0.010328 \pm 0.000066$	$\chi_{6\text{DF}}^2$	$0.050 \pm 0.057$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0040$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.39$
$\sigma_8 \Omega_m^{0.5}$	$0.4513 \pm 0.0058$	$100\theta_{\text{s,eq}}$	$0.4511 \pm 0.0021$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0057$	$H(0.15)$	$72.94 \pm 0.36$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.9843 \pm 0.0083$	$D_{\text{M}}(0.15)$	$640.8 \pm 3.6$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.66 \pm 0.71$	$H(0.38)$	$83.04 \pm 0.27$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.021$	$D_{\text{M}}(0.38)$	$1528.3 \pm 7.2$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.93; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.73; R - 1 = 0.01735$$



12.18 base\_nrun\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_nrun\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02247 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.417 \pm 0.029$	$H(0.38)$	$83.30 \pm 0.37$
$\Omega_c h^2$	$0.1184 \pm 0.0013$	$z_{\text{re}}$	$7.91^{+0.60}_{-0.88}$	$D_{\text{M}}(0.38)$	$1521.4 \pm 9.9$
$100\theta_{MC}$	$1.04109 \pm 0.00031$	$10^9 A_s$	$2.104^{+0.028}_{-0.040}$	$H(0.51)$	$89.96 \pm 0.29$
$\tau$	$0.0573^{+0.0057}_{-0.0089}$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.013$	$D_{\text{M}}(0.51)$	$1972 \pm 12$
$\ln(10^{10} A_s)$	$3.046^{+0.014}_{-0.019}$	$D_{40}$	$1216 \pm 19$	$H(0.61)$	$95.53 \pm 0.24$
$n_s$	$0.9686 \pm 0.0047$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(0.61)$	$2295 \pm 13$
$n_{\text{run}}$	$-0.0028 \pm 0.0072$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$235.60 \pm 0.83$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$817.0 \pm 4.8$	$D_{\text{M}}(2.33)$	$5753 \pm 11$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.8$	$f\sigma_8(0.15)$	$0.4509 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.978 \pm 0.022$	$\sigma_8(0.15)$	$0.7461^{+0.0060}_{-0.0074}$
$A_{143}^{tSZ}$	$4.6 \pm 2.1$	$Y_P$	$0.245433^{+0.000065}_{-0.000057}$	$f\sigma_8(0.38)$	$0.4705 \pm 0.0069$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.246759^{+0.000065}_{-0.000058}$	$\sigma_8(0.38)$	$0.6620^{+0.0049}_{-0.0063}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.567 \pm 0.030$	$f\sigma_8(0.51)$	$0.4698 \pm 0.0062$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.775 \pm 0.025$	$\sigma_8(0.51)$	$0.6198^{+0.0044}_{-0.0058}$
$A^{kSZ}$	$< 5.42$	$z_*$	$1089.65 \pm 0.27$	$f\sigma_8(0.61)$	$0.4653 \pm 0.0056$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$r_*$	$144.78 \pm 0.33$	$\sigma_8(0.61)$	$0.5899^{+0.0041}_{-0.0055}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04127 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2977^{+0.0020}_{-0.0027}$
$H_0$	$68.08 \pm 0.59$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.031$	$\sigma_8(2.33)$	$0.3072^{+0.0020}_{-0.0028}$
$\Omega_\Lambda$	$0.6946 \pm 0.0079$	$z_{\text{drag}}$	$1060.05 \pm 0.36$	$f_{2000}^{143}$	$29.7 \pm 3.2$
$\Omega_m$	$0.3054 \pm 0.0079$	$r_{\text{drag}}$	$147.41 \pm 0.34$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.2$
$\Omega_m h^2$	$0.1415 \pm 0.0013$	$k_{\text{D}}$	$0.14061^{+0.00042}_{-0.00037}$	$f_{2000}^{217}$	$107.0 \pm 2.1$
$\Omega_m h^3$	$0.09631 \pm 0.00036$	$100\theta_{\text{D}}$	$0.16070^{+0.00019}_{-0.00021}$	$\chi_{\text{small}}^2$	$397.3 \pm 2.3$
$\sigma_8$	$0.8067^{+0.0071}_{-0.0084}$	$z_{\text{eq}}$	$3366 \pm 31$	$\chi_{\text{lowl}}^2$	$22.4 \pm 1.6$
$S_8$	$0.814 \pm 0.016$	$k_{\text{eq}}$	$0.010272 \pm 0.000094$	$\chi_{\text{H073p45}}^2$	$10.6 \pm 2.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4458 \pm 0.0088$	$100\theta_{\text{eq}}$	$0.8204 \pm 0.0058$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.5997 \pm 0.0085$	$100\theta_{\text{s,eq}}$	$0.4530 \pm 0.0030$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.012$	$H(0.15)$	$73.29 \pm 0.50$		
$r_{\text{drag}} h$	$100.4 \pm 1.0$	$D_{\text{M}}(0.15)$	$637.3 \pm 4.9$		

$\bar{\chi}_{\text{eff}}^2 = 11954.85$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.33$ ;  $R - 1 = 0.05101$











## 15 nrun+r

### 15.1 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00024$	$z_{\text{re}}$	$7.62 \pm 0.85$	$D_{\text{M}}(0.51)$	$1992 \pm 19$
$\Omega_c h^2$	$0.1203 \pm 0.0021$	$10^9 A_s$	$2.098 \pm 0.037$	$H(0.61)$	$95.13 \pm 0.36$
$100\theta_{MC}$	$1.04085 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.014$	$D_{\text{M}}(0.61)$	$2317 \pm 20$
$\tau$	$0.0536 \pm 0.0085$	$D_{40}$	$1233 \pm 23$	$H(2.33)$	$236.6 \pm 1.3$
$\ln(10^{10} A_s)$	$3.044 \pm 0.018$	$D_{220}$	$5706 \pm 42$	$D_{\text{M}}(2.33)$	$5772 \pm 17$
$n_s$	$0.9634 \pm 0.0060$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.15)$	$0.461 \pm 0.012$
$n_{\text{run}}$	$-0.0072 \pm 0.0084$	$D_{1420}$	$813.7 \pm 5.2$	$\sigma_8(0.15)$	$0.7483 \pm 0.0076$
$r$	$< 0.0674$	$D_{2000}$	$229.0 \pm 1.9$	$f\sigma_8(0.38)$	$0.4780 \pm 0.0097$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.987 \pm 0.026$	$\sigma_8(0.38)$	$0.6626 \pm 0.0061$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P$	$0.24533^{+0.00011}_{-0.000088}$	$f\sigma_8(0.51)$	$0.4758 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.24665^{+0.00011}_{-0.000088}$	$\sigma_8(0.51)$	$0.6198 \pm 0.0056$
$A_{143}^{tSZ}$	$4.2^{+2.1}_{-2.4}$	$10^5 D/H$	$2.615 \pm 0.045$	$f\sigma_8(0.61)$	$0.4703 \pm 0.0073$
$A_{100}^{PS}$	$256 \pm 30$	Age/Gyr	$13.816 \pm 0.038$	$\sigma_8(0.61)$	$0.5895 \pm 0.0052$
$A_{143}^{PS}$	$47 \pm 9$	$z_*$	$1090.14 \pm 0.42$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0026$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$r_*$	$144.46 \pm 0.49$	$\sigma_8(2.33)$	$0.3059 \pm 0.0027$
$A^{kSZ}$	$4.7^{+1.8}_{-4.4}$	$100\theta_*$	$1.04105 \pm 0.00047$	$r_{0.002}$	$< 0.0641$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.877 \pm 0.046$	$r_{0.01}$	$< 0.0651$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{drag}}$	$1059.61 \pm 0.51$	$\ln(10^{10} A_t)$	$-0.35^{+1.4}_{-0.62}$
$H_0$	$67.10 \pm 0.93$	$r_{\text{drag}}$	$147.18 \pm 0.50$	$r_{L=10}$	$< 0.0333$
$\Omega_{\Lambda}$	$0.682 \pm 0.013$	$k_{\text{D}}$	$0.14066 \pm 0.00057$	$10^9 A_t$	$< 0.141$
$\Omega_m$	$0.318 \pm 0.013$	$100\theta_{\text{D}}$	$0.16095 \pm 0.00029$	$10^9 A_t e^{-2\tau}$	$< 0.127$
$\Omega_m h^2$	$0.1432 \pm 0.0020$	$z_{\text{eq}}$	$3406 \pm 48$	$f_{2000}^{143}$	$32.1 \pm 3.3$
$\Omega_m h^3$	$0.09606 \pm 0.00050$	$k_{\text{eq}}$	$0.01040 \pm 0.00015$	$f_{2000}^{143 \times 217}$	$34.1 \pm 2.4$
$\sigma_8$	$0.8105 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8122 \pm 0.0090$	$f_{2000}^{217}$	$108.5 \pm 2.2$
$S_8$	$0.835 \pm 0.024$	$100\theta_{s,\text{eq}}$	$0.4489 \pm 0.0046$	$\chi_{\text{simall}}^2$	$397.3 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.013$	$H(0.15)$	$72.45 \pm 0.79$	$\chi_{\text{lowl}}^2$	$23.7 \pm 2.3$
$\sigma_8 \Omega_m^{0.25}$	$0.609 \pm 0.012$	$D_{\text{M}}(0.15)$	$645.7 \pm 8.0$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.016$	$H(0.38)$	$82.68 \pm 0.57$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$
$r_{\text{drag}} h$	$98.8 \pm 1.6$	$D_{\text{M}}(0.38)$	$1538 \pm 16$		
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.039$	$H(0.51)$	$89.46 \pm 0.45$		

Best-fit  $\chi_{\text{eff}}^2 = 7471.53$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.12$ ;  $\bar{\chi}_{\text{eff}}^2 = 7493.80$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.84$ ;  $R - 1 = 0.00512$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.90 ( $\Delta$  -0.00) commander\_dx12\_v3.2.29: 22.71 ( $\Delta$  -0.02) CamSpec like\_10.7HM: 7050.49



## 15.2 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00022$	$10^9 A_s$	$2.097 \pm 0.038$	$D_M(0.61)$	$2303 \pm 12$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(2.33)$	$235.78 \pm 0.81$
$100\theta_{MC}$	$1.04104 \pm 0.00042$	$D_{40}$	$1228^{+21}_{-23}$	$D_M(2.33)$	$5763 \pm 13$
$\tau$	$0.0550 \pm 0.0083$	$D_{220}$	$5712 \pm 41$	$f\sigma_8(0.15)$	$0.4533 \pm 0.0077$
$\ln(10^{10} A_s)$	$3.043 \pm 0.018$	$D_{810}$	$2537 \pm 14$	$\sigma_8(0.15)$	$0.7455 \pm 0.0069$
$n_s$	$0.9668 \pm 0.0045$	$D_{1420}$	$814.6 \pm 5.1$	$f\sigma_8(0.38)$	$0.4721 \pm 0.0065$
$n_{\text{run}}$	$-0.0071 \pm 0.0084$	$D_{2000}$	$229.3 \pm 1.9$	$\sigma_8(0.38)$	$0.6611 \pm 0.0059$
$r$	$< 0.0736$	$n_{s,0.002}$	$0.989 \pm 0.026$	$f\sigma_8(0.51)$	$0.4709 \pm 0.0059$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$Y_P$	$0.245363^{+0.000093}_{-0.000080}$	$\sigma_8(0.51)$	$0.6188 \pm 0.0055$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P^{\text{BBN}}$	$0.246689^{+0.000093}_{-0.000080}$	$f\sigma_8(0.61)$	$0.4661 \pm 0.0054$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.600 \pm 0.041$	$\sigma_8(0.61)$	$0.5888 \pm 0.0052$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.4}$	Age/Gyr	$13.796 \pm 0.030$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0026$
$A_{100}^{PS}$	$256 \pm 30$	$z_*$	$1089.92 \pm 0.31$	$\sigma_8(2.33)$	$0.3063 \pm 0.0027$
$A_{143}^{PS}$	$46 \pm 9$	$r_*$	$144.77 \pm 0.33$	$r_{0.002}$	$< 0.0710$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$100\theta_*$	$1.04123 \pm 0.00041$	$r_{0.01}$	$< 0.0715$
$A^{kSZ}$	$4.7^{+2.0}_{-4.2}$	$D_M(z_*)/\text{Gpc}$	$13.904 \pm 0.032$	$\ln(10^{10} A_t)$	$-0.26^{+1.4}_{-0.62}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_{\text{drag}}$	$1059.69 \pm 0.50$	$r_{L=10}$	$< 0.0369$
$c_{217}$	$0.9998 \pm 0.0019$	$r_{\text{drag}}$	$147.46 \pm 0.37$	$10^9 A_t$	$< 0.154$
$H_0$	$67.72 \pm 0.55$	$k_D$	$0.14042 \pm 0.00049$	$10^9 A_t e^{-2\tau}$	$< 0.138$
$\Omega_\Lambda$	$0.6906 \pm 0.0073$	$100\theta_D$	$0.16091 \pm 0.00029$	$f_{2000}^{143}$	$31.8 \pm 3.3$
$\Omega_m$	$0.3094 \pm 0.0073$	$z_{\text{eq}}$	$3374 \pm 29$	$f_{2000}^{143 \times 217}$	$33.8 \pm 2.3$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_{\text{eq}}$	$0.010299 \pm 0.000089$	$f_{2000}^{217}$	$108.3 \pm 2.2$
$\Omega_m h^3$	$0.09606 \pm 0.00050$	$100\theta_{\text{eq}}$	$0.8183 \pm 0.0054$	$\chi_{\text{small}}^2$	$397.4 \pm 1.9$
$\sigma_8$	$0.8066 \pm 0.0078$	$100\theta_{s,\text{eq}}$	$0.4520 \pm 0.0028$	$\chi_{\text{lowl}}^2$	$23.3 \pm 2.1$
$S_8$	$0.819 \pm 0.015$	$H(0.15)$	$72.98 \pm 0.48$	$\chi_{6\text{DF}}^2$	$0.053 \pm 0.071$
$\sigma_8 \Omega_m^{0.5}$	$0.4486 \pm 0.0082$	$D_M(0.15)$	$640.3 \pm 4.7$	$\chi_{\text{MGS}}^2$	$1.41 \pm 0.54$
$\sigma_8 \Omega_m^{0.25}$	$0.6015 \pm 0.0081$	$H(0.38)$	$83.05 \pm 0.36$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.980 \pm 0.012$	$D_M(0.38)$	$1527.7 \pm 9.5$	$\chi_{\text{prior}}^2$	$7.6 \pm 3.6$
$r_{\text{drag}} h$	$99.87 \pm 0.95$	$H(0.51)$	$89.74 \pm 0.30$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.413 \pm 0.030$	$D_M(0.51)$	$1979 \pm 11$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$
$z_{\text{re}}$	$7.73 \pm 0.84$	$H(0.61)$	$95.34 \pm 0.26$		

$$\bar{\chi}_{\text{eff}}^2 = 7499.85; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.73; R - 1 = 0.00974$$



### 15.3 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00024$	$z_{\text{re}}$	$7.78^{+0.58}_{-0.85}$	$D_{\text{M}}(0.51)$	$1991 \pm 19$
$\Omega_c h^2$	$0.1203 \pm 0.0021$	$10^9 A_s$	$2.104^{+0.027}_{-0.038}$	$H(0.61)$	$95.14^{+0.34}_{-0.38}$
$100\theta_{MC}$	$1.04086 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.014$	$D_{\text{M}}(0.61)$	$2316 \pm 20$
$\tau$	$0.0551^{+0.0053}_{-0.0088}$	$D_{40}$	$1232 \pm 23$	$H(2.33)$	$236.6 \pm 1.3$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.018}$	$D_{220}$	$5706 \pm 42$	$D_{\text{M}}(2.33)$	$5771 \pm 17$
$n_s$	$0.9636 \pm 0.0060$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.461 \pm 0.012$
$n_{\text{run}}$	$-0.0075 \pm 0.0084$	$D_{1420}$	$813.7 \pm 5.2$	$\sigma_8(0.15)$	$0.7492 \pm 0.0072$
$r$	$< 0.0682$	$D_{2000}$	$229.0 \pm 1.9$	$f\sigma_8(0.38)$	$0.4784 \pm 0.0096$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.988 \pm 0.026$	$\sigma_8(0.38)$	$0.6634^{+0.0052}_{-0.0058}$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P$	$0.24533^{+0.00011}_{-0.000087}$	$f\sigma_8(0.51)$	$0.4762 \pm 0.0082$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.24666^{+0.00011}_{-0.000087}$	$\sigma_8(0.51)$	$0.6206^{+0.0046}_{-0.0053}$
$A_{143}^{tSZ}$	$4.2^{+2.1}_{-2.4}$	$10^5 D/H$	$2.613 \pm 0.045$	$f\sigma_8(0.61)$	$0.4707 \pm 0.0073$
$A_{100}^{PS}$	$256 \pm 30$	Age/Gyr	$13.814 \pm 0.038$	$\sigma_8(0.61)$	$0.5903^{+0.0042}_{-0.0050}$
$A_{143}^{PS}$	$47 \pm 9$	$z_*$	$1090.12 \pm 0.42$	$f\sigma_8(2.33)$	$0.2974^{+0.0020}_{-0.0025}$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$r_*$	$144.48 \pm 0.49$	$\sigma_8(2.33)$	$0.3064^{+0.0020}_{-0.0027}$
$A^{kSZ}$	$4.7^{+1.8}_{-4.4}$	$100\theta_*$	$1.04106 \pm 0.00047$	$r_{0.002}$	$< 0.0650$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.045$	$r_{0.01}$	$< 0.0659$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{drag}}$	$1059.62 \pm 0.50$	$\ln(10^{10} A_t)$	$-0.33^{+1.4}_{-0.62}$
$H_0$	$67.14 \pm 0.92$	$r_{\text{drag}}$	$147.18 \pm 0.50$	$r_{L=10}$	$< 0.0338$
$\Omega_{\Lambda}$	$0.682 \pm 0.013$	$k_{\text{D}}$	$0.14066 \pm 0.00057$	$10^9 A_t$	$< 0.143$
$\Omega_m$	$0.318 \pm 0.013$	$100\theta_{\text{D}}$	$0.16094 \pm 0.00029$	$10^9 A_t e^{-2\tau}$	$< 0.128$
$\Omega_m h^2$	$0.1431 \pm 0.0020$	$z_{\text{eq}}$	$3405 \pm 48$	$f_{2000}^{143}$	$32.0 \pm 3.3$
$\Omega_m h^3$	$0.09608 \pm 0.00050$	$k_{\text{eq}}$	$0.01039 \pm 0.00015$	$f_{2000}^{143 \times 217}$	$34.0 \pm 2.4$
$\sigma_8$	$0.8114 \pm 0.0087$	$100\theta_{\text{eq}}$	$0.8125 \pm 0.0090$	$f_{2000}^{217}$	$108.5 \pm 2.2$
$S_8$	$0.835 \pm 0.024$	$100\theta_{s,\text{eq}}$	$0.4491 \pm 0.0046$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.013$	$H(0.15)$	$72.48 \pm 0.79$	$\chi_{\text{lowl}}^2$	$23.6 \pm 2.2$
$\sigma_8 \Omega_m^{0.25}$	$0.609 \pm 0.012$	$D_{\text{M}}(0.15)$	$645.4 \pm 8.0$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.016$	$H(0.38)$	$82.70 \pm 0.57$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$
$r_{\text{drag}} h$	$98.8 \pm 1.6$	$D_{\text{M}}(0.38)$	$1538 \pm 16$		
$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.039$	$H(0.51)$	$89.48 \pm 0.45$		

$\bar{\chi}_{\text{eff}}^2 = 7493.58$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.86$ ;  $R - 1 = 0.00549$



15.4 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00022$	$10^9 A_s$	$2.102^{+0.028}_{-0.039}$	$D_M(0.61)$	$2303 \pm 12$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(2.33)$	$235.77 \pm 0.81$
$100\theta_{MC}$	$1.04104 \pm 0.00042$	$D_{40}$	$1228^{+21}_{-23}$	$D_M(2.33)$	$5762 \pm 13$
$\tau$	$0.0562^{+0.0057}_{-0.0088}$	$D_{220}$	$5712 \pm 41$	$f\sigma_8(0.15)$	$0.4537 \pm 0.0076$
$\ln(10^{10} A_s)$	$3.045^{+0.014}_{-0.018}$	$D_{810}$	$2537 \pm 14$	$\sigma_8(0.15)$	$0.7463^{+0.0059}_{-0.0068}$
$n_s$	$0.9668 \pm 0.0045$	$D_{1420}$	$814.5 \pm 5.1$	$f\sigma_8(0.38)$	$0.4725 \pm 0.0064$
$n_{\text{run}}$	$-0.0073 \pm 0.0084$	$D_{2000}$	$229.3 \pm 1.9$	$\sigma_8(0.38)$	$0.6618^{+0.0049}_{-0.0058}$
$r$	$< 0.0741$	$n_{s,0.002}$	$0.990 \pm 0.026$	$f\sigma_8(0.51)$	$0.4714 \pm 0.0057$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$Y_P$	$0.245365^{+0.000092}_{-0.000079}$	$\sigma_8(0.51)$	$0.6194^{+0.0044}_{-0.0054}$
$A_{217}^{CIB}$	$45 \pm 8$	$Y_P^{\text{BBN}}$	$0.246691^{+0.000093}_{-0.000080}$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0052$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.599 \pm 0.041$	$\sigma_8(0.61)$	$0.5895^{+0.0042}_{-0.0051}$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.4}$	Age/Gyr	$13.796 \pm 0.030$	$f\sigma_8(2.33)$	$0.2973^{+0.0020}_{-0.0026}$
$A_{100}^{PS}$	$256 \pm 30$	$z_*$	$1089.91 \pm 0.31$	$\sigma_8(2.33)$	$0.3066^{+0.0021}_{-0.0027}$
$A_{143}^{PS}$	$46 \pm 9$	$r_*$	$144.77 \pm 0.33$	$r_{0.002}$	$< 0.0717$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$100\theta_*$	$1.04123 \pm 0.00041$	$r_{0.01}$	$< 0.0721$
$A^{kSZ}$	$4.7^{+2.0}_{-4.2}$	$D_M(z_*)/\text{Gpc}$	$13.904 \pm 0.033$	$\ln(10^{10} A_t)$	$-0.24^{+1.4}_{-0.61}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_{\text{drag}}$	$1059.70 \pm 0.50$	$r_{L=10}$	$< 0.0372$
$c_{217}$	$0.9998 \pm 0.0019$	$r_{\text{drag}}$	$147.46 \pm 0.37$	$10^9 A_t$	$< 0.156$
$H_0$	$67.74 \pm 0.55$	$k_D$	$0.14042 \pm 0.00049$	$10^9 A_t e^{-2\tau}$	$< 0.139$
$\Omega_\Lambda$	$0.6908 \pm 0.0073$	$100\theta_D$	$0.16091 \pm 0.00029$	$f_{2000}^{143}$	$31.8 \pm 3.3$
$\Omega_m$	$0.3092 \pm 0.0073$	$z_{\text{eq}}$	$3374 \pm 29$	$f_{2000}^{143 \times 217}$	$33.8 \pm 2.3$
$\Omega_m h^2$	$0.1418 \pm 0.0012$	$k_{\text{eq}}$	$0.010298 \pm 0.000089$	$f_{2000}^{217}$	$108.3 \pm 2.2$
$\Omega_m h^3$	$0.09607 \pm 0.00050$	$100\theta_{\text{eq}}$	$0.8183 \pm 0.0054$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\sigma_8$	$0.8074^{+0.0068}_{-0.0076}$	$100\theta_{s,\text{eq}}$	$0.4521 \pm 0.0028$	$\chi_{\text{lowl}}^2$	$23.2 \pm 2.1$
$S_8$	$0.820 \pm 0.015$	$H(0.15)$	$72.99 \pm 0.48$	$\chi_{6\text{DF}}^2$	$0.053 \pm 0.070$
$\sigma_8 \Omega_m^{0.5}$	$0.4490 \pm 0.0081$	$D_M(0.15)$	$640.2 \pm 4.7$	$\chi_{\text{MGS}}^2$	$1.42 \pm 0.54$
$\sigma_8 \Omega_m^{0.25}$	$0.6021 \pm 0.0078$	$H(0.38)$	$83.06 \pm 0.36$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$D_M(0.38)$	$1527.5 \pm 9.5$	$\chi_{\text{prior}}^2$	$7.6 \pm 3.6$
$r_{\text{drag}} h$	$99.89 \pm 0.95$	$H(0.51)$	$89.75 \pm 0.30$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.415 \pm 0.029$	$D_M(0.51)$	$1979 \pm 11$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$
$z_{\text{re}}$	$7.85^{+0.62}_{-0.85}$	$H(0.61)$	$95.35 \pm 0.26$		

$$\bar{\chi}_{\text{eff}}^2 = 7499.67; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.73; R - 1 = 0.00851$$



### 15.5 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00017$	$z_{\text{re}}$	$7.78 \pm 0.77$	$D_{\text{M}}(0.51)$	$1984 \pm 11$
$\Omega_c h^2$	$0.1197 \pm 0.0012$	$10^9 A_s$	$2.105 \pm 0.033$	$H(0.61)$	$95.31 \pm 0.23$
$100\theta_{MC}$	$1.04091 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.61)$	$2308 \pm 12$
$\tau$	$0.0555 \pm 0.0078$	$D_{40}$	$1236^{+20}_{-22}$	$H(2.33)$	$236.38 \pm 0.75$
$\ln(10^{10} A_s)$	$3.047 \pm 0.016$	$D_{220}$	$5721 \pm 40$	$D_{\text{M}}(2.33)$	$5763 \pm 11$
$n_s$	$0.9655 \pm 0.0046$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.15)$	$0.4580 \pm 0.0066$
$n_{\text{run}}$	$-0.0070 \pm 0.0076$	$D_{1420}$	$815.8 \pm 5.1$	$\sigma_8(0.15)$	$0.7482 \pm 0.0055$
$r$	$< 0.0871$	$D_{2000}$	$230.0 \pm 1.9$	$f\sigma_8(0.38)$	$0.4758 \pm 0.0053$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$n_{s,0.002}$	$0.988 \pm 0.024$	$\sigma_8(0.38)$	$0.6629 \pm 0.0049$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245398^{+0.000068}_{-0.000059}$	$f\sigma_8(0.51)$	$0.4741 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246724^{+0.000068}_{-0.000059}$	$\sigma_8(0.51)$	$0.6203 \pm 0.0046$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.584 \pm 0.031$	$f\sigma_8(0.61)$	$0.4690 \pm 0.0043$
$A_{100}^{PS}$	$253 \pm 30$	Age/Gyr	$13.795 \pm 0.024$	$\sigma_8(0.61)$	$0.5902 \pm 0.0044$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1089.88 \pm 0.27$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0023$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$r_*$	$144.50 \pm 0.29$	$\sigma_8(2.33)$	$0.3066 \pm 0.0025$
$A^{kSZ}$	$< 5.79$	$100\theta_*$	$1.04109 \pm 0.00030$	$r_{0.002}$	$< 0.0840$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.880 \pm 0.027$	$r_{0.01}$	$< 0.0848$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.94 \pm 0.36$	$\ln(10^{10} A_t)$	$-0.04^{+1.3}_{-0.47}$
$H_0$	$67.46 \pm 0.55$	$r_{\text{drag}}$	$147.16 \pm 0.30$	$r_{L=10}$	$< 0.0437$
$\Omega_{\Lambda}$	$0.6863 \pm 0.0075$	$k_{\text{D}}$	$0.14081 \pm 0.00036$	$10^9 A_t$	$< 0.183$
$\Omega_m$	$0.3137 \pm 0.0075$	$100\theta_{\text{D}}$	$0.16075 \pm 0.00021$	$10^9 A_t e^{-2\tau}$	$< 0.164$
$\Omega_m h^2$	$0.1427 \pm 0.0012$	$z_{\text{eq}}$	$3396 \pm 28$	$f_{2000}^{143}$	$30.8 \pm 3.2$
$\Omega_m h^3$	$0.09629 \pm 0.00035$	$k_{\text{eq}}$	$0.010363 \pm 0.000085$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.3$
$\sigma_8$	$0.8099 \pm 0.0061$	$100\theta_{\text{eq}}$	$0.8146 \pm 0.0052$	$f_{2000}^{217}$	$107.7 \pm 2.1$
$S_8$	$0.828 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4500 \pm 0.0027$	$\chi_{\text{lensing}}^2$	$9.56 \pm 0.77$
$\sigma_8 \Omega_m^{0.5}$	$0.4536 \pm 0.0071$	$H(0.15)$	$72.77 \pm 0.47$	$\chi_{\text{small}}^2$	$397.4 \pm 1.8$
$\sigma_8 \Omega_m^{0.25}$	$0.6061 \pm 0.0065$	$D_{\text{M}}(0.15)$	$642.5 \pm 4.7$	$\chi_{\text{lowl}}^2$	$23.8 \pm 2.1$
$\sigma_8/h^{0.5}$	$0.9860 \pm 0.0092$	$H(0.38)$	$82.93 \pm 0.35$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$r_{\text{drag}} h$	$99.28 \pm 0.95$	$D_{\text{M}}(0.38)$	$1531.7 \pm 9.4$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.024$	$H(0.51)$	$89.67 \pm 0.28$		

Best-fit  $\chi_{\text{eff}}^2 = 11929.59$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.14$ ;  $\bar{\chi}_{\text{eff}}^2 = 11953.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.56$ ;  $R - 1 = 0.01351$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 8.89 ( $\Delta$  -0.07) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.00 ( $\Delta$  -0.06) commander\_dx12\_v3\_2\_29: 23.48 ( $\Delta$  0.81) CamSpec like\_10.7HM\_1400.unified: 11499.08



15.6 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02242 \pm 0.00016$	$10^9 A_s$	$2.110^{+0.030}_{-0.034}$	$D_M(0.61)$	$2302.5 \pm 9.4$
$\Omega_c h^2$	$0.11911 \pm 0.00096$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(2.33)$	$236.03 \pm 0.60$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$D_{40}$	$1234^{+20}_{-22}$	$D_M(2.33)$	$5758.4 \pm 9.5$
$\tau$	$0.0572 \pm 0.0075$	$D_{220}$	$5725 \pm 40$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0055$
$\ln(10^{10} A_s)$	$3.049 \pm 0.016$	$D_{810}$	$2540 \pm 14$	$\sigma_8(0.15)$	$0.7479 \pm 0.0055$
$n_s$	$0.9670 \pm 0.0041$	$D_{1420}$	$816.5 \pm 5.0$	$f\sigma_8(0.38)$	$0.4738 \pm 0.0047$
$n_{\text{run}}$	$-0.0069 \pm 0.0076$	$D_{2000}$	$230.2 \pm 1.8$	$\sigma_8(0.38)$	$0.6631 \pm 0.0049$
$r$	$< 0.0907$	$n_{s,0.002}$	$0.989 \pm 0.024$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0042$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$Y_P$	$0.245414^{+0.000064}_{-0.000055}$	$\sigma_8(0.51)$	$0.6206 \pm 0.0046$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P^{\text{BBN}}$	$0.246741^{+0.000064}_{-0.000055}$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0040$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.576 \pm 0.029$	$\sigma_8(0.61)$	$0.5906 \pm 0.0044$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	Age/Gyr	$13.786 \pm 0.022$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0023$
$A_{100}^{PS}$	$252^{+27}_{-30}$	$z_*$	$1089.78 \pm 0.24$	$\sigma_8(2.33)$	$0.3071 \pm 0.0024$
$A_{143}^{PS}$	$44 \pm 9$	$r_*$	$144.62 \pm 0.24$	$r_{0.002}$	$< 0.0881$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$100\theta_*$	$1.04116 \pm 0.00029$	$r_{0.01}$	$< 0.0886$
$A^{kSZ}$	$< 5.65$	$D_M(z_*)/\text{Gpc}$	$13.890 \pm 0.023$	$\ln(10^{10} A_t)$	$0.01^{+1.3}_{-0.47}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_{\text{drag}}$	$1060.00 \pm 0.35$	$r_{L=10}$	$< 0.0457$
$c_{217}$	$0.9997 \pm 0.0019$	$r_{\text{drag}}$	$147.27 \pm 0.26$	$10^9 A_t$	$< 0.192$
$H_0$	$67.73 \pm 0.43$	$k_D$	$0.14072 \pm 0.00034$	$10^9 A_t e^{-2\tau}$	$< 0.171$
$\Omega_\Lambda$	$0.6900 \pm 0.0057$	$100\theta_D$	$0.16072 \pm 0.00020$	$f_{2000}^{143}$	$30.5 \pm 3.2$
$\Omega_m$	$0.3100 \pm 0.0057$	$z_{\text{eq}}$	$3382 \pm 22$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$\Omega_m h^2$	$0.14218 \pm 0.00092$	$k_{\text{eq}}$	$0.010323 \pm 0.000067$	$f_{2000}^{217}$	$107.6 \pm 2.1$
$\Omega_m h^3$	$0.09630 \pm 0.00035$	$100\theta_{\text{eq}}$	$0.8171 \pm 0.0041$	$\chi_{\text{lensing}}^2$	$9.49 \pm 0.74$
$\sigma_8$	$0.8092 \pm 0.0061$	$100\theta_{s,\text{eq}}$	$0.4513 \pm 0.0021$	$\chi_{\text{simall}}^2$	$397.6 \pm 2.0$
$S_8$	$0.822 \pm 0.011$	$H(0.15)$	$73.00 \pm 0.37$	$\chi_{\text{lowl}}^2$	$23.7 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0058$	$D_M(0.15)$	$640.2 \pm 3.7$	$\chi_{6\text{DF}}^2$	$0.045 \pm 0.055$
$\sigma_8 \Omega_m^{0.25}$	$0.6037 \pm 0.0058$	$H(0.38)$	$83.09 \pm 0.28$	$\chi_{\text{MGS}}^2$	$1.32 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9832 \pm 0.0084$	$D_M(0.38)$	$1527.2 \pm 7.4$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.2$
$r_{\text{drag}} h$	$99.75 \pm 0.73$	$H(0.51)$	$89.80 \pm 0.23$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.421 \pm 0.023$	$D_M(0.51)$	$1978.5 \pm 8.7$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$z_{\text{re}}$	$7.93 \pm 0.74$	$H(0.61)$	$95.41 \pm 0.19$	$\chi_{\text{BAO}}^2$	$6.00 \pm 0.97$

$\bar{\chi}_{\text{eff}}^2 = 11958.98$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.35$ ;  $R - 1 = 0.01470$



15.7 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$z_{\text{re}}$	$7.86^{+0.61}_{-0.78}$	$D_{\text{M}}(0.51)$	$1983 \pm 11$
$\Omega_c h^2$	$0.1197 \pm 0.0012$	$10^9 A_s$	$2.108^{+0.026}_{-0.034}$	$H(0.61)$	$95.32 \pm 0.23$
$100\theta_{MC}$	$1.04091 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_{\text{M}}(0.61)$	$2308 \pm 12$
$\tau$	$0.0563^{+0.0057}_{-0.0082}$	$D_{40}$	$1236^{+20}_{-22}$	$H(2.33)$	$236.35 \pm 0.75$
$\ln(10^{10} A_s)$	$3.048^{+0.013}_{-0.016}$	$D_{220}$	$5721 \pm 40$	$D_{\text{M}}(2.33)$	$5762 \pm 11$
$n_s$	$0.9656 \pm 0.0045$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.15)$	$0.4580 \pm 0.0066$
$n_{\text{run}}$	$-0.0071 \pm 0.0076$	$D_{1420}$	$815.8 \pm 5.0$	$\sigma_8(0.15)$	$0.7486^{+0.0048}_{-0.0055}$
$r$	$< 0.0878$	$D_{2000}$	$230.0 \pm 1.9$	$f\sigma_8(0.38)$	$0.4759 \pm 0.0053$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$n_{s,0.002}$	$0.988 \pm 0.024$	$\sigma_8(0.38)$	$0.6634^{+0.0041}_{-0.0049}$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245400^{+0.000067}_{-0.000058}$	$f\sigma_8(0.51)$	$0.4743 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246726^{+0.000067}_{-0.000058}$	$\sigma_8(0.51)$	$0.6207^{+0.0038}_{-0.0047}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.583 \pm 0.030$	$f\sigma_8(0.61)$	$0.4692 \pm 0.0042$
$A_{100}^{PS}$	$253 \pm 30$	Age/Gyr	$13.794 \pm 0.024$	$\sigma_8(0.61)$	$0.5906^{+0.0036}_{-0.0045}$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1089.87 \pm 0.27$	$f\sigma_8(2.33)$	$0.2977^{+0.0018}_{-0.0023}$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$r_*$	$144.51 \pm 0.29$	$\sigma_8(2.33)$	$0.3068^{+0.0019}_{-0.0025}$
$A^{kSZ}$	$< 5.79$	$100\theta_*$	$1.04109 \pm 0.00030$	$r_{0.002}$	$< 0.0850$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.880 \pm 0.027$	$r_{0.01}$	$< 0.0856$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.95 \pm 0.35$	$\ln(10^{10} A_t)$	$-0.03^{+1.3}_{-0.47}$
$H_0$	$67.49 \pm 0.54$	$r_{\text{drag}}$	$147.16 \pm 0.30$	$r_{L=10}$	$< 0.0441$
$\Omega_{\Lambda}$	$0.6866 \pm 0.0074$	$k_{\text{D}}$	$0.14080 \pm 0.00036$	$10^9 A_t$	$< 0.185$
$\Omega_m$	$0.3134 \pm 0.0074$	$100\theta_{\text{D}}$	$0.16075 \pm 0.00020$	$10^9 A_t e^{-2\tau}$	$< 0.165$
$\Omega_m h^2$	$0.1427 \pm 0.0012$	$z_{\text{eq}}$	$3394 \pm 28$	$f_{2000}^{143}$	$30.8 \pm 3.2$
$\Omega_m h^3$	$0.09629 \pm 0.00035$	$k_{\text{eq}}$	$0.010360 \pm 0.000085$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.3$
$\sigma_8$	$0.8103 \pm 0.0059$	$100\theta_{\text{eq}}$	$0.8148 \pm 0.0052$	$f_{2000}^{217}$	$107.7 \pm 2.1$
$S_8$	$0.828 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4501 \pm 0.0027$	$\chi_{\text{lensing}}^2$	$9.54 \pm 0.75$
$\sigma_8 \Omega_m^{0.5}$	$0.4536 \pm 0.0071$	$H(0.15)$	$72.79 \pm 0.47$	$\chi_{\text{simall}}^2$	$397.4 \pm 1.8$
$\sigma_8 \Omega_m^{0.25}$	$0.6062 \pm 0.0065$	$D_{\text{M}}(0.15)$	$642.3 \pm 4.6$	$\chi_{\text{lowl}}^2$	$23.8 \pm 2.1$
$\sigma_8/h^{0.5}$	$0.9864 \pm 0.0091$	$H(0.38)$	$82.94 \pm 0.34$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$r_{\text{drag}} h$	$99.32 \pm 0.94$	$D_{\text{M}}(0.38)$	$1531.3 \pm 9.3$	$\chi_{\text{CMB}}^2$	$7368 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.024$	$H(0.51)$	$89.68 \pm 0.27$		

$\bar{\chi}_{\text{eff}}^2 = 11953.00$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.54$ ;  $R - 1 = 0.01489$



## 15.8 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02243 \pm 0.00016$	$10^9 A_s$	$2.111^{+0.027}_{-0.034}$	$D_M(0.61)$	$2302.3 \pm 9.3$
$\Omega_c h^2$	$0.11909 \pm 0.00095$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(2.33)$	$236.02 \pm 0.60$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$D_{40}$	$1234^{+20}_{-22}$	$D_M(2.33)$	$5758.2 \pm 9.5$
$\tau$	$0.0576^{+0.0061}_{-0.0078}$	$D_{220}$	$5725 \pm 40$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0055$
$\ln(10^{10} A_s)$	$3.050^{+0.013}_{-0.016}$	$D_{810}$	$2540 \pm 14$	$\sigma_8(0.15)$	$0.7481^{+0.0049}_{-0.0056}$
$n_s$	$0.9671 \pm 0.0041$	$D_{1420}$	$816.4 \pm 5.0$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0046$
$n_{\text{run}}$	$-0.0070 \pm 0.0076$	$D_{2000}$	$230.2 \pm 1.8$	$\sigma_8(0.38)$	$0.6633^{+0.0042}_{-0.0050}$
$r$	$< 0.0912$	$n_{s,0.002}$	$0.990 \pm 0.024$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0042$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$Y_P$	$0.245415^{+0.000063}_{-0.000055}$	$\sigma_8(0.51)$	$0.6209^{+0.0040}_{-0.0047}$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P^{\text{BBN}}$	$0.246742^{+0.000064}_{-0.000055}$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0039$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.576 \pm 0.029$	$\sigma_8(0.61)$	$0.5908^{+0.0038}_{-0.0045}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	Age/Gyr	$13.786 \pm 0.022$	$f\sigma_8(2.33)$	$0.2980^{+0.0019}_{-0.0023}$
$A_{100}^{PS}$	$252^{+27}_{-30}$	$z_*$	$1089.77 \pm 0.23$	$\sigma_8(2.33)$	$0.3073^{+0.0020}_{-0.0025}$
$A_{143}^{PS}$	$44 \pm 9$	$r_*$	$144.62 \pm 0.24$	$r_{0.002}$	$< 0.0887$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$100\theta_*$	$1.04116 \pm 0.00029$	$r_{0.01}$	$< 0.0890$
$A^{kSZ}$	$< 5.66$	$D_M(z_*)/\text{Gpc}$	$13.891 \pm 0.023$	$\ln(10^{10} A_t)$	$0.01^{+1.3}_{-0.46}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_{\text{drag}}$	$1060.00 \pm 0.35$	$r_{L=10}$	$< 0.0460$
$c_{217}$	$0.9997 \pm 0.0019$	$r_{\text{drag}}$	$147.27 \pm 0.26$	$10^9 A_t$	$< 0.193$
$H_0$	$67.74 \pm 0.43$	$k_D$	$0.14072 \pm 0.00034$	$10^9 A_t e^{-2\tau}$	$< 0.171$
$\Omega_\Lambda$	$0.6902 \pm 0.0057$	$100\theta_D$	$0.16072 \pm 0.00020$	$f_{2000}^{143}$	$30.5 \pm 3.2$
$\Omega_m$	$0.3098 \pm 0.0057$	$z_{\text{eq}}$	$3382 \pm 22$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$\Omega_m h^2$	$0.14216 \pm 0.00092$	$k_{\text{eq}}$	$0.010322 \pm 0.000067$	$f_{2000}^{217}$	$107.6 \pm 2.1$
$\Omega_m h^3$	$0.09630 \pm 0.00035$	$100\theta_{\text{eq}}$	$0.8172 \pm 0.0041$	$\chi^2_{\text{lensing}}$	$9.46 \pm 0.71$
$\sigma_8$	$0.8094^{+0.0055}_{-0.0062}$	$100\theta_{s,\text{eq}}$	$0.4514 \pm 0.0021$	$\chi^2_{\text{simall}}$	$397.6 \pm 2.0$
$S_8$	$0.823 \pm 0.011$	$H(0.15)$	$73.01 \pm 0.37$	$\chi^2_{\text{lowl}}$	$23.7 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0058$	$D_M(0.15)$	$640.1 \pm 3.6$	$\chi^2_{6\text{DF}}$	$0.044 \pm 0.054$
$\sigma_8 \Omega_m^{0.25}$	$0.6039 \pm 0.0057$	$H(0.38)$	$83.10 \pm 0.28$	$\chi^2_{\text{MGS}}$	$1.33 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9835 \pm 0.0083$	$D_M(0.38)$	$1527.0 \pm 7.3$	$\chi^2_{\text{DR12BAO}}$	$4.6 \pm 1.2$
$r_{\text{drag}} h$	$99.77 \pm 0.73$	$H(0.51)$	$89.80 \pm 0.23$	$\chi^2_{\text{prior}}$	$9.8 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.422 \pm 0.023$	$D_M(0.51)$	$1978.3 \pm 8.6$	$\chi^2_{\text{CMB}}$	$7368 \pm 5000$
$z_{\text{re}}$	$7.97^{+0.64}_{-0.75}$	$H(0.61)$	$95.41 \pm 0.19$	$\chi^2_{\text{BAO}}$	$5.98 \pm 0.94$

$$\bar{\chi}^2_{\text{eff}} = 11958.86; \Delta\bar{\chi}^2_{\text{eff}} = 9150.30; R - 1 = 0.01525$$



## 15.9 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02215 \pm 0.00023$	$\sigma_8 \Omega_m^{0.5}$	$0.464 \pm 0.013$	$H(0.38)$	$82.44 \pm 0.55$
$\Omega_c h^2$	$0.1212 \pm 0.0021$	$\sigma_8 \Omega_m^{0.25}$	$0.615 \pm 0.012$	$D_M(0.38)$	$1545 \pm 16$
$100\theta_{MC}$	$1.04076 \pm 0.00048$	$\sigma_8/h^{0.5}$	$0.998 \pm 0.016$	$H(0.51)$	$89.27 \pm 0.43$
$\tau$	$0.0541^{+0.0076}_{-0.0085}$	$r_{\text{drag}} h$	$98.1 \pm 1.6$	$D_M(0.51)$	$2000 \pm 18$
$\ln(10^{10} A_s)$	$3.047 \pm 0.018$	$\langle d^2 \rangle^{1/2}$	$2.456 \pm 0.038$	$H(0.61)$	$94.99 \pm 0.35$
$n_s$	$0.9613 \pm 0.0059$	$z_{\text{re}}$	$7.70 \pm 0.85$	$D_M(0.61)$	$2325 \pm 20$
$n_{\text{run}}$	$-0.0059 \pm 0.0076$	$10^9 A_s$	$2.105^{+0.034}_{-0.038}$	$H(2.33)$	$237.1 \pm 1.3$
$r$	$< 0.0336$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.014$	$D_M(2.33)$	$5778 \pm 16$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1232 \pm 21$	$f\sigma_8(0.15)$	$0.467 \pm 0.012$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{220}$	$5707 \pm 42$	$\sigma_8(0.15)$	$0.7515 \pm 0.0075$
$A_{B,\text{sync}}$	$1.63^{+0.52}_{-1.4}$	$D_{810}$	$2539 \pm 14$	$f\sigma_8(0.38)$	$0.4827 \pm 0.0094$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$813.7 \pm 5.3$	$\sigma_8(0.38)$	$0.6648 \pm 0.0061$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.096$	$D_{2000}$	$229.0 \pm 2.0$	$f\sigma_8(0.51)$	$0.4799 \pm 0.0080$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.980 \pm 0.024$	$\sigma_8(0.51)$	$0.6216 \pm 0.0055$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.24530^{+0.00011}_{-0.000087}$	$f\sigma_8(0.61)$	$0.4739 \pm 0.0071$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00011}_{-0.000088}$	$\sigma_8(0.61)$	$0.5912 \pm 0.0052$
$A_{217}^{CIB}$	$45 \pm 8$	$10^5 D/H$	$2.628 \pm 0.044$	$f\sigma_8(2.33)$	$0.2976 \pm 0.0026$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.829 \pm 0.037$	$\sigma_8(2.33)$	$0.3063 \pm 0.0027$
$A_{143}^{tSZ}$	$4.2^{+2.1}_{-2.4}$	$z_*$	$1090.31 \pm 0.41$	$r_{0.002}$	$< 0.0311$
$A_{100}^{PS}$	$256 \pm 30$	$r_*$	$144.28 \pm 0.48$	$r_{0.01}$	$< 0.0321$
$A_{143}^{PS}$	$47 \pm 9$	$100\theta_*$	$1.04097 \pm 0.00047$	$\ln(10^{10} A_t)$	$-0.90^{+1.1}_{-0.42}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.861 \pm 0.045$	$r_{L=10}$	$< 0.0161$
$A^{kSZ}$	$< 6.20$	$z_{\text{drag}}$	$1059.51 \pm 0.50$	$10^9 A_t$	$< 0.0708$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.01 \pm 0.49$	$10^9 A_t e^{-2\tau}$	$< 0.0635$
$c_{217}$	$0.9998 \pm 0.0019$	$k_D$	$0.14078 \pm 0.00056$	$f_{2000}^{143}$	$32.1 \pm 3.3$
$H_0$	$66.70 \pm 0.90$	$100\theta_D$	$0.16101 \pm 0.00029$	$f_{2000}^{143 \times 217}$	$34.1 \pm 2.3$
$\Omega_\Lambda$	$0.676 \pm 0.013$	$z_{\text{eq}}$	$3426 \pm 47$	$f_{2000}^{217}$	$108.6 \pm 2.2$
$\Omega_m$	$0.324 \pm 0.013$	$k_{\text{eq}}$	$0.01046 \pm 0.00014$	$\chi_{\text{BKPLANCK}}^2$	$739.2 \pm 2.7$
$\Omega_m h^2$	$0.1440 \pm 0.0020$	$100\theta_{\text{eq}}$	$0.8084 \pm 0.0087$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\Omega_m h^3$	$0.09605 \pm 0.00049$	$100\theta_{s,\text{eq}}$	$0.4470 \pm 0.0045$	$\chi_{\text{lowl}}^2$	$23.6 \pm 2.2$
$\sigma_8$	$0.8146 \pm 0.0089$	$H(0.15)$	$72.11 \pm 0.77$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.847 \pm 0.024$	$D_M(0.15)$	$649.2 \pm 7.8$	$\chi_{\text{CMB}}^2$	$5079 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8206.96$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.16$ ;  $\bar{\chi}_{\text{eff}}^2 = 8233.85$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.13$ ;  $R - 1 = 0.00340$   
 $\chi_{\text{eff}}^2$ : CMB - BK15\_dust: 734.86 ( $\Delta$  0.15) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.03 ( $\Delta$  0.00) commander\_dx12\_v3\_2\_29: 22.86 ( $\Delta$  -0.47) CamSpec like\_10.7HM: 7050.61



15.10 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00022$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.011$	$H(0.61)$	$95.29 \pm 0.25$
$\Omega_c h^2$	$0.1192 \pm 0.0012$	$r_{\text{drag}} h$	$99.62 \pm 0.94$	$D_{\text{M}}(0.61)$	$2307 \pm 12$
$100\theta_{MC}$	$1.04103 \pm 0.00043$	$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.029$	$H(2.33)$	$235.95 \pm 0.80$
$\tau$	$0.0562^{+0.0075}_{-0.0086}$	$z_{\text{re}}$	$7.87 \pm 0.84$	$D_{\text{M}}(2.33)$	$5765 \pm 13$
$\ln(10^{10} A_s)$	$3.047^{+0.017}_{-0.019}$	$10^9 A_s$	$2.105^{+0.034}_{-0.040}$	$f\sigma_8(0.15)$	$0.4562 \pm 0.0076$
$n_s$	$0.9659 \pm 0.0045$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$\sigma_8(0.15)$	$0.7479 \pm 0.0070$
$n_{\text{run}}$	$-0.0054 \pm 0.0077$	$D_{40}$	$1224 \pm 20$	$f\sigma_8(0.38)$	$0.4745 \pm 0.0065$
$r$	$0.0296^{+0.0085}_{-0.028}$	$D_{220}$	$5716 \pm 41$	$\sigma_8(0.38)$	$0.6629 \pm 0.0060$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0058$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{1420}$	$814.9 \pm 5.2$	$\sigma_8(0.51)$	$0.6204^{+0.0051}_{-0.0057}$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{2000}$	$229.5 \pm 1.9$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0054$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.23}_{-0.31}$	$n_{s,0.002}$	$0.983 \pm 0.024$	$\sigma_8(0.61)$	$0.5903^{+0.0048}_{-0.0054}$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.097$	$Y_P$	$0.245348^{+0.000095}_{-0.000079}$	$f\sigma_8(2.33)$	$0.2977^{+0.0024}_{-0.0027}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246674^{+0.000095}_{-0.000079}$	$\sigma_8(2.33)$	$0.3069^{+0.0025}_{-0.0028}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.607 \pm 0.040$	$r_{0.002}$	$0.0278^{+0.0070}_{-0.027}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	Age/Gyr	$13.802 \pm 0.030$	$r_{0.01}$	$0.0285^{+0.0078}_{-0.027}$
$A_{217}^{CIB}$	$45 \pm 8$	$z_*$	$1089.99 \pm 0.31$	$\ln(10^{10} A_t)$	$-0.79^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.72 \pm 0.33$	$r_{L=10}$	$0.0144^{+0.0035}_{-0.014}$
$A_{143}^{tSZ}$	$4.3^{+2.2}_{-2.5}$	$100\theta_*$	$1.04122 \pm 0.00042$	$10^9 A_t$	$0.062^{+0.018}_{-0.059}$
$A_{100}^{PS}$	$256 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.899 \pm 0.032$	$10^9 A_t e^{-2\tau}$	$0.056^{+0.016}_{-0.053}$
$A_{143}^{PS}$	$46 \pm 9$	$z_{\text{drag}}$	$1059.63 \pm 0.49$	$f_{2000}^{143}$	$31.6 \pm 3.3$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$r_{\text{drag}}$	$147.42 \pm 0.37$	$f_{2000}^{143 \times 217}$	$33.7 \pm 2.3$
$A^{kSZ}$	$< 6.18$	$k_{\text{D}}$	$0.14044 \pm 0.00049$	$f_{2000}^{217}$	$108.3 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16095 \pm 0.00029$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.7$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{eq}}$	$3381 \pm 29$	$\chi_{\text{simall}}^2$	$397.5 \pm 2.2$
$H_0$	$67.58 \pm 0.54$	$k_{\text{eq}}$	$0.010320 \pm 0.000088$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.9$
$\Omega_{\Lambda}$	$0.6887 \pm 0.0073$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0053$	$\chi_{6\text{DF}}^2$	$0.068 \pm 0.084$
$\Omega_m$	$0.3113 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0027$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.51$
$\Omega_m h^2$	$0.1421 \pm 0.0012$	$H(0.15)$	$72.85 \pm 0.47$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.8$
$\Omega_m h^3$	$0.09604 \pm 0.00050$	$D_{\text{M}}(0.15)$	$641.6 \pm 4.6$	$\chi_{\text{prior}}^2$	$9.2 \pm 3.9$
$\sigma_8$	$0.8093 \pm 0.0078$	$H(0.38)$	$82.96 \pm 0.35$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.5$
$S_8$	$0.824 \pm 0.015$	$D_{\text{M}}(0.38)$	$1530.2 \pm 9.4$	$\chi_{\text{CMB}}^2$	$5079 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0081$	$H(0.51)$	$89.67 \pm 0.29$		
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0080$	$D_{\text{M}}(0.51)$	$1982 \pm 11$		

Best-fit  $\chi_{\text{eff}}^2 = 8213.81$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.06$ ;  $\bar{\chi}_{\text{eff}}^2 = 8240.71$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.94$ ;  $R - 1 = 0.00691$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  -0.01) MGS: 1.22 ( $\Delta$  0.06) DR12BAO: 4.37 ( $\Delta$  -0.20) CMB - BK15\_dust: 735.64 ( $\Delta$  0.08) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.20 ( $\Delta$  -0.14) commander\_dx12\_v3.2.29: 22.25 ( $\Delta$  -0.17) CamSpec like\_10.7HM: 7051.59



15.11 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_lensing/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00023$	$\sigma_8 \Omega_m^{0.25}$	$0.6102 \pm 0.0076$	$H(0.51)$	$89.40 \pm 0.37$
$\Omega_c h^2$	$0.1205 \pm 0.0016$	$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$D_M(0.51)$	$1994 \pm 15$
$100\theta_{MC}$	$1.04082 \pm 0.00046$	$r_{\text{drag}} h$	$98.6 \pm 1.2$	$H(0.61)$	$95.07 \pm 0.31$
$\tau$	$0.0537 \pm 0.0082$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.027$	$D_M(0.61)$	$2319 \pm 16$
$\ln(10^{10} A_s)$	$3.044 \pm 0.016$	$z_{\text{re}}$	$7.64 \pm 0.82$	$H(2.33)$	$236.68 \pm 0.96$
$n_s$	$0.9628 \pm 0.0050$	$10^9 A_s$	$2.099 \pm 0.033$	$D_M(2.33)$	$5774 \pm 15$
$n_{\text{run}}$	$-0.0045 \pm 0.0076$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.012$	$f\sigma_8(0.15)$	$0.4626 \pm 0.0081$
$r$	$< 0.0342$	$D_{40}$	$1231 \pm 21$	$\sigma_8(0.15)$	$0.7493 \pm 0.0056$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{220}$	$5711 \pm 41$	$f\sigma_8(0.38)$	$0.4792 \pm 0.0062$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{810}$	$2537 \pm 14$	$\sigma_8(0.38)$	$0.6634 \pm 0.0049$
$A_{B,\text{sync}}$	$1.63^{+0.52}_{-1.4}$	$D_{1420}$	$814.0 \pm 5.3$	$f\sigma_8(0.51)$	$0.4769 \pm 0.0053$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$229.2 \pm 2.0$	$\sigma_8(0.51)$	$0.6204 \pm 0.0046$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.097$	$n_{s,0.002}$	$0.977 \pm 0.024$	$f\sigma_8(0.61)$	$0.4713 \pm 0.0047$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.24531^{+0.00011}_{-0.000084}$	$\sigma_8(0.61)$	$0.5902 \pm 0.0045$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00011}_{-0.000085}$	$f\sigma_8(2.33)$	$0.2973 \pm 0.0024$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$10^5 D/H$	$2.623 \pm 0.043$	$\sigma_8(2.33)$	$0.3061 \pm 0.0026$
$A_{217}^{CIB}$	$45 \pm 8$	Age/Gyr	$13.822 \pm 0.034$	$r_{0.002}$	$< 0.0315$
$\xi^{tSZ-CIB}$	—	$z_*$	$1090.21 \pm 0.37$	$r_{0.01}$	$< 0.0327$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.5}$	$r_*$	$144.46 \pm 0.37$	$\ln(10^{10} A_t)$	$-0.88^{+1.1}_{-0.41}$
$A_{100}^{PS}$	$256 \pm 30$	$100\theta_*$	$1.04103 \pm 0.00045$	$r_{L=10}$	$< 0.0163$
$A_{143}^{PS}$	$46 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.876 \pm 0.035$	$10^9 A_t$	$< 0.0718$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_{\text{drag}}$	$1059.52 \pm 0.50$	$10^9 A_t e^{-2\tau}$	$< 0.0644$
$A^{kSZ}$	$< 6.18$	$r_{\text{drag}}$	$147.18 \pm 0.39$	$f_{2000}^{143}$	$31.9 \pm 3.3$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$k_D$	$0.14062 \pm 0.00049$	$f_{2000}^{143 \times 217}$	$33.9 \pm 2.3$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_D$	$0.16100 \pm 0.00029$	$f_{2000}^{217}$	$108.4 \pm 2.1$
$H_0$	$67.00 \pm 0.71$	$z_{\text{eq}}$	$3409 \pm 36$	$\chi_{\text{lensing}}^2$	$9.7 \pm 1.0$
$\Omega_\Lambda$	$0.6806 \pm 0.0099$	$k_{\text{eq}}$	$0.01040 \pm 0.00011$	$\chi_{\text{BKPLANCK}}^2$	$739.5 \pm 2.6$
$\Omega_m$	$0.3194 \pm 0.0099$	$100\theta_{\text{eq}}$	$0.8115 \pm 0.0067$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1433 \pm 0.0015$	$100\theta_{s,\text{eq}}$	$0.4486 \pm 0.0034$	$\chi_{\text{lowl}}^2$	$23.7 \pm 2.2$
$\Omega_m h^3$	$0.09600 \pm 0.00049$	$H(0.15)$	$72.36 \pm 0.61$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8$	$0.8117 \pm 0.0063$	$D_M(0.15)$	$646.6 \pm 6.2$	$\chi_{\text{CMB}}^2$	$5088 \pm 3000$
$S_8$	$0.838 \pm 0.016$	$H(0.38)$	$82.60 \pm 0.45$		
$\sigma_8 \Omega_m^{0.5}$	$0.4587 \pm 0.0088$	$D_M(0.38)$	$1540 \pm 12$		

Best-fit  $\chi_{\text{eff}}^2 = 8216.23$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.06$ ;  $\bar{\chi}_{\text{eff}}^2 = 8243.12$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.97$ ;  $R - 1 = 0.00347$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.11 ( $\Delta$  0.03) BK15\_dust: 735.18 ( $\Delta$  -0.02) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.02 ( $\Delta$  0.00) com-  
mander\_dx12\_v3\_2\_29: 22.95 ( $\Delta$  -0.26) CamSpec like\_10.7HM: 7050.44



15.12 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00021$	$\sigma_8/h^{0.5}$	$0.9858 \pm 0.0089$	$H(0.61)$	$95.28 \pm 0.25$
$\Omega_c h^2$	$0.1193 \pm 0.0011$	$r_{\text{drag}} h$	$99.58 \pm 0.84$	$D_{\text{M}}(0.61)$	$2307 \pm 11$
$100\theta_{MC}$	$1.04101 \pm 0.00043$	$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.024$	$H(2.33)$	$235.97 \pm 0.72$
$\tau$	$0.0569^{+0.0069}_{-0.0081}$	$z_{\text{re}}$	$7.94 \pm 0.77$	$D_{\text{M}}(2.33)$	$5766 \pm 13$
$\ln(10^{10} A_s)$	$3.048 \pm 0.016$	$10^9 A_s$	$2.108^{+0.030}_{-0.035}$	$f\sigma_8(0.15)$	$0.4568 \pm 0.0060$
$n_s$	$0.9657 \pm 0.0043$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$\sigma_8(0.15)$	$0.7487 \pm 0.0056$
$n_{\text{run}}$	$-0.0046 \pm 0.0076$	$D_{40}$	$1227 \pm 20$	$f\sigma_8(0.38)$	$0.4751 \pm 0.0050$
$r$	$0.0289^{+0.0081}_{-0.028}$	$D_{220}$	$5720 \pm 41$	$\sigma_8(0.38)$	$0.6636^{+0.0046}_{-0.0052}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.51)$	$0.4737 \pm 0.0045$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{1420}$	$815.2 \pm 5.2$	$\sigma_8(0.51)$	$0.6210^{+0.0043}_{-0.0049}$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{2000}$	$229.7 \pm 1.9$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0042$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.23}_{-0.32}$	$n_{s,0.002}$	$0.980 \pm 0.024$	$\sigma_8(0.61)$	$0.5909^{+0.0041}_{-0.0047}$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.097$	$Y_P$	$0.245346^{+0.000095}_{-0.000079}$	$f\sigma_8(2.33)$	$0.2979^{+0.0021}_{-0.0024}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246673^{+0.000095}_{-0.000079}$	$\sigma_8(2.33)$	$0.3072^{+0.0023}_{-0.0026}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.607 \pm 0.040$	$r_{0.002}$	$0.0271^{+0.0067}_{-0.027}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	Age/Gyr	$13.803 \pm 0.029$	$r_{0.01}$	$0.0278^{+0.0074}_{-0.027}$
$A_{217}^{CIB}$	$45 \pm 8$	$z_*$	$1090.00 \pm 0.31$	$\ln(10^{10} A_t)$	$-0.82^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.71 \pm 0.30$	$r_{L=10}$	$0.0139^{+0.0033}_{-0.014}$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$100\theta_*$	$1.04121 \pm 0.00042$	$10^9 A_t$	$0.061^{+0.017}_{-0.058}$
$A_{100}^{PS}$	$255 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.898 \pm 0.030$	$10^9 A_t e^{-2\tau}$	$0.054^{+0.015}_{-0.052}$
$A_{143}^{PS}$	$46 \pm 9$	$z_{\text{drag}}$	$1059.62 \pm 0.49$	$f_{2000}^{143}$	$31.5 \pm 3.3$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_{\text{drag}}$	$147.41 \pm 0.34$	$f_{2000}^{143 \times 217}$	$33.6 \pm 2.3$
$A^{kSZ}$	$< 6.10$	$k_{\text{D}}$	$0.14044 \pm 0.00047$	$f_{2000}^{217}$	$108.2 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_{\text{D}}$	$0.16095 \pm 0.00028$	$\chi^2_{\text{lensing}}$	$9.42 \pm 0.72$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{eq}}$	$3382 \pm 26$	$\chi^2_{\text{BKPLANCK}}$	$739.8 \pm 2.6$
$H_0$	$67.55 \pm 0.50$	$k_{\text{eq}}$	$0.010322 \pm 0.000079$	$\chi^2_{\text{simall}}$	$397.5 \pm 2.1$
$\Omega_{\Lambda}$	$0.6884 \pm 0.0066$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0047$	$\chi^2_{\text{lowl}}$	$23.2 \pm 2.0$
$\Omega_m$	$0.3116 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0024$	$\chi^2_{6\text{DF}}$	$0.064 \pm 0.076$
$\Omega_m h^2$	$0.1422 \pm 0.0011$	$H(0.15)$	$72.83 \pm 0.44$	$\chi^2_{\text{MGS}}$	$1.24 \pm 0.46$
$\Omega_m h^3$	$0.09603 \pm 0.00049$	$D_{\text{M}}(0.15)$	$641.8 \pm 4.3$	$\chi^2_{\text{DR12BAO}}$	$5.0 \pm 1.6$
$\sigma_8$	$0.8102 \pm 0.0062$	$H(0.38)$	$82.94 \pm 0.33$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.9$
$S_8$	$0.826 \pm 0.012$	$D_{\text{M}}(0.38)$	$1530.6 \pm 8.7$	$\chi^2_{\text{CMB}}$	$5088 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4523 \pm 0.0065$	$H(0.51)$	$89.66 \pm 0.28$	$\chi^2_{\text{BAO}}$	$6.3 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6053 \pm 0.0062$	$D_{\text{M}}(0.51)$	$1983 \pm 10$		

Best-fit  $\chi^2_{\text{eff}} = 8222.87$ ;  $\Delta\chi^2_{\text{eff}} = 6292.21$ ;  $\bar{\chi}^2_{\text{eff}} = 8249.75$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.05$ ;  $R - 1 = 0.00778$   
 $\chi^2_{\text{eff}}$ : BAO - 6DF: 0.04 ( $\Delta$  0.00) MGS: 1.16 ( $\Delta$  0.00) DR12BAO: 4.57 ( $\Delta$  0.01) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.03 ( $\Delta$  0.16) BK15\_dust: 735.56 ( $\Delta$  0.06) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.42 ( $\Delta$  0.07) commander\_dx12\_v3.2.29: 22.43 ( $\Delta$  -0.37) CamSpec like\_10.7HM: 7051.18



15.13 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02216 \pm 0.00023$	$\sigma_8 \Omega_m^{0.5}$	$0.464 \pm 0.013$	$H(0.38)$	$82.46 \pm 0.55$
$\Omega_c h^2$	$0.1212 \pm 0.0021$	$\sigma_8 \Omega_m^{0.25}$	$0.615 \pm 0.011$	$D_M(0.38)$	$1545 \pm 15$
$100\theta_{MC}$	$1.04077 \pm 0.00048$	$\sigma_8/h^{0.5}$	$0.998 \pm 0.016$	$H(0.51)$	$89.29 \pm 0.43$
$\tau$	$0.0553^{+0.0053}_{-0.0090}$	$r_{\text{drag}} h$	$98.1 \pm 1.6$	$D_M(0.51)$	$1999 \pm 18$
$\ln(10^{10} A_s)$	$3.049^{+0.013}_{-0.018}$	$\langle d^2 \rangle^{1/2}$	$2.458 \pm 0.037$	$H(0.61)$	$95.00 \pm 0.35$
$n_s$	$0.9614 \pm 0.0058$	$z_{\text{re}}$	$7.83^{+0.59}_{-0.86}$	$D_M(0.61)$	$2325 \pm 19$
$n_{\text{run}}$	$-0.0061 \pm 0.0076$	$10^9 A_s$	$2.110^{+0.027}_{-0.038}$	$H(2.33)$	$237.1 \pm 1.3$
$r$	$< 0.0337$	$10^9 A_s e^{-2\tau}$	$1.889 \pm 0.014$	$D_M(2.33)$	$5777 \pm 16$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{40}$	$1231 \pm 21$	$f\sigma_8(0.15)$	$0.467 \pm 0.012$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{220}$	$5708 \pm 42$	$\sigma_8(0.15)$	$0.7523 \pm 0.0071$
$A_{B,\text{sync}}$	$1.63^{+0.52}_{-1.4}$	$D_{810}$	$2539 \pm 14$	$f\sigma_8(0.38)$	$0.4830 \pm 0.0093$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$813.6 \pm 5.3$	$\sigma_8(0.38)$	$0.6655^{+0.0051}_{-0.0060}$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.096$	$D_{2000}$	$229.0 \pm 2.0$	$f\sigma_8(0.51)$	$0.4802 \pm 0.0080$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.981 \pm 0.024$	$\sigma_8(0.51)$	$0.6223^{+0.0045}_{-0.0055}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.24530^{+0.00011}_{-0.000087}$	$f\sigma_8(0.61)$	$0.4742 \pm 0.0070$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00011}_{-0.000087}$	$\sigma_8(0.61)$	$0.5918^{+0.0041}_{-0.0052}$
$A_{217}^{CIB}$	$45 \pm 8$	$10^5 D/H$	$2.626 \pm 0.044$	$f\sigma_8(2.33)$	$0.2979^{+0.0019}_{-0.0026}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.828 \pm 0.037$	$\sigma_8(2.33)$	$0.3067^{+0.0020}_{-0.0028}$
$A_{143}^{tSZ}$	$4.2^{+2.1}_{-2.5}$	$z_*$	$1090.29 \pm 0.41$	$r_{0.002}$	$< 0.0312$
$A_{100}^{PS}$	$256 \pm 30$	$r_*$	$144.29 \pm 0.48$	$r_{0.01}$	$< 0.0322$
$A_{143}^{PS}$	$47 \pm 9$	$100\theta_*$	$1.04097 \pm 0.00047$	$\ln(10^{10} A_t)$	$-0.90^{+1.1}_{-0.42}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.861 \pm 0.045$	$r_{L=10}$	$< 0.0161$
$A^{kSZ}$	$< 6.20$	$z_{\text{drag}}$	$1059.53 \pm 0.49$	$10^9 A_t$	$< 0.0711$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.02 \pm 0.49$	$10^9 A_t e^{-2\tau}$	$< 0.0636$
$c_{217}$	$0.9998 \pm 0.0019$	$k_D$	$0.14078 \pm 0.00056$	$f_{2000}^{143}$	$32.1 \pm 3.3$
$H_0$	$66.73 \pm 0.89$	$100\theta_D$	$0.16100 \pm 0.00029$	$f_{2000}^{143 \times 217}$	$34.1 \pm 2.3$
$\Omega_\Lambda$	$0.676 \pm 0.013$	$z_{\text{eq}}$	$3425 \pm 47$	$f_{2000}^{217}$	$108.6 \pm 2.2$
$\Omega_m$	$0.324 \pm 0.013$	$k_{\text{eq}}$	$0.01045 \pm 0.00014$	$\chi_{\text{BKPLANCK}}^2$	$739.1 \pm 2.7$
$\Omega_m h^2$	$0.1440 \pm 0.0020$	$100\theta_{\text{eq}}$	$0.8086 \pm 0.0087$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\Omega_m h^3$	$0.09606 \pm 0.00049$	$100\theta_{s,\text{eq}}$	$0.4471 \pm 0.0045$	$\chi_{\text{lowl}}^2$	$23.5 \pm 2.2$
$\sigma_8$	$0.8154 \pm 0.0085$	$H(0.15)$	$72.14 \pm 0.76$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.847 \pm 0.024$	$D_M(0.15)$	$648.9 \pm 7.8$	$\chi_{\text{CMB}}^2$	$5078 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 8233.63; \Delta\bar{\chi}_{\text{eff}}^2 = 6292.12; R - 1 = 0.00394$$



## 15.14 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02227 \pm 0.00021$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.011$	$H(0.61)$	$95.29 \pm 0.25$
$\Omega_c h^2$	$0.1192 \pm 0.0012$	$r_{\text{drag}} h$	$99.63 \pm 0.93$	$D_{\text{M}}(0.61)$	$2306 \pm 12$
$100\theta_{MC}$	$1.04103 \pm 0.00043$	$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.028$	$H(2.33)$	$235.95 \pm 0.80$
$\tau$	$0.0571^{+0.0059}_{-0.0089}$	$z_{\text{re}}$	$7.96^{+0.64}_{-0.86}$	$D_{\text{M}}(2.33)$	$5765 \pm 13$
$\ln(10^{10} A_s)$	$3.048^{+0.014}_{-0.019}$	$10^9 A_s$	$2.108^{+0.029}_{-0.040}$	$f\sigma_8(0.15)$	$0.4564 \pm 0.0075$
$n_s$	$0.9659 \pm 0.0045$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$\sigma_8(0.15)$	$0.7484^{+0.0058}_{-0.0071}$
$n_{\text{run}}$	$-0.0055 \pm 0.0077$	$D_{40}$	$1224 \pm 20$	$f\sigma_8(0.38)$	$0.4748 \pm 0.0063$
$r$	$0.0295^{+0.0085}_{-0.028}$	$D_{220}$	$5716 \pm 41$	$\sigma_8(0.38)$	$0.6635^{+0.0048}_{-0.0061}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.51)$	$0.4734 \pm 0.0057$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{1420}$	$814.9 \pm 5.2$	$\sigma_8(0.51)$	$0.6209^{+0.0044}_{-0.0057}$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{2000}$	$229.5 \pm 1.9$	$f\sigma_8(0.61)$	$0.4685 \pm 0.0052$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.23}_{-0.31}$	$n_{s,0.002}$	$0.984 \pm 0.024$	$\sigma_8(0.61)$	$0.5908^{+0.0042}_{-0.0054}$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.097$	$Y_P$	$0.245350^{+0.000094}_{-0.000079}$	$f\sigma_8(2.33)$	$0.2979^{+0.0021}_{-0.0027}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246676^{+0.000094}_{-0.000080}$	$\sigma_8(2.33)$	$0.3072^{+0.0021}_{-0.0029}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.606 \pm 0.040$	$r_{0.002}$	$0.0279^{+0.0070}_{-0.027}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.29$	Age/Gyr	$13.801 \pm 0.029$	$r_{0.01}$	$0.0285^{+0.0078}_{-0.027}$
$A_{217}^{CIB}$	$45 \pm 8$	$z_*$	$1089.98 \pm 0.31$	$\ln(10^{10} A_t)$	$-0.79^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.72 \pm 0.33$	$r_{L=10}$	$0.0144^{+0.0035}_{-0.014}$
$A_{143}^{tSZ}$	$4.3^{+2.2}_{-2.5}$	$100\theta_*$	$1.04122 \pm 0.00042$	$10^9 A_t$	$0.062^{+0.018}_{-0.059}$
$A_{100}^{PS}$	$255 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.899 \pm 0.032$	$10^9 A_t e^{-2\tau}$	$0.056^{+0.016}_{-0.053}$
$A_{143}^{PS}$	$46 \pm 9$	$z_{\text{drag}}$	$1059.64 \pm 0.49$	$f_{2000}^{143}$	$31.6 \pm 3.3$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$r_{\text{drag}}$	$147.42 \pm 0.37$	$f_{2000}^{143 \times 217}$	$33.7 \pm 2.3$
$A^{kSZ}$	$< 6.18$	$k_{\text{D}}$	$0.14044 \pm 0.00049$	$f_{2000}^{217}$	$108.3 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16095 \pm 0.00028$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.7$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{eq}}$	$3381 \pm 29$	$\chi_{\text{small}}^2$	$397.5 \pm 2.2$
$H_0$	$67.58 \pm 0.54$	$k_{\text{eq}}$	$0.010319 \pm 0.000088$	$\chi_{\text{lowl}}^2$	$22.9 \pm 1.9$
$\Omega_{\Lambda}$	$0.6888 \pm 0.0073$	$100\theta_{\text{eq}}$	$0.8170 \pm 0.0053$	$\chi_{6\text{DF}}^2$	$0.067 \pm 0.084$
$\Omega_m$	$0.3112 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4514 \pm 0.0027$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.51$
$\Omega_m h^2$	$0.1421 \pm 0.0012$	$H(0.15)$	$72.86 \pm 0.47$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.8$
$\Omega_m h^3$	$0.09605 \pm 0.00050$	$D_{\text{M}}(0.15)$	$641.5 \pm 4.6$	$\chi_{\text{prior}}^2$	$9.2 \pm 3.9$
$\sigma_8$	$0.8099^{+0.0067}_{-0.0080}$	$H(0.38)$	$82.96 \pm 0.35$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.5$
$S_8$	$0.825 \pm 0.015$	$D_{\text{M}}(0.38)$	$1530.0 \pm 9.4$	$\chi_{\text{CMB}}^2$	$5079 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4518 \pm 0.0080$	$H(0.51)$	$89.68 \pm 0.29$		
$\sigma_8 \Omega_m^{0.25}$	$0.6049 \pm 0.0078$	$D_{\text{M}}(0.51)$	$1982 \pm 11$		

 $\bar{\chi}_{\text{eff}}^2 = 8240.52; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.91; R - 1 = 0.00672$



15.15 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00022$	$\sigma_8 \Omega_m^{0.25}$	$0.6103 \pm 0.0076$	$H(0.51)$	$89.42 \pm 0.36$
$\Omega_c h^2$	$0.1204 \pm 0.0015$	$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$D_M(0.51)$	$1993 \pm 14$
$100\theta_{MC}$	$1.04084 \pm 0.00045$	$r_{\text{drag}} h$	$98.7 \pm 1.2$	$H(0.61)$	$95.09 \pm 0.30$
$\tau$	$0.0549^{+0.0051}_{-0.0087}$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.027$	$D_M(0.61)$	$2318 \pm 15$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.016}$	$z_{\text{re}}$	$7.77^{+0.57}_{-0.82}$	$H(2.33)$	$236.62 \pm 0.94$
$n_s$	$0.9631 \pm 0.0050$	$10^9 A_s$	$2.104^{+0.024}_{-0.034}$	$D_M(2.33)$	$5773 \pm 15$
$n_{\text{run}}$	$-0.0047 \pm 0.0075$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.012$	$f\sigma_8(0.15)$	$0.4625 \pm 0.0081$
$r$	$0.0277^{+0.0068}_{-0.028}$	$D_{40}$	$1231 \pm 20$	$\sigma_8(0.15)$	$0.7499^{+0.0049}_{-0.0055}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{220}$	$5711 \pm 41$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0062$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{810}$	$2537 \pm 14$	$\sigma_8(0.38)$	$0.6640^{+0.0040}_{-0.0049}$
$A_{B,\text{sync}}$	$1.63^{+0.52}_{-1.4}$	$D_{1420}$	$813.9 \pm 5.3$	$f\sigma_8(0.51)$	$0.4770 \pm 0.0053$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$229.2 \pm 2.0$	$\sigma_8(0.51)$	$0.6210^{+0.0037}_{-0.0046}$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.097$	$n_{s,0.002}$	$0.978 \pm 0.024$	$f\sigma_8(0.61)$	$0.4715 \pm 0.0047$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.24532^{+0.00010}_{-0.000084}$	$\sigma_8(0.61)$	$0.5907^{+0.0035}_{-0.0045}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000084}$	$f\sigma_8(2.33)$	$0.2976^{+0.0018}_{-0.0024}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$10^5 D/H$	$2.621 \pm 0.042$	$\sigma_8(2.33)$	$0.3065^{+0.0019}_{-0.0026}$
$A_{217}^{CIB}$	$45 \pm 8$	Age/Gyr	$13.820 \pm 0.033$	$r_{0.002}$	$< 0.0318$
$\xi^{tSZ-CIB}$	—	$z_*$	$1090.19 \pm 0.36$	$r_{0.01}$	$< 0.0328$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.5}$	$r_*$	$144.48 \pm 0.37$	$\ln(10^{10} A_t)$	$-0.87^{+1.1}_{-0.41}$
$A_{100}^{PS}$	$256 \pm 30$	$100\theta_*$	$1.04104 \pm 0.00045$	$r_{L=10}$	$< 0.0164$
$A_{143}^{PS}$	$46 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.878 \pm 0.035$	$10^9 A_t$	$0.058^{+0.014}_{-0.058}$
$A_{217}^{PS}$	$107^{+20}_{-10}$	$z_{\text{drag}}$	$1059.54 \pm 0.49$	$10^9 A_t e^{-2\tau}$	$0.052^{+0.013}_{-0.052}$
$A^{kSZ}$	$< 6.19$	$r_{\text{drag}}$	$147.20 \pm 0.39$	$f_{2000}^{143}$	$31.8 \pm 3.3$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$k_D$	$0.14061 \pm 0.00049$	$f_{2000}^{143 \times 217}$	$33.9 \pm 2.3$
$c_{217}$	$0.9998 \pm 0.0019$	$100\theta_D$	$0.16099 \pm 0.00029$	$f_{2000}^{217}$	$108.4 \pm 2.1$
$H_0$	$67.05 \pm 0.69$	$z_{\text{eq}}$	$3407 \pm 35$	$\chi_{\text{lensing}}^2$	$9.7 \pm 1.0$
$\Omega_\Lambda$	$0.6813 \pm 0.0096$	$k_{\text{eq}}$	$0.01040 \pm 0.00011$	$\chi_{\text{BKPLANCK}}^2$	$739.5 \pm 2.6$
$\Omega_m$	$0.3187 \pm 0.0096$	$100\theta_{\text{eq}}$	$0.8120 \pm 0.0065$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1432 \pm 0.0015$	$100\theta_{s,\text{eq}}$	$0.4488 \pm 0.0033$	$\chi_{\text{lowl}}^2$	$23.6 \pm 2.2$
$\Omega_m h^3$	$0.09601 \pm 0.00049$	$H(0.15)$	$72.40 \pm 0.60$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8$	$0.8123 \pm 0.0060$	$D_M(0.15)$	$646.1 \pm 6.0$	$\chi_{\text{CMB}}^2$	$5088 \pm 3000$
$S_8$	$0.837 \pm 0.016$	$H(0.38)$	$82.64 \pm 0.44$		
$\sigma_8 \Omega_m^{0.5}$	$0.4585 \pm 0.0088$	$D_M(0.38)$	$1539 \pm 12$		

$\bar{\chi}_{\text{eff}}^2 = 8242.90$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6291.97$ ;  $R - 1 = 0.00417$



15.16 base\_nrun\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing\_zre6p5/base\_nrun\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_le

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00021$	$\sigma_8/h^{0.5}$	$0.9861 \pm 0.0088$	$H(0.61)$	$95.28 \pm 0.25$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$r_{\text{drag}} h$	$99.60 \pm 0.84$	$D_{\text{M}}(0.61)$	$2307 \pm 11$
$100\theta_{MC}$	$1.04101 \pm 0.00043$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.023$	$H(2.33)$	$235.96 \pm 0.71$
$\tau$	$0.0574^{+0.0060}_{-0.0083}$	$z_{\text{re}}$	$7.99^{+0.63}_{-0.79}$	$D_{\text{M}}(2.33)$	$5765 \pm 13$
$\ln(10^{10} A_s)$	$3.049^{+0.013}_{-0.016}$	$10^9 A_s$	$2.110^{+0.027}_{-0.035}$	$f\sigma_8(0.15)$	$0.4569 \pm 0.0060$
$n_s$	$0.9657 \pm 0.0043$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$\sigma_8(0.15)$	$0.7490^{+0.0050}_{-0.0058}$
$n_{\text{run}}$	$-0.0047 \pm 0.0076$	$D_{40}$	$1227 \pm 20$	$f\sigma_8(0.38)$	$0.4753 \pm 0.0050$
$r$	$0.0289^{+0.0081}_{-0.028}$	$D_{220}$	$5720 \pm 41$	$\sigma_8(0.38)$	$0.6639^{+0.0042}_{-0.0052}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{810}$	$2538 \pm 14$	$f\sigma_8(0.51)$	$0.4739 \pm 0.0044$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{1420}$	$815.1 \pm 5.2$	$\sigma_8(0.51)$	$0.6213^{+0.0040}_{-0.0049}$
$A_{B,\text{sync}}$	$1.64^{+0.53}_{-1.4}$	$D_{2000}$	$229.7 \pm 1.9$	$f\sigma_8(0.61)$	$0.4689 \pm 0.0041$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.23}_{-0.32}$	$n_{s,0.002}$	$0.981 \pm 0.024$	$\sigma_8(0.61)$	$0.5912^{+0.0038}_{-0.0047}$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.097$	$Y_P$	$0.245348^{+0.000094}_{-0.000079}$	$f\sigma_8(2.33)$	$0.2981^{+0.0019}_{-0.0024}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246674^{+0.000094}_{-0.000079}$	$\sigma_8(2.33)$	$0.3073^{+0.0020}_{-0.0026}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.607 \pm 0.040$	$r_{0.002}$	$0.0271^{+0.0067}_{-0.027}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	Age/Gyr	$13.802 \pm 0.029$	$r_{0.01}$	$0.0278^{+0.0074}_{-0.027}$
$A_{217}^{CIB}$	$45 \pm 8$	$z_*$	$1089.99 \pm 0.30$	$\ln(10^{10} A_t)$	$-0.81^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.71 \pm 0.30$	$r_{L=10}$	$0.0139^{+0.0033}_{-0.014}$
$A_{143}^{tSZ}$	$4.3 \pm 2.2$	$100\theta_*$	$1.04121 \pm 0.00042$	$10^9 A_t$	$0.061^{+0.017}_{-0.059}$
$A_{100}^{PS}$	$255 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.898 \pm 0.030$	$10^9 A_t e^{-2\tau}$	$0.054^{+0.015}_{-0.052}$
$A_{143}^{PS}$	$46 \pm 9$	$z_{\text{drag}}$	$1059.63 \pm 0.49$	$f_{2000}^{143}$	$31.5 \pm 3.3$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_{\text{drag}}$	$147.41 \pm 0.34$	$f_{2000}^{143 \times 217}$	$33.6 \pm 2.3$
$A^{kSZ}$	$< 6.11$	$k_{\text{D}}$	$0.14044 \pm 0.00047$	$f_{2000}^{217}$	$108.2 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_{\text{D}}$	$0.16095 \pm 0.00028$	$\chi^2_{\text{lensing}}$	$9.39 \pm 0.69$
$c_{217}$	$0.9998 \pm 0.0019$	$z_{\text{eq}}$	$3382 \pm 26$	$\chi^2_{\text{BKPLANCK}}$	$739.8 \pm 2.6$
$H_0$	$67.56 \pm 0.50$	$k_{\text{eq}}$	$0.010321 \pm 0.000078$	$\chi^2_{\text{small}}$	$397.5 \pm 2.1$
$\Omega_{\Lambda}$	$0.6885 \pm 0.0066$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0047$	$\chi^2_{\text{lowl}}$	$23.2 \pm 2.0$
$\Omega_m$	$0.3115 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0024$	$\chi^2_{6\text{DF}}$	$0.062 \pm 0.074$
$\Omega_m h^2$	$0.1422 \pm 0.0011$	$H(0.15)$	$72.84 \pm 0.43$	$\chi^2_{\text{MGS}}$	$1.25 \pm 0.46$
$\Omega_m h^3$	$0.09604 \pm 0.00049$	$D_{\text{M}}(0.15)$	$641.7 \pm 4.3$	$\chi^2_{\text{DR12BAO}}$	$4.9 \pm 1.6$
$\sigma_8$	$0.8105^{+0.0056}_{-0.0063}$	$H(0.38)$	$82.95 \pm 0.33$	$\chi^2_{\text{prior}}$	$9.2 \pm 3.9$
$S_8$	$0.826 \pm 0.012$	$D_{\text{M}}(0.38)$	$1530.4 \pm 8.7$	$\chi^2_{\text{CMB}}$	$5088 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4523 \pm 0.0065$	$H(0.51)$	$89.66 \pm 0.28$	$\chi^2_{\text{BAO}}$	$6.3 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6055 \pm 0.0061$	$D_{\text{M}}(0.51)$	$1983 \pm 10$		

$$\bar{\chi}^2_{\text{eff}} = 8249.63; \Delta\bar{\chi}^2_{\text{eff}} = 6292.05; R - 1 = 0.00812$$



15.17 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00016$	$\sigma_8 \Omega_m^{0.5}$	$0.4571 \pm 0.0093$	$H(0.38)$	$82.79 \pm 0.38$
$\Omega_c h^2$	$0.1202 \pm 0.0014$	$\sigma_8 \Omega_m^{0.25}$	$0.6093 \pm 0.0088$	$D_M(0.38)$	$1536 \pm 11$
$100\theta_{MC}$	$1.04086 \pm 0.00031$	$\sigma_8/h^{0.5}$	$0.990 \pm 0.012$	$H(0.51)$	$89.56 \pm 0.30$
$\tau$	$0.0556^{+0.0075}_{-0.0085}$	$r_{\text{drag}} h$	$98.9 \pm 1.1$	$D_M(0.51)$	$1988 \pm 12$
$\ln(10^{10} A_s)$	$3.048 \pm 0.018$	$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.030$	$H(0.61)$	$95.22 \pm 0.24$
$n_s$	$0.9641 \pm 0.0048$	$z_{\text{re}}$	$7.80 \pm 0.83$	$D_M(0.61)$	$2313 \pm 13$
$n_{\text{run}}$	$-0.0059 \pm 0.0073$	$10^9 A_s$	$2.108^{+0.035}_{-0.039}$	$H(2.33)$	$236.67 \pm 0.89$
$r$	$0.032^{+0.011}_{-0.028}$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.013$	$D_M(2.33)$	$5766 \pm 11$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1229 \pm 19$	$f\sigma_8(0.15)$	$0.4613 \pm 0.0087$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{220}$	$5723 \pm 40$	$\sigma_8(0.15)$	$0.7498 \pm 0.0070$
$A_{B,\text{sync}}$	$1.62^{+0.52}_{-1.3}$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.38)$	$0.4784 \pm 0.0071$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.22}_{-0.32}$	$D_{1420}$	$815.7 \pm 5.0$	$\sigma_8(0.38)$	$0.6641 \pm 0.0059$
$\beta_{B,\text{dust}}$	$1.601 \pm 0.096$	$D_{2000}$	$229.9 \pm 1.8$	$f\sigma_8(0.51)$	$0.4764 \pm 0.0063$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.983 \pm 0.022$	$\sigma_8(0.51)$	$0.6212 \pm 0.0054$
$\beta_{B,\text{sync}}$	$-3.10^{+0.29}_{-0.26}$	$Y_P$	$0.245382^{+0.000069}_{-0.000060}$	$f\sigma_8(0.61)$	$0.4709 \pm 0.0057$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246708^{+0.000069}_{-0.000060}$	$\sigma_8(0.61)$	$0.5910 \pm 0.0051$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.592 \pm 0.030$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0026$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.803 \pm 0.025$	$\sigma_8(2.33)$	$0.3068 \pm 0.0027$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$z_*$	$1089.98 \pm 0.28$	$r_{0.002}$	$0.0299^{+0.0094}_{-0.027}$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.40 \pm 0.34$	$r_{0.01}$	$0.031^{+0.010}_{-0.027}$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04104 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.70^{+1.0}_{-0.38}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.870 \pm 0.032$	$r_{L=10}$	$0.0154^{+0.0048}_{-0.014}$
$A^{kSZ}$	$< 5.79$	$z_{\text{drag}}$	$1059.88 \pm 0.35$	$10^9 A_t$	$0.067^{+0.023}_{-0.059}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.07 \pm 0.35$	$10^9 A_t e^{-2\tau}$	$0.060^{+0.021}_{-0.052}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$k_D$	$0.14087 \pm 0.00040$	$f_{2000}^{143}$	$30.8 \pm 3.2$
$H_0$	$67.24 \pm 0.62$	$100\theta_D$	$0.16078 \pm 0.00021$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.3$
$\Omega_\Lambda$	$0.6831 \pm 0.0087$	$z_{\text{eq}}$	$3407 \pm 33$	$f_{2000}^{217}$	$107.8 \pm 2.1$
$\Omega_m$	$0.3169 \pm 0.0087$	$k_{\text{eq}}$	$0.01040 \pm 0.00010$	$\chi_{\text{BKPLANCK}}^2$	$739.7 \pm 2.7$
$\Omega_m h^2$	$0.1432 \pm 0.0014$	$100\theta_{\text{eq}}$	$0.8124 \pm 0.0061$	$\chi_{\text{simall}}^2$	$397.4 \pm 2.1$
$\Omega_m h^3$	$0.09628 \pm 0.00035$	$100\theta_{s,\text{eq}}$	$0.4489 \pm 0.0032$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.9$
$\sigma_8$	$0.8120 \pm 0.0080$	$H(0.15)$	$72.58 \pm 0.53$	$\chi_{\text{prior}}^2$	$11.4 \pm 4.7$
$S_8$	$0.835 \pm 0.017$	$D_M(0.15)$	$644.5 \pm 5.3$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 12656.13$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.30$ ;  $\bar{\chi}_{\text{eff}}^2 = 12684.91$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.07$ ;  $R - 1 = 0.00385$   
 $\chi_{\text{eff}}^2$ : CMB - BK15\_dust: 735.31 ( $\Delta$  0.24) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.13 ( $\Delta$  -0.23) commander\_dx12\_v3\_2\_29: 23.09 ( $\Delta$  0.66) CamSpec like\_10.7HM\_1400\_unified: 11499.22



## 15.18 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00016$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.011$	$H(0.61)$	$95.37 \pm 0.19$
$\Omega_c h^2$	$0.1193 \pm 0.0010$	$r_{\text{drag}} h$	$99.61 \pm 0.79$	$D_M(0.61)$	$2304.5 \pm 9.8$
$100\theta_{MC}$	$1.04097 \pm 0.00029$	$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.026$	$H(2.33)$	$236.12 \pm 0.67$
$\tau$	$0.0568^{+0.0075}_{-0.0087}$	$z_{\text{re}}$	$7.90 \pm 0.83$	$D_M(2.33)$	$5760.1 \pm 9.5$
$\ln(10^{10} A_s)$	$3.048 \pm 0.018$	$10^9 A_s$	$2.109^{+0.035}_{-0.040}$	$f\sigma_8(0.15)$	$0.4563 \pm 0.0068$
$n_s$	$0.9664 \pm 0.0042$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$\sigma_8(0.15)$	$0.7483 \pm 0.0068$
$n_{\text{run}}$	$-0.0053 \pm 0.0073$	$D_{40}$	$1226 \pm 19$	$f\sigma_8(0.38)$	$0.4747 \pm 0.0059$
$r$	$0.033^{+0.012}_{-0.028}$	$D_{220}$	$5727 \pm 39$	$\sigma_8(0.38)$	$0.6634 \pm 0.0059$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.51)$	$0.4733 \pm 0.0054$
$A_{B,\text{dust}}$	$4.86^{+0.83}_{-1.2}$	$D_{1420}$	$816.3 \pm 5.0$	$\sigma_8(0.51)$	$0.6208 \pm 0.0055$
$A_{B,\text{sync}}$	$1.62^{+0.51}_{-1.3}$	$D_{2000}$	$230.2 \pm 1.8$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0051$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.31}$	$n_{s,0.002}$	$0.984 \pm 0.022$	$\sigma_8(0.61)$	$0.5907 \pm 0.0052$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.097$	$Y_P$	$0.245404^{+0.000065}_{-0.000055}$	$f\sigma_8(2.33)$	$0.2979 \pm 0.0026$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246731^{+0.000065}_{-0.000055}$	$\sigma_8(2.33)$	$0.3071 \pm 0.0027$
$\beta_{B,\text{sync}}$	$-3.11 \pm 0.27$	$10^5 D/H$	$2.581^{+0.027}_{-0.030}$	$r_{0.002}$	$0.031^{+0.010}_{-0.028}$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	Age/Gyr	$13.790 \pm 0.022$	$r_{0.01}$	$0.032^{+0.011}_{-0.028}$
$A_{217}^{CIB}$	$44 \pm 8$	$z_*$	$1089.82 \pm 0.24$	$\ln(10^{10} A_t)$	$-0.66^{+1.0}_{-0.38}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.59 \pm 0.27$	$r_{L=10}$	$0.0160^{+0.0052}_{-0.014}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$100\theta_*$	$1.04115 \pm 0.00029$	$10^9 A_t$	$0.069^{+0.025}_{-0.059}$
$A_{100}^{PS}$	$252 \pm 30$	$D_M(z_*)/\text{Gpc}$	$13.888 \pm 0.026$	$10^9 A_t e^{-2\tau}$	$0.062^{+0.022}_{-0.053}$
$A_{143}^{PS}$	$44 \pm 9$	$z_{\text{drag}}$	$1059.95 \pm 0.35$	$f_{2000}^{143}$	$30.5 \pm 3.2$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_{\text{drag}}$	$147.25 \pm 0.29$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$A^{kSZ}$	$< 5.69$	$k_D$	$0.14072 \pm 0.00037$	$f_{2000}^{217}$	$107.5 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_D$	$0.16075 \pm 0.00020$	$\chi_{\text{BKPLANCK}}^2$	$740.0 \pm 2.7$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{eq}}$	$3386 \pm 24$	$\chi_{\text{simall}}^2$	$397.6 \pm 2.3$
$H_0$	$67.64 \pm 0.45$	$k_{\text{eq}}$	$0.010334 \pm 0.000075$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.8$
$\Omega_\Lambda$	$0.6889 \pm 0.0062$	$100\theta_{\text{eq}}$	$0.8164 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.059 \pm 0.069$
$\Omega_m$	$0.3111 \pm 0.0062$	$100\theta_{s,\text{eq}}$	$0.4510 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.43$
$\Omega_m h^2$	$0.1423 \pm 0.0010$	$H(0.15)$	$72.92 \pm 0.39$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.5$
$\Omega_m h^3$	$0.09628 \pm 0.00035$	$D_M(0.15)$	$640.9 \pm 3.8$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.8$
$\sigma_8$	$0.8098 \pm 0.0076$	$H(0.38)$	$83.03 \pm 0.29$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$S_8$	$0.825 \pm 0.013$	$D_M(0.38)$	$1528.7 \pm 7.7$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4517 \pm 0.0072$	$H(0.51)$	$89.75 \pm 0.23$		
$\sigma_8 \Omega_m^{0.25}$	$0.6048 \pm 0.0073$	$D_M(0.51)$	$1980.4 \pm 9.1$		

Best-fit  $\chi_{\text{eff}}^2 = 12662.16$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.77$ ;  $\bar{\chi}_{\text{eff}}^2 = 12690.95$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.56$ ;  $R - 1 = 0.00720$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  -0.02) MGS: 1.22 ( $\Delta$  0.12) DR12BAO: 4.40 ( $\Delta$  -0.48) CMB - BK15\_dust: 735.68 ( $\Delta$  0.39) simall.100x143\_offlike5\_EE\_Aplanck\_B: 396.13 ( $\Delta$  -0.64) commander.dx12.v3.2.29: 22.83 ( $\Delta$  0.43) CamSpec like.10.7HM.1400\_unified: 11499.52



15.19 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_lensing/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00016$	$\sigma_8 \Omega_m^{0.25}$	$0.6080 \pm 0.0065$	$H(0.51)$	$89.60 \pm 0.27$
$\Omega_c h^2$	$0.1200 \pm 0.0012$	$\sigma_8/h^{0.5}$	$0.9887 \pm 0.0091$	$D_M(0.51)$	$1987 \pm 11$
$100\theta_{MC}$	$1.04088 \pm 0.00031$	$r_{\text{drag}} h$	$99.04 \pm 0.94$	$H(0.61)$	$95.25 \pm 0.22$
$\tau$	$0.0554^{+0.0070}_{-0.0079}$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.023$	$D_M(0.61)$	$2311 \pm 12$
$\ln(10^{10} A_s)$	$3.047 \pm 0.015$	$z_{\text{re}}$	$7.78 \pm 0.76$	$H(2.33)$	$236.54 \pm 0.75$
$n_s$	$0.9645 \pm 0.0045$	$10^9 A_s$	$2.106^{+0.030}_{-0.034}$	$D_M(2.33)$	$5765 \pm 11$
$n_{\text{run}}$	$-0.0049 \pm 0.0072$	$10^9 A_s e^{-2\tau}$	$1.885 \pm 0.011$	$f\sigma_8(0.15)$	$0.4600 \pm 0.0065$
$r$	$0.032^{+0.011}_{-0.028}$	$D_{40}$	$1230 \pm 19$	$\sigma_8(0.15)$	$0.7492 \pm 0.0055$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{220}$	$5725 \pm 39$	$f\sigma_8(0.38)$	$0.4774 \pm 0.0053$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{810}$	$2540 \pm 13$	$\sigma_8(0.38)$	$0.6637 \pm 0.0048$
$A_{B,\text{sync}}$	$1.62^{+0.52}_{-1.3}$	$D_{1420}$	$815.9 \pm 5.0$	$f\sigma_8(0.51)$	$0.4755 \pm 0.0046$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$230.1 \pm 1.9$	$\sigma_8(0.51)$	$0.6209 \pm 0.0045$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.096$	$n_{s,0.002}$	$0.980 \pm 0.022$	$f\sigma_8(0.61)$	$0.4702 \pm 0.0042$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245384^{+0.000069}_{-0.000059}$	$\sigma_8(0.61)$	$0.5907 \pm 0.0043$
$\beta_{B,\text{sync}}$	$-3.10^{+0.28}_{-0.26}$	$Y_P^{\text{BBN}}$	$0.246711^{+0.000069}_{-0.000059}$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0023$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	$10^5 D/H$	$2.590 \pm 0.030$	$\sigma_8(2.33)$	$0.3067 \pm 0.0024$
$A_{217}^{CIB}$	$44 \pm 8$	Age/Gyr	$13.801 \pm 0.024$	$r_{0.002}$	$0.0295^{+0.0090}_{-0.027}$
$\xi^{tSZ-CIB}$	—	$z_*$	$1089.95 \pm 0.27$	$r_{0.01}$	$0.0303^{+0.0098}_{-0.027}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$r_*$	$144.45 \pm 0.29$	$\ln(10^{10} A_t)$	$-0.71^{+1.0}_{-0.38}$
$A_{100}^{PS}$	$253 \pm 30$	$100\theta_*$	$1.04106 \pm 0.00030$	$r_{L=10}$	$0.0152^{+0.0045}_{-0.014}$
$A_{143}^{PS}$	$44 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.875 \pm 0.028$	$10^9 A_t$	$0.066^{+0.022}_{-0.059}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_{\text{drag}}$	$1059.88 \pm 0.35$	$10^9 A_t e^{-2\tau}$	$0.059^{+0.020}_{-0.053}$
$A^{kSZ}$	$< 5.74$	$r_{\text{drag}}$	$147.12 \pm 0.30$	$f_{2000}^{143}$	$20 \pm 11$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$k_D$	$0.14082 \pm 0.00037$	$f_{2000}^{143 \times 217}$	$386 \pm 400$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_D$	$0.16078 \pm 0.00021$	$f_{2000}^{217}$	$252 \pm 100$
$H_0$	$67.32 \pm 0.54$	$z_{\text{eq}}$	$3402 \pm 28$	$\chi_{\text{lensing}}^2$	$16.2 \pm 6.9$
$\Omega_\Lambda$	$0.6844 \pm 0.0075$	$k_{\text{eq}}$	$0.010382 \pm 0.000086$	$\chi_{\text{BKPLANCK}}^2$	$1550 \pm 800$
$\Omega_m$	$0.3156 \pm 0.0075$	$100\theta_{\text{eq}}$	$0.8133 \pm 0.0052$	$\chi_{\text{small}}^2$	$205 \pm 200$
$\Omega_m h^2$	$0.1430 \pm 0.0012$	$100\theta_{s,\text{eq}}$	$0.4494 \pm 0.0027$	$\chi_{\text{lowl}}^2$	$27 \pm 4$
$\Omega_m h^3$	$0.09626 \pm 0.00034$	$H(0.15)$	$72.65 \pm 0.46$	$\chi_{\text{prior}}^2$	$59 \pm 50$
$\sigma_8$	$0.8112 \pm 0.0060$	$D_M(0.15)$	$643.7 \pm 4.7$	$\chi_{\text{CMB}}^2$	$8107 \pm 5000$
$S_8$	$0.832 \pm 0.013$	$H(0.38)$	$82.84 \pm 0.34$		
$\sigma_8 \Omega_m^{0.5}$	$0.4557 \pm 0.0071$	$D_M(0.38)$	$1534.2 \pm 9.3$		

Best-fit  $\chi_{\text{eff}}^2 = 12665.09$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.07$ ;  $\bar{\chi}_{\text{eff}}^2 = 12693.83$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.85$ ;  $R - 1 = 0.00535$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.90 ( $\Delta$  -0.14) BK15\_dust: 735.38 ( $\Delta$  0.11) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.03 ( $\Delta$  -0.17) com-  
mander\_dx12\_v3.2.29: 23.34 ( $\Delta$  0.70) CamSpec like\_10.7HM\_1400\_unified: 11499.17



15.20 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_lensing/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00016$	$\sigma_8/h^{0.5}$	$0.9854 \pm 0.0084$	$H(0.61)$	$95.37 \pm 0.19$
$\Omega_c h^2$	$0.11929 \pm 0.00096$	$r_{\text{drag}} h$	$99.60 \pm 0.73$	$D_{\text{M}}(0.61)$	$2304.6 \pm 9.3$
$100\theta_{MC}$	$1.04097 \pm 0.00029$	$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.022$	$H(2.33)$	$236.13 \pm 0.61$
$\tau$	$0.0573^{+0.0070}_{-0.0079}$	$z_{\text{re}}$	$7.95 \pm 0.74$	$D_{\text{M}}(2.33)$	$5760.3 \pm 9.4$
$\ln(10^{10} A_s)$	$3.050 \pm 0.016$	$10^9 A_s$	$2.111^{+0.030}_{-0.034}$	$f\sigma_8(0.15)$	$0.4566 \pm 0.0055$
$n_s$	$0.9663 \pm 0.0041$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.011$	$\sigma_8(0.15)$	$0.7489 \pm 0.0055$
$n_{\text{run}}$	$-0.0047 \pm 0.0072$	$D_{40}$	$1228 \pm 19$	$f\sigma_8(0.38)$	$0.4750 \pm 0.0047$
$r$	$0.032^{+0.011}_{-0.028}$	$D_{220}$	$5730 \pm 39$	$\sigma_8(0.38)$	$0.6639 \pm 0.0049$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.51)$	$0.4737 \pm 0.0042$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{1420}$	$816.6 \pm 5.0$	$\sigma_8(0.51)$	$0.6213 \pm 0.0046$
$A_{B,\text{sync}}$	$1.62^{+0.51}_{-1.3}$	$D_{2000}$	$230.4 \pm 1.8$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0039$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.31}$	$n_{s,0.002}$	$0.981 \pm 0.022$	$\sigma_8(0.61)$	$0.5912 \pm 0.0044$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.096$	$Y_P$	$0.245403^{+0.000065}_{-0.000056}$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0022$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246730^{+0.000065}_{-0.000056}$	$\sigma_8(2.33)$	$0.3073 \pm 0.0024$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.581^{+0.027}_{-0.030}$	$r_{0.002}$	$0.0303^{+0.0098}_{-0.027}$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	Age/Gyr	$13.790 \pm 0.021$	$r_{0.01}$	$0.031^{+0.011}_{-0.027}$
$A_{217}^{CIB}$	$44 \pm 8$	$z_*$	$1089.83 \pm 0.23$	$\ln(10^{10} A_t)$	$-0.68^{+1.0}_{-0.38}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.59 \pm 0.25$	$r_{L=10}$	$0.0156^{+0.0049}_{-0.014}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$100\theta_*$	$1.04115 \pm 0.00029$	$10^9 A_t$	$0.068^{+0.024}_{-0.059}$
$A_{100}^{PS}$	$252 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.888 \pm 0.024$	$10^9 A_t e^{-2\tau}$	$0.061^{+0.021}_{-0.053}$
$A_{143}^{PS}$	$44 \pm 9$	$z_{\text{drag}}$	$1059.94 \pm 0.35$	$f_{2000}^{143}$	$30.3 \pm 3.2$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_{\text{drag}}$	$147.25 \pm 0.27$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.3$
$A^{kSZ}$	$< 5.60$	$k_{\text{D}}$	$0.14072 \pm 0.00035$	$f_{2000}^{217}$	$107.4 \pm 2.1$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16075 \pm 0.00020$	$\chi_{\text{lensing}}^2$	$9.33 \pm 0.66$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{eq}}$	$3386 \pm 22$	$\chi_{\text{BKPLANCK}}^2$	$740.0 \pm 2.7$
$H_0$	$67.64 \pm 0.43$	$k_{\text{eq}}$	$0.010334 \pm 0.000068$	$\chi_{\text{simall}}^2$	$397.5 \pm 2.0$
$\Omega_{\Lambda}$	$0.6888 \pm 0.0057$	$100\theta_{\text{eq}}$	$0.8163 \pm 0.0041$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.9$
$\Omega_m$	$0.3112 \pm 0.0057$	$100\theta_{\text{s,eq}}$	$0.4510 \pm 0.0021$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.062$
$\Omega_m h^2$	$0.14234 \pm 0.00093$	$H(0.15)$	$72.92 \pm 0.37$	$\chi_{\text{MGS}}^2$	$1.24 \pm 0.40$
$\Omega_m h^3$	$0.09627 \pm 0.00035$	$D_{\text{M}}(0.15)$	$641.0 \pm 3.6$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.4$
$\sigma_8$	$0.8104 \pm 0.0061$	$H(0.38)$	$83.03 \pm 0.27$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.8$
$S_8$	$0.825 \pm 0.011$	$D_{\text{M}}(0.38)$	$1528.8 \pm 7.3$	$\chi_{\text{CMB}}^2$	$8107 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4520 \pm 0.0058$	$H(0.51)$	$89.75 \pm 0.22$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.6052 \pm 0.0057$	$D_{\text{M}}(0.51)$	$1980.4 \pm 8.6$		

Best-fit  $\chi_{\text{eff}}^2 = 12671.14$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.82$ ;  $\bar{\chi}_{\text{eff}}^2 = 12699.90$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.61$ ;  $R - 1 = 0.00769$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  0.00) MGS: 1.22 ( $\Delta$  0.00) DR12BAO: 4.43 ( $\Delta$  0.00) CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.96 ( $\Delta$  0.13) BK15\_dust: 735.57  
( $\Delta$  0.11) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.36 ( $\Delta$  -0.43) commander\_dx12\_v3\_2\_29: 22.82 ( $\Delta$  0.19) CamSpec like\_10.7HM\_1400\_unified: 11499.49



15.21 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_zre6p5/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00016$	$\sigma_8 \Omega_m^{0.5}$	$0.4574 \pm 0.0092$	$H(0.38)$	$82.80 \pm 0.38$
$\Omega_c h^2$	$0.1202 \pm 0.0014$	$\sigma_8 \Omega_m^{0.25}$	$0.6096 \pm 0.0086$	$D_M(0.38)$	$1535 \pm 11$
$100\theta_{MC}$	$1.04086 \pm 0.00031$	$\sigma_8/h^{0.5}$	$0.991 \pm 0.012$	$H(0.51)$	$89.57 \pm 0.30$
$\tau$	$0.0565^{+0.0057}_{-0.0089}$	$r_{\text{drag}} h$	$98.9 \pm 1.1$	$D_M(0.51)$	$1988 \pm 12$
$\ln(10^{10} A_s)$	$3.050^{+0.014}_{-0.018}$	$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.029$	$H(0.61)$	$95.23 \pm 0.24$
$n_s$	$0.9641 \pm 0.0048$	$z_{\text{re}}$	$7.90^{+0.62}_{-0.86}$	$D_M(0.61)$	$2313 \pm 13$
$n_{\text{run}}$	$-0.0060 \pm 0.0072$	$10^9 A_s$	$2.112^{+0.029}_{-0.039}$	$H(2.33)$	$236.66 \pm 0.89$
$r$	$0.032^{+0.011}_{-0.028}$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.013$	$D_M(2.33)$	$5766 \pm 11$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1229 \pm 19$	$f\sigma_8(0.15)$	$0.4615 \pm 0.0086$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{220}$	$5723 \pm 40$	$\sigma_8(0.15)$	$0.7504^{+0.0060}_{-0.0070}$
$A_{B,\text{sync}}$	$1.62^{+0.52}_{-1.3}$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.38)$	$0.4787 \pm 0.0070$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$815.6 \pm 5.0$	$\sigma_8(0.38)$	$0.6647^{+0.0049}_{-0.0059}$
$\beta_{B,\text{dust}}$	$1.601 \pm 0.096$	$D_{2000}$	$229.9 \pm 1.8$	$f\sigma_8(0.51)$	$0.4767 \pm 0.0061$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.983 \pm 0.022$	$\sigma_8(0.51)$	$0.6218^{+0.0044}_{-0.0055}$
$\beta_{B,\text{sync}}$	$-3.10^{+0.29}_{-0.26}$	$Y_P$	$0.245383^{+0.000068}_{-0.000060}$	$f\sigma_8(0.61)$	$0.4713 \pm 0.0056$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246710^{+0.000069}_{-0.000060}$	$\sigma_8(0.61)$	$0.5915^{+0.0041}_{-0.0052}$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.591 \pm 0.030$	$f\sigma_8(2.33)$	$0.2980^{+0.0020}_{-0.0026}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.802 \pm 0.025$	$\sigma_8(2.33)$	$0.3070^{+0.0021}_{-0.0028}$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$z_*$	$1089.97 \pm 0.28$	$r_{0.002}$	$0.0299^{+0.0095}_{-0.027}$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.40 \pm 0.34$	$r_{0.01}$	$0.031^{+0.010}_{-0.027}$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04105 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.69^{+1.0}_{-0.38}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.871 \pm 0.032$	$r_{L=10}$	$0.0155^{+0.0048}_{-0.014}$
$A^{kSZ}$	$< 5.78$	$z_{\text{drag}}$	$1059.89 \pm 0.35$	$10^9 A_t$	$0.067^{+0.023}_{-0.059}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.07 \pm 0.35$	$10^9 A_t e^{-2\tau}$	$0.060^{+0.021}_{-0.052}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$k_D$	$0.14087 \pm 0.00040$	$f_{2000}^{143}$	$30.8 \pm 3.2$
$H_0$	$67.25 \pm 0.62$	$100\theta_D$	$0.16078 \pm 0.00020$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.3$
$\Omega_\Lambda$	$0.6833 \pm 0.0087$	$z_{\text{eq}}$	$3406 \pm 33$	$f_{2000}^{217}$	$107.7 \pm 2.1$
$\Omega_m$	$0.3167 \pm 0.0087$	$k_{\text{eq}}$	$0.01040 \pm 0.00010$	$\chi_{\text{BKPLANCK}}^2$	$739.7 \pm 2.7$
$\Omega_m h^2$	$0.1432 \pm 0.0014$	$100\theta_{\text{eq}}$	$0.8125 \pm 0.0061$	$\chi_{\text{simall}}^2$	$397.4 \pm 2.1$
$\Omega_m h^3$	$0.09628 \pm 0.00035$	$100\theta_{s,\text{eq}}$	$0.4490 \pm 0.0032$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.8$
$\sigma_8$	$0.8127^{+0.0071}_{-0.0079}$	$H(0.15)$	$72.59 \pm 0.52$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.7$
$S_8$	$0.835 \pm 0.017$	$D_M(0.15)$	$644.3 \pm 5.3$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 12684.69$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.04$ ;  $R - 1 = 0.00378$



15.22 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00016$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.010$	$H(0.61)$	$95.37 \pm 0.19$
$\Omega_c h^2$	$0.1193 \pm 0.0010$	$r_{\text{drag}} h$	$99.62 \pm 0.79$	$D_{\text{M}}(0.61)$	$2304.3 \pm 9.8$
$100\theta_{MC}$	$1.04097 \pm 0.00029$	$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.026$	$H(2.33)$	$236.12 \pm 0.67$
$\tau$	$0.0576^{+0.0059}_{-0.0091}$	$z_{\text{re}}$	$7.98^{+0.64}_{-0.87}$	$D_{\text{M}}(2.33)$	$5760.0 \pm 9.4$
$\ln(10^{10} A_s)$	$3.050^{+0.014}_{-0.019}$	$10^9 A_s$	$2.112^{+0.029}_{-0.040}$	$f\sigma_8(0.15)$	$0.4565 \pm 0.0067$
$n_s$	$0.9664 \pm 0.0042$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$\sigma_8(0.15)$	$0.7488^{+0.0057}_{-0.0069}$
$n_{\text{run}}$	$-0.0055 \pm 0.0072$	$D_{40}$	$1226 \pm 19$	$f\sigma_8(0.38)$	$0.4750 \pm 0.0058$
$r$	$0.033^{+0.012}_{-0.028}$	$D_{220}$	$5727 \pm 39$	$\sigma_8(0.38)$	$0.6638^{+0.0049}_{-0.0060}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{810}$	$2540 \pm 14$	$f\sigma_8(0.51)$	$0.4736 \pm 0.0052$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{1420}$	$816.3 \pm 5.0$	$\sigma_8(0.51)$	$0.6213^{+0.0045}_{-0.0056}$
$A_{B,\text{sync}}$	$1.62^{+0.51}_{-1.3}$	$D_{2000}$	$230.2 \pm 1.8$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0049$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.31}$	$n_{s,0.002}$	$0.984 \pm 0.022$	$\sigma_8(0.61)$	$0.5912^{+0.0042}_{-0.0054}$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.097$	$Y_P$	$0.245405^{+0.000065}_{-0.000055}$	$f\sigma_8(2.33)$	$0.2981^{+0.0021}_{-0.0027}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246731^{+0.000065}_{-0.000055}$	$\sigma_8(2.33)$	$0.3073^{+0.0021}_{-0.0028}$
$\beta_{B,\text{sync}}$	$-3.11 \pm 0.27$	$10^5 D/H$	$2.581^{+0.027}_{-0.030}$	$r_{0.002}$	$0.031^{+0.010}_{-0.028}$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	Age/Gyr	$13.790 \pm 0.021$	$r_{0.01}$	$0.032^{+0.011}_{-0.028}$
$A_{217}^{CIB}$	$44 \pm 8$	$z_*$	$1089.82 \pm 0.23$	$\ln(10^{10} A_t)$	$-0.66^{+1.0}_{-0.38}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.60 \pm 0.27$	$r_{L=10}$	$0.0160^{+0.0052}_{-0.014}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$100\theta_*$	$1.04115 \pm 0.00029$	$10^9 A_t$	$0.069^{+0.025}_{-0.060}$
$A_{100}^{PS}$	$252 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.888 \pm 0.026$	$10^9 A_t e^{-2\tau}$	$0.062^{+0.022}_{-0.053}$
$A_{143}^{PS}$	$44 \pm 9$	$z_{\text{drag}}$	$1059.95 \pm 0.35$	$f_{2000}^{143}$	$30.5 \pm 3.2$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_{\text{drag}}$	$147.25 \pm 0.29$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.3$
$A^{kSZ}$	$< 5.68$	$k_{\text{D}}$	$0.14072 \pm 0.00037$	$f_{2000}^{217}$	$107.5 \pm 2.1$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16075 \pm 0.00020$	$\chi_{\text{BKPLANCK}}^2$	$740.0 \pm 2.7$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{eq}}$	$3386 \pm 24$	$\chi_{\text{small}}^2$	$397.6 \pm 2.3$
$H_0$	$67.65 \pm 0.45$	$k_{\text{eq}}$	$0.010334 \pm 0.000075$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.8$
$\Omega_{\Lambda}$	$0.6889 \pm 0.0062$	$100\theta_{\text{eq}}$	$0.8164 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.058 \pm 0.068$
$\Omega_m$	$0.3111 \pm 0.0062$	$100\theta_{\text{s,eq}}$	$0.4510 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.43$
$\Omega_m h^2$	$0.1423 \pm 0.0010$	$H(0.15)$	$72.93 \pm 0.39$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.5$
$\Omega_m h^3$	$0.09628 \pm 0.00035$	$D_{\text{M}}(0.15)$	$640.9 \pm 3.8$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.8$
$\sigma_8$	$0.8103^{+0.0065}_{-0.0077}$	$H(0.38)$	$83.04 \pm 0.29$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$S_8$	$0.825 \pm 0.013$	$D_{\text{M}}(0.38)$	$1528.6 \pm 7.7$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4519 \pm 0.0071$	$H(0.51)$	$89.75 \pm 0.23$		
$\sigma_8 \Omega_m^{0.25}$	$0.6051 \pm 0.0071$	$D_{\text{M}}(0.51)$	$1980.2 \pm 9.1$		

$\bar{\chi}_{\text{eff}}^2 = 12690.74$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.49$ ;  $R - 1 = 0.00701$



15.23 base\_nrun\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5/base\_nrun\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00016$	$\sigma_8 \Omega_m^{0.25}$	$0.6082 \pm 0.0064$	$H(0.51)$	$89.61 \pm 0.27$
$\Omega_c h^2$	$0.1200 \pm 0.0012$	$\sigma_8/h^{0.5}$	$0.9891 \pm 0.0090$	$D_M(0.51)$	$1986 \pm 11$
$100\theta_{MC}$	$1.04088 \pm 0.00030$	$r_{\text{drag}} h$	$99.08 \pm 0.93$	$H(0.61)$	$95.26 \pm 0.22$
$\tau$	$0.0562^{+0.0056}_{-0.0082}$	$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.023$	$D_M(0.61)$	$2311 \pm 12$
$\ln(10^{10} A_s)$	$3.048^{+0.012}_{-0.016}$	$z_{\text{re}}$	$7.86^{+0.61}_{-0.78}$	$H(2.33)$	$236.51 \pm 0.75$
$n_s$	$0.9647 \pm 0.0045$	$10^9 A_s$	$2.108^{+0.025}_{-0.034}$	$D_M(2.33)$	$5765 \pm 10$
$n_{\text{run}}$	$-0.0050 \pm 0.0072$	$10^9 A_s e^{-2\tau}$	$1.884 \pm 0.011$	$f\sigma_8(0.15)$	$0.4600 \pm 0.0065$
$r$	$0.032^{+0.011}_{-0.028}$	$D_{40}$	$1230 \pm 19$	$\sigma_8(0.15)$	$0.7496^{+0.0048}_{-0.0054}$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{220}$	$5725 \pm 39$	$f\sigma_8(0.38)$	$0.4775 \pm 0.0052$
$A_{B,\text{dust}}$	$4.86^{+0.81}_{-1.2}$	$D_{810}$	$2540 \pm 13$	$\sigma_8(0.38)$	$0.6641^{+0.0041}_{-0.0048}$
$A_{B,\text{sync}}$	$1.62^{+0.52}_{-1.3}$	$D_{1420}$	$815.8 \pm 5.0$	$f\sigma_8(0.51)$	$0.4757 \pm 0.0046$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$230.1 \pm 1.8$	$\sigma_8(0.51)$	$0.6213^{+0.0038}_{-0.0046}$
$\beta_{B,\text{dust}}$	$1.600 \pm 0.096$	$n_{s,0.002}$	$0.981 \pm 0.022$	$f\sigma_8(0.61)$	$0.4704 \pm 0.0041$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245386^{+0.000069}_{-0.000059}$	$\sigma_8(0.61)$	$0.5911^{+0.0036}_{-0.0044}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P^{\text{BBN}}$	$0.246712^{+0.000069}_{-0.000059}$	$f\sigma_8(2.33)$	$0.2979^{+0.0018}_{-0.0023}$
$\epsilon_{\text{dust,sync}}$	$-0.36 \pm 0.28$	$10^5 D/H$	$2.589 \pm 0.030$	$\sigma_8(2.33)$	$0.3069^{+0.0019}_{-0.0025}$
$A_{217}^{CIB}$	$44 \pm 8$	Age/Gyr	$13.800 \pm 0.024$	$r_{0.002}$	$0.0296^{+0.0092}_{-0.027}$
$\xi^{tSZ-CIB}$	—	$z_*$	$1089.94 \pm 0.26$	$r_{0.01}$	$0.0303^{+0.0099}_{-0.027}$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$r_*$	$144.46 \pm 0.29$	$\ln(10^{10} A_t)$	$-0.71^{+1.0}_{-0.38}$
$A_{100}^{PS}$	$252 \pm 30$	$100\theta_*$	$1.04106 \pm 0.00030$	$r_{L=10}$	$0.0153^{+0.0046}_{-0.014}$
$A_{143}^{PS}$	$44 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.876 \pm 0.027$	$10^9 A_t$	$0.067^{+0.023}_{-0.059}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_{\text{drag}}$	$1059.89 \pm 0.35$	$10^9 A_t e^{-2\tau}$	$0.059^{+0.020}_{-0.053}$
$A^{kSZ}$	$< 5.74$	$r_{\text{drag}}$	$147.12 \pm 0.30$	$f_{2000}^{143}$	$20 \pm 11$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$k_D$	$0.14082 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$386 \pm 400$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_D$	$0.16078 \pm 0.00020$	$f_{2000}^{217}$	$252 \pm 100$
$H_0$	$67.34 \pm 0.54$	$z_{\text{eq}}$	$3401 \pm 28$	$\chi_{\text{lensing}}^2$	$16.2 \pm 6.9$
$\Omega_\Lambda$	$0.6847 \pm 0.0074$	$k_{\text{eq}}$	$0.010380 \pm 0.000085$	$\chi_{\text{BKPLANCK}}^2$	$1550 \pm 800$
$\Omega_m$	$0.3153 \pm 0.0074$	$100\theta_{\text{eq}}$	$0.8135 \pm 0.0052$	$\chi_{\text{simall}}^2$	$205 \pm 200$
$\Omega_m h^2$	$0.1430 \pm 0.0012$	$100\theta_{s,\text{eq}}$	$0.4495 \pm 0.0027$	$\chi_{\text{lowl}}^2$	$27 \pm 4$
$\Omega_m h^3$	$0.09626 \pm 0.00034$	$H(0.15)$	$72.67 \pm 0.46$	$\chi_{\text{prior}}^2$	$59 \pm 50$
$\sigma_8$	$0.8116 \pm 0.0058$	$D_M(0.15)$	$643.5 \pm 4.6$	$\chi_{\text{CMB}}^2$	$8107 \pm 5000$
$S_8$	$0.832 \pm 0.013$	$H(0.38)$	$82.85 \pm 0.34$		
$\sigma_8 \Omega_m^{0.5}$	$0.4557 \pm 0.0071$	$D_M(0.38)$	$1533.8 \pm 9.2$		

$\bar{\chi}_{\text{eff}}^2 = 12693.65$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.83$ ;  $R - 1 = 0.00582$







## 16 omegak

### 16.1 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE/base\_omegak\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02256 \pm 0.00027$	$r_{\text{drag}} h$	$76.9 \pm 6.5$	$H(0.15)$	$58.3^{+3.8}_{-4.3}$
$\Omega_c h^2$	$0.1173 \pm 0.0023$	$\langle d^2 \rangle^{1/2}$	$2.680 \pm 0.083$	$D_{\text{M}}(0.15)$	$821^{+57}_{-68}$
$100\theta_{MC}$	$1.04131 \pm 0.00051$	$z_{\text{re}}$	$6.84^{+0.93}_{-0.75}$	$H(0.38)$	$69.8^{+3.3}_{-3.9}$
$\tau$	$0.0488 \pm 0.0084$	$10^9 A_s$	$2.061^{+0.037}_{-0.033}$	$D_{\text{M}}(0.38)$	$1905^{+120}_{-140}$
$\Omega_K$	$-0.057^{+0.029}_{-0.018}$	$10^9 A_s e^{-2\tau}$	$1.870 \pm 0.014$	$H(0.51)$	$77.3^{+3.1}_{-3.7}$
$\ln(10^{10} A_s)$	$3.026^{+0.018}_{-0.016}$	$D_{40}$	$1201 \pm 17$	$D_{\text{M}}(0.51)$	$2435^{+140}_{-160}$
$n_s$	$0.9726 \pm 0.0065$	$D_{220}$	$5740 \pm 43$	$H(0.61)$	$83.4^{+3.0}_{-3.5}$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2528 \pm 14$	$D_{\text{M}}(0.61)$	$2807 \pm 170$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$813.7 \pm 5.1$	$H(2.33)$	$227.6 \pm 3.0$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.4 \pm 2.1$	$D_{\text{M}}(2.33)$	$6468 \pm 220$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$n_{s,0.002}$	$0.9726 \pm 0.0065$	$f\sigma_8(0.15)$	$0.538^{+0.026}_{-0.023}$
$A_{100}^{PS}$	$240 \pm 30$	$Y_P$	$0.24547 \pm 0.00011$	$\sigma_8(0.15)$	$0.690^{+0.024}_{-0.021}$
$A_{143}^{PS}$	$37 \pm 10$	$Y_P^{\text{BBN}}$	$0.24680 \pm 0.00011$	$f\sigma_8(0.38)$	$0.512^{+0.011}_{-0.0078}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.551 \pm 0.049$	$\sigma_8(0.38)$	$0.594^{+0.026}_{-0.023}$
$A^{kSZ}$	$< 4.38$	Age/Gyr	$15.64 \pm 0.61$	$f\sigma_8(0.51)$	$0.4910^{+0.0071}_{-0.0060}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1089.45 \pm 0.48$	$\sigma_8(0.51)$	$0.549^{+0.026}_{-0.024}$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	$r_*$	$144.99 \pm 0.49$	$f\sigma_8(0.61)$	$0.4735^{+0.0073}_{-0.0061}$
$H_0$	$52.1 \pm 4.4$	$100\theta_*$	$1.04147 \pm 0.00050$	$\sigma_8(0.61)$	$0.518 \pm 0.025$
$\Omega_\Lambda$	$0.529^{+0.071}_{-0.051}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.921 \pm 0.045$	$f\sigma_8(2.33)$	$0.257 \pm 0.014$
$\Omega_m$	$0.528^{+0.068}_{-0.099}$	$z_{\text{drag}}$	$1060.18 \pm 0.53$	$\sigma_8(2.33)$	$0.256 \pm 0.016$
$\Omega_m h^2$	$0.1405 \pm 0.0021$	$r_{\text{drag}}$	$147.60 \pm 0.48$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.0732^{+0.0061}_{-0.0070}$	$k_{\text{D}}$	$0.14047 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$29.5 \pm 2.5$
$\sigma_8$	$0.765^{+0.021}_{-0.018}$	$100\theta_{\text{D}}$	$0.16065 \pm 0.00029$	$f_{2000}^{217}$	$104.5 \pm 2.3$
$S_8$	$1.010 \pm 0.062$	$z_{\text{eq}}$	$3342 \pm 51$	$\chi_{\text{small}}^2$	$396.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.553 \pm 0.034$	$k_{\text{eq}}$	$0.01020 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$21.33 \pm 0.67$
$\sigma_8 \Omega_m^{0.25}$	$0.650^{+0.016}_{-0.014}$	$100\theta_{\text{eq}}$	$0.825 \pm 0.010$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8/h^{0.5}$	$1.061^{+0.026}_{-0.022}$	$100\theta_{\text{s,eq}}$	$0.4554 \pm 0.0051$	$\chi_{\text{CMB}}^2$	$4331 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7463.28$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.45$ ;  $\bar{\chi}_{\text{eff}}^2 = 7484.59$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.69$ ;  $R - 1 = 0.03021$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.53 ( $\Delta$  0.01) commander\_dx12\_v3.2\_29: 20.98 ( $\Delta$  0.01) CamSpec like\_10.7HM: 7045.30



16.2 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_omegak\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02257 \pm 0.00027$	$r_{\text{drag}} h$	$77.8^{+5.8}_{-6.6}$	$H(0.15)$	$58.9^{+3.6}_{-4.2}$
$\Omega_c h^2$	$0.1173 \pm 0.0023$	$\langle d^2 \rangle^{1/2}$	$2.679 \pm 0.082$	$D_{\text{M}}(0.15)$	$812^{+55}_{-64}$
$100\theta_{MC}$	$1.04132 \pm 0.00052$	$z_{\text{re}}$	$< 7.53$	$H(0.38)$	$70.3^{+3.2}_{-3.8}$
$\tau$	$0.0532^{+0.0033}_{-0.0069}$	$10^9 A_s$	$2.079^{+0.020}_{-0.029}$	$D_{\text{M}}(0.38)$	$1888^{+120}_{-130}$
$\Omega_K$	$-0.054^{+0.027}_{-0.017}$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.014$	$H(0.51)$	$77.7^{+3.0}_{-3.6}$
$\ln(10^{10} A_s)$	$3.0345^{+0.0097}_{-0.014}$	$D_{40}$	$1202 \pm 17$	$D_{\text{M}}(0.51)$	$2414 \pm 150$
$n_s$	$0.9728 \pm 0.0065$	$D_{220}$	$5739 \pm 43$	$H(0.61)$	$83.8^{+2.9}_{-3.5}$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{810}$	$2528 \pm 14$	$D_{\text{M}}(0.61)$	$2784 \pm 160$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$813.8 \pm 5.1$	$H(2.33)$	$227.8 \pm 3.0$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.4 \pm 2.1$	$D_{\text{M}}(2.33)$	$6439 \pm 220$
$A_{143}^{tSZ}$	$4.8 \pm 2.1$	$n_{s,0.002}$	$0.9728 \pm 0.0065$	$f\sigma_8(0.15)$	$0.536^{+0.026}_{-0.023}$
$A_{100}^{PS}$	$240 \pm 30$	$Y_P$	$0.24547 \pm 0.00011$	$\sigma_8(0.15)$	$0.695^{+0.022}_{-0.020}$
$A_{143}^{PS}$	$37 \pm 9$	$Y_P^{\text{BBN}}$	$0.24680 \pm 0.00011$	$f\sigma_8(0.38)$	$0.513^{+0.011}_{-0.0078}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.551 \pm 0.048$	$\sigma_8(0.38)$	$0.599 \pm 0.023$
$A^{kSZ}$	$< 4.36$	Age/Gyr	$15.56 \pm 0.59$	$f\sigma_8(0.51)$	$0.4926^{+0.0064}_{-0.0057}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$z_*$	$1089.44 \pm 0.48$	$\sigma_8(0.51)$	$0.554 \pm 0.024$
$c_{217}$	$0.9995^{+0.0018}_{-0.0022}$	$r_*$	$145.00 \pm 0.49$	$f\sigma_8(0.61)$	$0.4756 \pm 0.0061$
$H_0$	$52.7 \pm 4.3$	$100\theta_*$	$1.04148 \pm 0.00050$	$\sigma_8(0.61)$	$0.523 \pm 0.024$
$\Omega_\Lambda$	$0.538^{+0.065}_{-0.050}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.922 \pm 0.045$	$f\sigma_8(2.33)$	$0.260 \pm 0.013$
$\Omega_m$	$0.515^{+0.067}_{-0.091}$	$z_{\text{drag}}$	$1060.19 \pm 0.53$	$\sigma_8(2.33)$	$0.259 \pm 0.015$
$\Omega_m h^2$	$0.1405 \pm 0.0021$	$r_{\text{drag}}$	$147.61 \pm 0.48$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.0741^{+0.0060}_{-0.0068}$	$k_{\text{D}}$	$0.14046 \pm 0.00051$	$f_{2000}^{143 \times 217}$	$29.5 \pm 2.5$
$\sigma_8$	$0.770^{+0.019}_{-0.017}$	$100\theta_{\text{D}}$	$0.16065 \pm 0.00029$	$f_{2000}^{217}$	$104.5 \pm 2.3$
$S_8$	$1.004 \pm 0.060$	$z_{\text{eq}}$	$3341 \pm 50$	$\chi_{\text{simall}}^2$	$396.4 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.550 \pm 0.033$	$k_{\text{eq}}$	$0.01020 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$21.33 \pm 0.69$
$\sigma_8 \Omega_m^{0.25}$	$0.650^{+0.016}_{-0.014}$	$100\theta_{\text{eq}}$	$0.8253 \pm 0.0099$	$\chi_{\text{prior}}^2$	$7.1 \pm 3.4$
$\sigma_8/h^{0.5}$	$1.062^{+0.026}_{-0.022}$	$100\theta_{\text{s,eq}}$	$0.4555 \pm 0.0051$	$\chi_{\text{CMB}}^2$	$4331 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7484.13$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.70$ ;  $R - 1 = 0.03650$



### 16.3 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02257 \pm 0.00018$	$r_{\text{drag}} h$	$81.4^{+5.0}_{-6.4}$	$H(0.15)$	$61.3^{+3.1}_{-4.1}$
$\Omega_c h^2$	$0.1180 \pm 0.0015$	$\langle d^2 \rangle^{1/2}$	$2.623^{+0.075}_{-0.067}$	$D_{\text{M}}(0.15)$	$777 \pm 51$
$100\theta_{MC}$	$1.04113 \pm 0.00032$	$z_{\text{re}}$	$6.84^{+0.92}_{-0.73}$	$H(0.38)$	$72.5^{+2.8}_{-3.7}$
$\tau$	$0.0484^{+0.0083}_{-0.0072}$	$10^9 A_s$	$2.063 \pm 0.036$	$D_{\text{M}}(0.38)$	$1815 \pm 100$
$\Omega_K$	$-0.041^{+0.019}_{-0.016}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.012$	$H(0.51)$	$79.7^{+2.6}_{-3.5}$
$\ln(10^{10} A_s)$	$3.027^{+0.017}_{-0.016}$	$D_{40}$	$1206 \pm 14$	$D_{\text{M}}(0.51)$	$2328 \pm 130$
$n_s$	$0.9710 \pm 0.0048$	$D_{220}$	$5740 \pm 40$	$H(0.61)$	$85.8^{+2.5}_{-3.4}$
$y_{\text{cal}}$	$0.99998 \pm 0.0025$	$D_{810}$	$2531 \pm 14$	$D_{\text{M}}(0.61)$	$2689 \pm 140$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$814.9 \pm 4.8$	$H(2.33)$	$229.5^{+2.1}_{-2.5}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.2 \pm 1.7$	$D_{\text{M}}(2.33)$	$6308^{+200}_{-170}$
$A_{143}^{tSZ}$	$4.9 \pm 2.1$	$n_{s,0.002}$	$0.9710 \pm 0.0048$	$f\sigma_8(0.15)$	$0.521^{+0.025}_{-0.020}$
$A_{100}^{PS}$	$239 \pm 30$	$Y_P$	$0.245469 \pm 0.000069$	$\sigma_8(0.15)$	$0.704 \pm 0.018$
$A_{143}^{PS}$	$38 \pm 9$	$Y_P^{\text{BBN}}$	$0.246796 \pm 0.000069$	$f\sigma_8(0.38)$	$0.506^{+0.012}_{-0.0075}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.550 \pm 0.032$	$\sigma_8(0.38)$	$0.610 \pm 0.021$
$A^{kSZ}$	$< 4.10$	Age/Gyr	$15.21^{+0.53}_{-0.47}$	$f\sigma_8(0.51)$	$0.4895^{+0.0065}_{-0.0051}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.50 \pm 0.32$	$\sigma_8(0.51)$	$0.565 \pm 0.021$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$r_*$	$144.80 \pm 0.33$	$f\sigma_8(0.61)$	$0.4748 \pm 0.0052$
$H_0$	$55.2^{+3.4}_{-4.4}$	$100\theta_*$	$1.04130 \pm 0.00032$	$\sigma_8(0.61)$	$0.534 \pm 0.021$
$\Omega_\Lambda$	$0.571^{+0.052}_{-0.045}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.906 \pm 0.030$	$f\sigma_8(2.33)$	$0.266 \pm 0.012$
$\Omega_m$	$0.470^{+0.060}_{-0.070}$	$z_{\text{drag}}$	$1060.25 \pm 0.35$	$\sigma_8(2.33)$	$0.267^{+0.013}_{-0.015}$
$\Omega_m h^2$	$0.1412 \pm 0.0014$	$r_{\text{drag}}$	$147.41 \pm 0.32$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.0780^{+0.0050}_{-0.0065}$	$k_{\text{D}}$	$0.14068 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$29.6 \pm 2.1$
$\sigma_8$	$0.776^{+0.016}_{-0.014}$	$100\theta_{\text{D}}$	$0.16059 \pm 0.00020$	$f_{2000}^{217}$	$104.6 \pm 2.0$
$S_8$	$0.967 \pm 0.052$	$z_{\text{eq}}$	$3359 \pm 33$	$\chi_{\text{small}}^2$	$396.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.530 \pm 0.029$	$k_{\text{eq}}$	$0.01025 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$21.45 \pm 0.64$
$\sigma_8 \Omega_m^{0.25}$	$0.641^{+0.015}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8219 \pm 0.0065$	$\chi_{\text{prior}}^2$	$9.4 \pm 4.3$
$\sigma_8/h^{0.5}$	$1.045^{+0.024}_{-0.019}$	$100\theta_{\text{s,eq}}$	$0.4537 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7350 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11914.02$ ;  $\Delta\chi_{\text{eff}}^2 = 9159.51$ ;  $\bar{\chi}_{\text{eff}}^2 = 11937.16$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.56$ ;  $R - 1 = 0.03285$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.63 ( $\Delta$  0.08) commander\_dx12\_v3.2.29: 21.16 ( $\Delta$  -0.00) CamSpec like\_10.7HM\_1400\_unified: 11495.33



16.4 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02257 \pm 0.00018$	$r_{\text{drag}} h$	$82.5^{+4.8}_{-6.4}$	$H(0.15)$	$61.9^{+3.0}_{-4.1}$
$\Omega_c h^2$	$0.1180 \pm 0.0015$	$\langle d^2 \rangle^{1/2}$	$2.619^{+0.074}_{-0.067}$	$D_{\text{M}}(0.15)$	$768 \pm 48$
$100\theta_{MC}$	$1.04114 \pm 0.00032$	$z_{\text{re}}$	$< 7.51$	$H(0.38)$	$73.0^{+2.7}_{-3.7}$
$\tau$	$0.0526^{+0.0029}_{-0.0067}$	$10^9 A_s$	$2.080^{+0.019}_{-0.029}$	$D_{\text{M}}(0.38)$	$1796 \pm 100$
$\Omega_K$	$-0.037^{+0.018}_{-0.015}$	$10^9 A_s e^{-2\tau}$	$1.873 \pm 0.012$	$H(0.51)$	$80.3^{+2.5}_{-3.5}$
$\ln(10^{10} A_s)$	$3.0351^{+0.0093}_{-0.014}$	$D_{40}$	$1207 \pm 14$	$D_{\text{M}}(0.51)$	$2305 \pm 120$
$n_s$	$0.9711 \pm 0.0048$	$D_{220}$	$5739 \pm 40$	$H(0.61)$	$86.3^{+2.4}_{-3.4}$
$y_{\text{cal}}$	$0.99998 \pm 0.0025$	$D_{810}$	$2531 \pm 14$	$D_{\text{M}}(0.61)$	$2664^{+140}_{-130}$
$A_{217}^{CIB}$	$41 \pm 8$	$D_{1420}$	$815.0 \pm 4.8$	$H(2.33)$	$229.8^{+2.1}_{-2.5}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$232.2 \pm 1.7$	$D_{\text{M}}(2.33)$	$6275^{+200}_{-170}$
$A_{143}^{tSZ}$	$4.9 \pm 2.1$	$n_{s,0.002}$	$0.9711 \pm 0.0048$	$f\sigma_8(0.15)$	$0.518^{+0.024}_{-0.020}$
$A_{100}^{PS}$	$239 \pm 30$	$Y_P$	$0.245469 \pm 0.000068$	$\sigma_8(0.15)$	$0.709 \pm 0.016$
$A_{143}^{PS}$	$38 \pm 9$	$Y_P^{\text{BBN}}$	$0.246796 \pm 0.000069$	$f\sigma_8(0.38)$	$0.506^{+0.012}_{-0.0079}$
$A_{217}^{PS}$	$110^{+10}_{-10}$	$10^5 D/H$	$2.550 \pm 0.032$	$\sigma_8(0.38)$	$0.616 \pm 0.019$
$A^{kSZ}$	$< 4.08$	Age/Gyr	$15.12^{+0.52}_{-0.45}$	$f\sigma_8(0.51)$	$0.4906^{+0.0067}_{-0.0048}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.50 \pm 0.32$	$\sigma_8(0.51)$	$0.571 \pm 0.019$
$c_{217}$	$0.9995^{+0.0019}_{-0.0023}$	$r_*$	$144.81 \pm 0.33$	$f\sigma_8(0.61)$	$0.4765 \pm 0.0046$
$H_0$	$56.0^{+3.3}_{-4.3}$	$100\theta_*$	$1.04130 \pm 0.00032$	$\sigma_8(0.61)$	$0.540 \pm 0.019$
$\Omega_\Lambda$	$0.580^{+0.048}_{-0.042}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.907 \pm 0.030$	$f\sigma_8(2.33)$	$0.269 \pm 0.011$
$\Omega_m$	$0.457^{+0.057}_{-0.065}$	$z_{\text{drag}}$	$1060.24 \pm 0.35$	$\sigma_8(2.33)$	$0.270^{+0.012}_{-0.014}$
$\Omega_m h^2$	$0.1412 \pm 0.0014$	$r_{\text{drag}}$	$147.41 \pm 0.32$	$f_{2000}^{143}$	$26 \pm 3$
$\Omega_m h^3$	$0.0790^{+0.0049}_{-0.0065}$	$k_{\text{D}}$	$0.14067 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$29.6 \pm 2.1$
$\sigma_8$	$0.781 \pm 0.013$	$100\theta_{\text{D}}$	$0.16059 \pm 0.00020$	$f_{2000}^{217}$	$104.6 \pm 2.0$
$S_8$	$0.960 \pm 0.051$	$z_{\text{eq}}$	$3358 \pm 33$	$\chi_{\text{small}}^2$	$396.3 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.526 \pm 0.028$	$k_{\text{eq}}$	$0.01025 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$21.48 \pm 0.67$
$\sigma_8 \Omega_m^{0.25}$	$0.640^{+0.015}_{-0.012}$	$100\theta_{\text{eq}}$	$0.8220 \pm 0.0065$	$\chi_{\text{prior}}^2$	$9.5 \pm 4.3$
$\sigma_8/h^{0.5}$	$1.045^{+0.024}_{-0.020}$	$100\theta_{\text{s,eq}}$	$0.4538 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7350 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11936.68$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9154.46$ ;  $R - 1 = 0.03528$



## 16.5 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00023$	$z_{\text{re}}$	$7.55 \pm 0.82$	$H(0.51)$	$89.96 \pm 0.69$
$\Omega_c h^2$	$0.1197 \pm 0.0022$	$10^9 A_s$	$2.089 \pm 0.035$	$D_{\text{M}}(0.51)$	$1975 \pm 17$
$100\theta_{\text{MC}}$	$1.04090 \pm 0.00049$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.014$	$H(0.61)$	$95.58 \pm 0.72$
$\tau$	$0.0528 \pm 0.0080$	$D_{40}$	$1227 \pm 16$	$D_{\text{M}}(0.61)$	$2299 \pm 19$
$\Omega_K$	$0.0011 \pm 0.0026$	$D_{220}$	$5710 \pm 42$	$H(2.33)$	$236.5 \pm 1.8$
$\ln(10^{10} A_s)$	$3.039 \pm 0.017$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5750 \pm 38$
$n_s$	$0.9652 \pm 0.0060$	$D_{1420}$	$814.8 \pm 5.2$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0085$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.7 \pm 1.9$	$\sigma_8(0.15)$	$0.7484 \pm 0.0094$
$A_{217}^{\text{CIB}}$	$44 \pm 8$	$n_{s,0.002}$	$0.9652 \pm 0.0060$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0075$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24531^{+0.00011}_{-0.000087}$	$\sigma_8(0.38)$	$0.6636 \pm 0.0082$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00011}_{-0.000087}$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0069$
$A_{100}^{\text{PS}}$	$253 \pm 30$	$10^5 D/H$	$2.625 \pm 0.043$	$\sigma_8(0.51)$	$0.6211 \pm 0.0077$
$A_{143}^{\text{PS}}$	$45 \pm 9$	Age/Gyr	$13.763 \pm 0.098$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0065$
$A_{217}^{\text{PS}}$	$108^{+20}_{-10}$	$z_*$	$1090.16 \pm 0.43$	$\sigma_8(0.61)$	$0.5911 \pm 0.0073$
$A^{kSZ}$	$< 5.84$	$r_*$	$144.66 \pm 0.49$	$f\sigma_8(2.33)$	$0.2980 \pm 0.0036$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04111 \pm 0.00048$	$\sigma_8(2.33)$	$0.3075 \pm 0.0040$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.045$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$H_0$	$67.84 \pm 0.69$	$z_{\text{drag}}$	$1059.44 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6890 \pm 0.0077$	$r_{\text{drag}}$	$147.39 \pm 0.48$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3099 \pm 0.0073$	$k_{\text{D}}$	$0.14039 \pm 0.00051$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$\Omega_m h^2$	$0.1426 \pm 0.0021$	$100\theta_{\text{D}}$	$0.16105 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.4$
$\Omega_m h^3$	$0.0967 \pm 0.0018$	$z_{\text{eq}}$	$3391 \pm 49$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.075$
$\sigma_8$	$0.810 \pm 0.010$	$k_{\text{eq}}$	$0.01035 \pm 0.00015$	$\chi_{\text{MGS}}^2$	$1.50 \pm 0.60$
$S_8$	$0.823 \pm 0.017$	$100\theta_{\text{eq}}$	$0.8148 \pm 0.0094$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0090$	$100\theta_{s,\text{eq}}$	$0.4503 \pm 0.0048$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6041 \pm 0.0095$	$H(0.15)$	$73.12 \pm 0.67$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.013$	$D_{\text{M}}(0.15)$	$639.2 \pm 6.1$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$r_{\text{drag}} h$	$99.98 \pm 1.0$	$H(0.38)$	$83.24 \pm 0.67$		
$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.030$	$D_{\text{M}}(0.38)$	$1525 \pm 14$		

Best-fit  $\chi_{\text{eff}}^2 = 7477.49$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.12$ ;  $\bar{\chi}_{\text{eff}}^2 = 7498.13$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.87$ ;  $R - 1 = 0.00836$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  0.00) MGS: 1.41 ( $\Delta$  0.00) DR12BAO: 3.69 ( $\Delta$  0.02) CMB - simall\_100x143.offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  0.02) commander\_dx12\_v3\_2\_29: 23.19 ( $\Delta$  -0.15) CamSpec like\_10.7HM: 7051.07



16.6 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_lensing/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00022$	$z_{\text{re}}$	$7.69 \pm 0.76$	$H(0.51)$	$89.93 \pm 0.69$
$\Omega_c h^2$	$0.1199 \pm 0.0020$	$10^9 A_s$	$2.096 \pm 0.031$	$D_M(0.51)$	$1977 \pm 17$
$100\theta_{MC}$	$1.04089 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.013$	$H(0.61)$	$95.56 \pm 0.72$
$\tau$	$0.0542 \pm 0.0077$	$D_{40}$	$1229 \pm 15$	$D_M(0.61)$	$2300 \pm 19$
$\Omega_K$	$0.0011 \pm 0.0025$	$D_{220}$	$5715 \pm 42$	$H(2.33)$	$236.5 \pm 1.7$
$\ln(10^{10} A_s)$	$3.043 \pm 0.015$	$D_{810}$	$2536 \pm 14$	$D_M(2.33)$	$5751 \pm 38$
$n_s$	$0.9648 \pm 0.0057$	$D_{1420}$	$815.1 \pm 5.1$	$f\sigma_8(0.15)$	$0.4568 \pm 0.0066$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.9$	$\sigma_8(0.15)$	$0.7498 \pm 0.0078$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9648 \pm 0.0057$	$f\sigma_8(0.38)$	$0.4752 \pm 0.0057$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24531^{+0.00010}_{-0.000086}$	$\sigma_8(0.38)$	$0.6648 \pm 0.0070$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000086}$	$f\sigma_8(0.51)$	$0.4739 \pm 0.0052$
$A_{100}^{PS}$	$253^{+27}_{-30}$	$10^5 D/H$	$2.624 \pm 0.042$	$\sigma_8(0.51)$	$0.6222 \pm 0.0066$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.766 \pm 0.097$	$f\sigma_8(0.61)$	$0.4690 \pm 0.0050$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.16 \pm 0.41$	$\sigma_8(0.61)$	$0.5920 \pm 0.0063$
$A^{kSZ}$	$< 5.83$	$r_*$	$144.62 \pm 0.44$	$f\sigma_8(2.33)$	$0.2985 \pm 0.0032$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04109 \pm 0.00047$	$\sigma_8(2.33)$	$0.3079 \pm 0.0036$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.891 \pm 0.041$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$H_0$	$67.77 \pm 0.67$	$z_{\text{drag}}$	$1059.46 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6882 \pm 0.0067$	$r_{\text{drag}}$	$147.35 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3107 \pm 0.0066$	$k_D$	$0.14044 \pm 0.00048$	$\chi_{\text{lensing}}^2$	$9.41 \pm 0.79$
$\Omega_m h^2$	$0.1427 \pm 0.0019$	$100\theta_D$	$0.16104 \pm 0.00026$	$\chi_{\text{simall}}^2$	$346 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0018$	$z_{\text{eq}}$	$3394 \pm 44$	$\chi_{\text{lowl}}^2$	$74 \pm 100$
$\sigma_8$	$0.8113 \pm 0.0084$	$k_{\text{eq}}$	$0.01036 \pm 0.00014$	$\chi_{6\text{DF}}^2$	$0.24 \pm 0.52$
$S_8$	$0.826 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8143 \pm 0.0084$	$\chi_{\text{MGS}}^2$	$1.24 \pm 0.71$
$\sigma_8 \Omega_m^{0.5}$	$0.4522 \pm 0.0070$	$100\theta_{s,\text{eq}}$	$0.4500 \pm 0.0043$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6057 \pm 0.0073$	$H(0.15)$	$73.06 \pm 0.66$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.9856 \pm 0.0097$	$D_M(0.15)$	$639.8 \pm 6.1$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$r_{\text{drag}} h$	$99.86 \pm 0.96$	$H(0.38)$	$83.20 \pm 0.67$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.6$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.022$	$D_M(0.38)$	$1526 \pm 14$		

$$\bar{\chi}_{\text{eff}}^2 = 7507.17; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.03; R - 1 = 0.01378$$



16.7 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_lensing\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00022$	$z_{\text{re}}$	$7.73 \pm 0.76$	$H(0.51)$	$89.96 \pm 0.69$
$\Omega_c h^2$	$0.1197 \pm 0.0020$	$10^9 A_s$	$2.097 \pm 0.031$	$D_{\text{M}}(0.51)$	$1975 \pm 17$
$100\theta_{MC}$	$1.04091 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.013$	$H(0.61)$	$95.58 \pm 0.71$
$\tau$	$0.0546 \pm 0.0077$	$D_{40}$	$1228 \pm 15$	$D_{\text{M}}(0.61)$	$2299 \pm 19$
$\Omega_K$	$0.0011 \pm 0.0025$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$236.4 \pm 1.7$
$\ln(10^{10} A_s)$	$3.043 \pm 0.015$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(2.33)$	$5750 \pm 38$
$n_s$	$0.9652 \pm 0.0056$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0064$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.7497 \pm 0.0078$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9652 \pm 0.0056$	$f\sigma_8(0.38)$	$0.4747 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24531^{+0.00010}_{-0.000085}$	$\sigma_8(0.38)$	$0.6647 \pm 0.0070$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000086}$	$f\sigma_8(0.51)$	$0.4735 \pm 0.0052$
$A_{100}^{PS}$	$253^{+27}_{-30}$	$10^5 D/H$	$2.621 \pm 0.042$	$\sigma_8(0.51)$	$0.6222 \pm 0.0066$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.764 \pm 0.097$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0049$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.13 \pm 0.40$	$\sigma_8(0.61)$	$0.5921 \pm 0.0063$
$A^{kSZ}$	$< 5.79$	$r_*$	$144.65 \pm 0.44$	$f\sigma_8(2.33)$	$0.2986 \pm 0.0032$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04111 \pm 0.00047$	$\sigma_8(2.33)$	$0.3080 \pm 0.0036$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.040$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$67.84 \pm 0.66$	$z_{\text{drag}}$	$1059.48 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6892 \pm 0.0064$	$r_{\text{drag}}$	$147.38 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3098 \pm 0.0063$	$k_{\text{D}}$	$0.14042 \pm 0.00048$	$\chi_{\text{lensing}}^2$	$9.42 \pm 0.81$
$\Omega_m h^2$	$0.1425 \pm 0.0018$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$\chi_{\text{small}}^2$	$346 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0018$	$z_{\text{eq}}$	$3390 \pm 44$	$\chi_{\text{lowl}}^2$	$75 \pm 100$
$\sigma_8$	$0.8111 \pm 0.0084$	$k_{\text{eq}}$	$0.01035 \pm 0.00013$	$\chi_{\text{JLA}}^2$	$1035.07 \pm 0.31$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8150 \pm 0.0084$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.54$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0068$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0043$	$\chi_{\text{MGS}}^2$	$1.29 \pm 0.72$
$\sigma_8 \Omega_m^{0.25}$	$0.6051 \pm 0.0072$	$H(0.15)$	$73.12 \pm 0.65$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9848 \pm 0.0096$	$D_{\text{M}}(0.15)$	$639.2 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$r_{\text{drag}} h$	$99.98 \pm 0.93$	$H(0.38)$	$83.24 \pm 0.67$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.022$	$D_{\text{M}}(0.38)$	$1525 \pm 13$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.5$

$$\bar{\chi}_{\text{eff}}^2 = 8542.21; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.06; R - 1 = 0.01384$$



16.8 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_zre6p5/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00023$	$z_{\text{re}}$	$7.71^{+0.54}_{-0.83}$	$H(0.51)$	$89.95 \pm 0.69$
$\Omega_c h^2$	$0.1197 \pm 0.0022$	$10^9 A_s$	$2.095^{+0.025}_{-0.035}$	$D_{\text{M}}(0.51)$	$1975 \pm 17$
$100\theta_{\text{MC}}$	$1.04091 \pm 0.00049$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.014$	$H(0.61)$	$95.58 \pm 0.72$
$\tau$	$0.0543^{+0.0049}_{-0.0083}$	$D_{40}$	$1226 \pm 16$	$D_{\text{M}}(0.61)$	$2299 \pm 19$
$\Omega_K$	$0.0011 \pm 0.0026$	$D_{220}$	$5710 \pm 42$	$H(2.33)$	$236.4 \pm 1.8$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.016}$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5751 \pm 38$
$n_s$	$0.9654 \pm 0.0060$	$D_{1420}$	$814.8 \pm 5.2$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0085$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.7 \pm 1.9$	$\sigma_8(0.15)$	$0.7493 \pm 0.0091$
$A_{217}^{\text{CIB}}$	$44 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0060$	$f\sigma_8(0.38)$	$0.4745 \pm 0.0074$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24531^{+0.00011}_{-0.000086}$	$\sigma_8(0.38)$	$0.6644 \pm 0.0079$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00011}_{-0.000087}$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0067$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.624 \pm 0.043$	$\sigma_8(0.51)$	$0.6219 \pm 0.0074$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.764 \pm 0.098$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0063$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.15 \pm 0.43$	$\sigma_8(0.61)$	$0.5918 \pm 0.0071$
$A^{kSZ}$	$< 5.83$	$r_*$	$144.67 \pm 0.49$	$f\sigma_8(2.33)$	$0.2984 \pm 0.0035$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04112 \pm 0.00048$	$\sigma_8(2.33)$	$0.3079 \pm 0.0039$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.895 \pm 0.045$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$67.84 \pm 0.69$	$z_{\text{drag}}$	$1059.45 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6892 \pm 0.0077$	$r_{\text{drag}}$	$147.40 \pm 0.49$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3097 \pm 0.0073$	$k_{\text{D}}$	$0.14039 \pm 0.00051$	$\chi_{\text{small}}^2$	$396.9 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0021$	$100\theta_{\text{D}}$	$0.16105 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.4 \pm 1.4$
$\Omega_m h^3$	$0.0967 \pm 0.0018$	$z_{\text{eq}}$	$3390 \pm 50$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.075$
$\sigma_8$	$0.811 \pm 0.010$	$k_{\text{eq}}$	$0.01035 \pm 0.00015$	$\chi_{\text{MGS}}^2$	$1.50 \pm 0.61$
$S_8$	$0.824 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8151 \pm 0.0094$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0090$	$100\theta_{s,\text{eq}}$	$0.4504 \pm 0.0048$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6048 \pm 0.0094$	$H(0.15)$	$73.12 \pm 0.67$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.984 \pm 0.012$	$D_{\text{M}}(0.15)$	$639.2 \pm 6.2$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$r_{\text{drag}} h$	$99.99 \pm 1.0$	$H(0.38)$	$83.24 \pm 0.67$		
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.029$	$D_{\text{M}}(0.38)$	$1525 \pm 14$		

$$\bar{\chi}_{\text{eff}}^2 = 7497.90; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.86; R - 1 = 0.01053$$



16.9 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00022$	$z_{\text{re}}$	$7.79^{+0.59}_{-0.77}$	$H(0.51)$	$89.92 \pm 0.69$
$\Omega_c h^2$	$0.1198 \pm 0.0020$	$10^9 A_s$	$2.100^{+0.024}_{-0.031}$	$D_{\text{M}}(0.51)$	$1977 \pm 17$
$100\theta_{MC}$	$1.04090 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.54 \pm 0.72$
$\tau$	$0.0551^{+0.0055}_{-0.0080}$	$D_{40}$	$1228 \pm 15$	$D_{\text{M}}(0.61)$	$2300 \pm 19$
$\Omega_K$	$0.0010 \pm 0.0025$	$D_{220}$	$5715 \pm 42$	$H(2.33)$	$236.5 \pm 1.7$
$\ln(10^{10} A_s)$	$3.044^{+0.011}_{-0.015}$	$D_{810}$	$2536 \pm 13$	$D_{\text{M}}(2.33)$	$5752 \pm 38$
$n_s$	$0.9650 \pm 0.0056$	$D_{1420}$	$815.0 \pm 5.1$	$f\sigma_8(0.15)$	$0.4569 \pm 0.0066$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.9$	$\sigma_8(0.15)$	$0.7502 \pm 0.0077$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9650 \pm 0.0056$	$f\sigma_8(0.38)$	$0.4754 \pm 0.0057$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24531^{+0.00010}_{-0.000085}$	$\sigma_8(0.38)$	$0.6651 \pm 0.0069$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000086}$	$f\sigma_8(0.51)$	$0.4741 \pm 0.0052$
$A_{100}^{PS}$	$252^{+27}_{-30}$	$10^5 D/H$	$2.623 \pm 0.042$	$\sigma_8(0.51)$	$0.6225 \pm 0.0065$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.768 \pm 0.097$	$f\sigma_8(0.61)$	$0.4692 \pm 0.0049$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.15 \pm 0.40$	$\sigma_8(0.61)$	$0.5924 \pm 0.0062$
$A^{kSZ}$	$< 5.83$	$r_*$	$144.64 \pm 0.44$	$f\sigma_8(2.33)$	$0.2987 \pm 0.0031$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04110 \pm 0.00047$	$\sigma_8(2.33)$	$0.3081 \pm 0.0036$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.040$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$67.77 \pm 0.68$	$z_{\text{drag}}$	$1059.47 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6885 \pm 0.0066$	$r_{\text{drag}}$	$147.37 \pm 0.43$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3105 \pm 0.0065$	$k_{\text{D}}$	$0.14042 \pm 0.00048$	$\chi_{\text{lensing}}^2$	$9.36 \pm 0.74$
$\Omega_m h^2$	$0.1426 \pm 0.0018$	$100\theta_{\text{D}}$	$0.16104 \pm 0.00026$	$\chi_{\text{small}}^2$	$346 \pm 100$
$\Omega_m h^3$	$0.0966 \pm 0.0017$	$z_{\text{eq}}$	$3392 \pm 44$	$\chi_{\text{lowl}}^2$	$74 \pm 100$
$\sigma_8$	$0.8117 \pm 0.0083$	$k_{\text{eq}}$	$0.01035 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.24 \pm 0.52$
$S_8$	$0.826 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8147 \pm 0.0083$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.71$
$\sigma_8 \Omega_m^{0.5}$	$0.4523 \pm 0.0070$	$100\theta_{s,\text{eq}}$	$0.4502 \pm 0.0043$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6059 \pm 0.0073$	$H(0.15)$	$73.06 \pm 0.66$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.9860 \pm 0.0096$	$D_{\text{M}}(0.15)$	$639.8 \pm 6.1$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$r_{\text{drag}} h$	$99.88 \pm 0.96$	$H(0.38)$	$83.19 \pm 0.67$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.6$
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.022$	$D_{\text{M}}(0.38)$	$1526 \pm 14$		

$\bar{\chi}_{\text{eff}}^2 = 7506.97$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6292.02$ ;  $R - 1 = 0.01641$



## 16.10 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18\_zre6p5/base\_omegak\_plikHM\_TT\_lowl\_lowE\_BAO\_post.l

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00022$	$z_{\text{re}}$	$7.82^{+0.60}_{-0.77}$	$H(0.51)$	$89.95 \pm 0.69$
$\Omega_c h^2$	$0.1196 \pm 0.0019$	$10^9 A_s$	$2.100^{+0.024}_{-0.032}$	$D_{\text{M}}(0.51)$	$1975 \pm 17$
$100\theta_{MC}$	$1.04092 \pm 0.00048$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.57 \pm 0.71$
$\tau$	$0.0554^{+0.0056}_{-0.0080}$	$D_{40}$	$1228 \pm 15$	$D_{\text{M}}(0.61)$	$2299 \pm 19$
$\Omega_K$	$0.0010 \pm 0.0025$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$236.4 \pm 1.7$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2536 \pm 13$	$D_{\text{M}}(2.33)$	$5751 \pm 37$
$n_s$	$0.9654 \pm 0.0056$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.4561 \pm 0.0064$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$229.9 \pm 1.9$	$\sigma_8(0.15)$	$0.7500 \pm 0.0077$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0056$	$f\sigma_8(0.38)$	$0.4748 \pm 0.0056$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24532^{+0.00010}_{-0.000085}$	$\sigma_8(0.38)$	$0.6651 \pm 0.0069$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.24664^{+0.00010}_{-0.000085}$	$f\sigma_8(0.51)$	$0.4736 \pm 0.0051$
$A_{100}^{PS}$	$252^{+27}_{-30}$	$10^5 D/H$	$2.620 \pm 0.042$	$\sigma_8(0.51)$	$0.6225 \pm 0.0065$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.766 \pm 0.097$	$f\sigma_8(0.61)$	$0.4688 \pm 0.0049$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.12 \pm 0.40$	$\sigma_8(0.61)$	$0.5924 \pm 0.0062$
$A^{kSZ}$	$< 5.78$	$r_*$	$144.67 \pm 0.43$	$f\sigma_8(2.33)$	$0.2987 \pm 0.0031$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04112 \pm 0.00047$	$\sigma_8(2.33)$	$0.3082 \pm 0.0036$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.896 \pm 0.040$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$H_0$	$67.84 \pm 0.66$	$z_{\text{drag}}$	$1059.49 \pm 0.46$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6894 \pm 0.0064$	$r_{\text{drag}}$	$147.40 \pm 0.43$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3096 \pm 0.0063$	$k_{\text{D}}$	$0.14040 \pm 0.00048$	$\chi_{\text{lensing}}^2$	$9.37 \pm 0.75$
$\Omega_m h^2$	$0.1425 \pm 0.0018$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$\chi_{\text{simall}}^2$	$346 \pm 100$
$\Omega_m h^3$	$0.0966 \pm 0.0017$	$z_{\text{eq}}$	$3389 \pm 44$	$\chi_{\text{lowl}}^2$	$75 \pm 100$
$\sigma_8$	$0.8114 \pm 0.0083$	$k_{\text{eq}}$	$0.01034 \pm 0.00013$	$\chi_{\text{JLA}}^2$	$1035.06 \pm 0.30$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8153 \pm 0.0083$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.54$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0068$	$100\theta_{s,\text{eq}}$	$0.4506 \pm 0.0042$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.72$
$\sigma_8 \Omega_m^{0.25}$	$0.6052 \pm 0.0072$	$H(0.15)$	$73.12 \pm 0.65$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9852 \pm 0.0094$	$D_{\text{M}}(0.15)$	$639.2 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$r_{\text{drag}} h$	$99.99 \pm 0.93$	$H(0.38)$	$83.23 \pm 0.67$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.022$	$D_{\text{M}}(0.38)$	$1525 \pm 13$	$\chi_{\text{BAO}}^2$	$6.0 \pm 1.5$

$$\bar{\chi}_{\text{eff}}^2 = 8542.02; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.05; R - 1 = 0.01706$$



16.11 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00016$	$z_{\text{re}}$	$7.63 \pm 0.80$	$H(0.51)$	$89.96 \pm 0.61$
$\Omega_c h^2$	$0.1195 \pm 0.0015$	$10^9 A_s$	$2.094 \pm 0.034$	$D_M(0.51)$	$1975 \pm 16$
$100\theta_{MC}$	$1.04094 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.58 \pm 0.62$
$\tau$	$0.0540 \pm 0.0079$	$D_{40}$	$1226 \pm 13$	$D_M(0.61)$	$2298 \pm 18$
$\Omega_K$	$0.0007 \pm 0.0020$	$D_{220}$	$5727 \pm 40$	$H(2.33)$	$236.4 \pm 1.2$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5750 \pm 32$
$n_s$	$0.9663 \pm 0.0045$	$D_{1420}$	$816.6 \pm 4.9$	$f\sigma_8(0.15)$	$0.4546 \pm 0.0068$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.6$	$\sigma_8(0.15)$	$0.7479 \pm 0.0079$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9663 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4734 \pm 0.0060$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245387^{+0.000068}_{-0.000057}$	$\sigma_8(0.38)$	$0.6632 \pm 0.0070$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246714^{+0.000068}_{-0.000058}$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0055$
$A_{100}^{PS}$	$250 \pm 30$	$10^5 D/H$	$2.589^{+0.028}_{-0.031}$	$\sigma_8(0.51)$	$0.6208 \pm 0.0066$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763 \pm 0.081$	$f\sigma_8(0.61)$	$0.4674 \pm 0.0052$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.89 \pm 0.29$	$\sigma_8(0.61)$	$0.5907 \pm 0.0064$
$A^{kSZ}$	$< 5.38$	$r_*$	$144.58 \pm 0.33$	$f\sigma_8(2.33)$	$0.2979 \pm 0.0032$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3073 \pm 0.0036$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.887 \pm 0.031$	$f_{2000}^{143}$	$29.7 \pm 2.8$
$H_0$	$67.88 \pm 0.67$	$z_{\text{drag}}$	$1059.86 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\Omega_\Lambda$	$0.6900 \pm 0.0062$	$r_{\text{drag}}$	$147.25 \pm 0.33$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3093 \pm 0.0066$	$k_D$	$0.14068 \pm 0.00036$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0014$	$100\theta_D$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3389 \pm 33$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.075$
$\sigma_8$	$0.8091 \pm 0.0086$	$k_{\text{eq}}$	$0.01034 \pm 0.00010$	$\chi_{\text{MGS}}^2$	$1.47 \pm 0.59$
$S_8$	$0.821 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8157 \pm 0.0062$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4499 \pm 0.0072$	$100\theta_{s,\text{eq}}$	$0.4506 \pm 0.0032$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6034 \pm 0.0075$	$H(0.15)$	$73.15 \pm 0.64$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_M(0.15)$	$638.9 \pm 6.0$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.95 \pm 0.99$	$H(0.38)$	$83.25 \pm 0.62$		
$\langle d^2 \rangle^{1/2}$	$2.428 \pm 0.026$	$D_M(0.38)$	$1524 \pm 13$		

Best-fit  $\chi_{\text{eff}}^2 = 11926.45$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.07$ ;  $\bar{\chi}_{\text{eff}}^2 = 11948.83$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.25$ ;  $R - 1 = 0.01869$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.01 ( $\Delta$  -0.01) MGS: 1.47 ( $\Delta$  0.13) DR12BAO: 3.65 ( $\Delta$  -0.26) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.85 ( $\Delta$  -0.21) commander\_dx12\_v3\_2\_29: 22.88 ( $\Delta$  -0.33) CamSpec like\_10.7HM\_1400\_unified: 11500.78



**16.12**    **base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00016$	$z_{\text{re}}$	$7.76 \pm 0.73$	$H(0.51)$	$89.93 \pm 0.61$
$\Omega_c h^2$	$0.1195 \pm 0.0014$	$10^9 A_s$	$2.100 \pm 0.030$	$D_{\text{M}}(0.51)$	$1976 \pm 16$
$100\theta_{MC}$	$1.04093 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.55 \pm 0.61$
$\tau$	$0.0553 \pm 0.0074$	$D_{40}$	$1228 \pm 13$	$D_{\text{M}}(0.61)$	$2299 \pm 18$
$\Omega_K$	$0.0006 \pm 0.0019$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$236.4 \pm 1.2$
$\ln(10^{10} A_s)$	$3.045 \pm 0.015$	$D_{810}$	$2538 \pm 13$	$D_{\text{M}}(2.33)$	$5751 \pm 32$
$n_s$	$0.9661 \pm 0.0045$	$D_{1420}$	$816.9 \pm 4.8$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0056$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.7490 \pm 0.0069$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9661 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4744 \pm 0.0048$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245389^{+0.000068}_{-0.000057}$	$\sigma_8(0.38)$	$0.6642 \pm 0.0063$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246716^{+0.000068}_{-0.000057}$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0044$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.588^{+0.028}_{-0.031}$	$\sigma_8(0.51)$	$0.6216 \pm 0.0060$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.767 \pm 0.080$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0042$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.29$	$\sigma_8(0.61)$	$0.5916 \pm 0.0058$
$A^{kSZ}$	$< 5.24$	$r_*$	$144.57 \pm 0.31$	$f\sigma_8(2.33)$	$0.2983 \pm 0.0029$
$c_{100}$	$0.9986^{+0.0018}_{-0.0012}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3077 \pm 0.0034$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.886 \pm 0.029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$67.83 \pm 0.66$	$z_{\text{drag}}$	$1059.88^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6895 \pm 0.0058$	$r_{\text{drag}}$	$147.23 \pm 0.31$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3099 \pm 0.0063$	$k_{\text{D}}$	$0.14071 \pm 0.00034$	$\chi_{\text{lensing}}^2$	$9.22 \pm 0.69$
$\Omega_m h^2$	$0.1425 \pm 0.0013$	$100\theta_{\text{D}}$	$0.16079^{+0.00018}_{-0.00020}$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3390 \pm 31$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\sigma_8$	$0.8104 \pm 0.0073$	$k_{\text{eq}}$	$0.010347 \pm 0.000096$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.53$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8155 \pm 0.0060$	$\chi_{\text{MGS}}^2$	$1.22 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0059$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0030$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6046 \pm 0.0061$	$H(0.15)$	$73.10 \pm 0.63$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9841 \pm 0.0086$	$D_{\text{M}}(0.15)$	$639.3 \pm 5.8$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.86 \pm 0.95$	$H(0.38)$	$83.21 \pm 0.61$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.6$
$\langle d^2 \rangle^{1/2}$	$2.434 \pm 0.020$	$D_{\text{M}}(0.38)$	$1525 \pm 13$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.96; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.75; R - 1 = 0.03026$$



16.13 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00016$	$z_{\text{re}}$	$7.79 \pm 0.73$	$H(0.51)$	$89.97 \pm 0.60$
$\Omega_c h^2$	$0.1194 \pm 0.0014$	$10^9 A_s$	$2.101 \pm 0.030$	$D_{\text{M}}(0.51)$	$1974 \pm 16$
$100\theta_{MC}$	$1.04094 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.59 \pm 0.61$
$\tau$	$0.0556 \pm 0.0074$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2298 \pm 18$
$\Omega_K$	$0.0007 \pm 0.0019$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$236.3 \pm 1.2$
$\ln(10^{10} A_s)$	$3.045 \pm 0.014$	$D_{810}$	$2538 \pm 13$	$D_{\text{M}}(2.33)$	$5749 \pm 31$
$n_s$	$0.9663 \pm 0.0045$	$D_{1420}$	$817.0 \pm 4.8$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0054$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.7491 \pm 0.0069$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9663 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245392^{+0.000067}_{-0.000057}$	$\sigma_8(0.38)$	$0.6643 \pm 0.0063$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246719^{+0.000067}_{-0.000057}$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0044$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.587^{+0.028}_{-0.031}$	$\sigma_8(0.51)$	$0.6218 \pm 0.0060$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763 \pm 0.080$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0042$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.87 \pm 0.28$	$\sigma_8(0.61)$	$0.5918 \pm 0.0057$
$A^{kSZ}$	$< 5.22$	$r_*$	$144.58 \pm 0.31$	$f\sigma_8(2.33)$	$0.2984 \pm 0.0029$
$c_{100}$	$0.9986^{+0.0018}_{-0.0011}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3079 \pm 0.0033$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.887 \pm 0.029$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$67.89 \pm 0.64$	$z_{\text{drag}}$	$1059.89 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6903 \pm 0.0056$	$r_{\text{drag}}$	$147.25 \pm 0.31$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3091 \pm 0.0060$	$k_{\text{D}}$	$0.14070 \pm 0.00034$	$\chi_{\text{lensing}}^2$	$9.23 \pm 0.71$
$\Omega_m h^2$	$0.1424 \pm 0.0013$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{simall}}^2$	$344 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3388 \pm 31$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\sigma_8$	$0.8104 \pm 0.0074$	$k_{\text{eq}}$	$0.010342 \pm 0.000095$	$\chi_{\text{JLA}}^2$	$1035.02 \pm 0.26$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8158 \pm 0.0059$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.55$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0058$	$100\theta_{s,\text{eq}}$	$0.4507 \pm 0.0030$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.71$
$\sigma_8 \Omega_m^{0.25}$	$0.6042 \pm 0.0060$	$H(0.15)$	$73.17 \pm 0.62$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9836 \pm 0.0085$	$D_{\text{M}}(0.15)$	$638.7 \pm 5.7$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.97 \pm 0.92$	$H(0.38)$	$83.26 \pm 0.60$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.020$	$D_{\text{M}}(0.38)$	$1524 \pm 13$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.5$

$$\bar{\chi}_{\text{eff}}^2 = 12992.90; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.71; R - 1 = 0.03012$$



16.14 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00016$	$z_{\text{re}}$	$7.76^{+0.59}_{-0.81}$	$H(0.51)$	$89.97 \pm 0.61$
$\Omega_c h^2$	$0.1194 \pm 0.0015$	$10^9 A_s$	$2.099^{+0.026}_{-0.035}$	$D_M(0.51)$	$1975 \pm 16$
$100\theta_{MC}$	$1.04094 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.58 \pm 0.62$
$\tau$	$0.0552^{+0.0054}_{-0.0082}$	$D_{40}$	$1226 \pm 13$	$D_M(0.61)$	$2298 \pm 18$
$\Omega_K$	$0.0007 \pm 0.0020$	$D_{220}$	$5727 \pm 40$	$H(2.33)$	$236.3 \pm 1.2$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.017}$	$D_{810}$	$2536 \pm 14$	$D_M(2.33)$	$5750 \pm 32$
$n_s$	$0.9664 \pm 0.0045$	$D_{1420}$	$816.6 \pm 4.9$	$f\sigma_8(0.15)$	$0.4551 \pm 0.0067$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.6$	$\sigma_8(0.15)$	$0.7487^{+0.0069}_{-0.0077}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9664 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0058$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245388^{+0.000068}_{-0.000057}$	$\sigma_8(0.38)$	$0.6639^{+0.0062}_{-0.0069}$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246715^{+0.000068}_{-0.000058}$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0053$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.588^{+0.028}_{-0.031}$	$\sigma_8(0.51)$	$0.6215^{+0.0058}_{-0.0065}$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763 \pm 0.081$	$f\sigma_8(0.61)$	$0.4679 \pm 0.0050$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.89 \pm 0.29$	$\sigma_8(0.61)$	$0.5914^{+0.0056}_{-0.0062}$
$A^{kSZ}$	$< 5.36$	$r_*$	$144.59 \pm 0.33$	$f\sigma_8(2.33)$	$0.2983^{+0.0028}_{-0.0031}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3077 \pm 0.0034$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.888 \pm 0.031$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$67.89 \pm 0.67$	$z_{\text{drag}}$	$1059.87 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6902 \pm 0.0062$	$r_{\text{drag}}$	$147.26 \pm 0.33$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3092 \pm 0.0066$	$k_D$	$0.14068 \pm 0.00036$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1424 \pm 0.0014$	$100\theta_D$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.1$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3388 \pm 33$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.074$
$\sigma_8$	$0.8100 \pm 0.0081$	$k_{\text{eq}}$	$0.01034 \pm 0.00010$	$\chi_{\text{MGS}}^2$	$1.48 \pm 0.59$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8158 \pm 0.0062$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4504 \pm 0.0070$	$100\theta_{s,\text{eq}}$	$0.4507 \pm 0.0032$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6040 \pm 0.0072$	$H(0.15)$	$73.16 \pm 0.65$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$D_M(0.15)$	$638.8 \pm 6.0$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$r_{\text{drag}} h$	$99.96 \pm 0.99$	$H(0.38)$	$83.26 \pm 0.62$		
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.024$	$D_M(0.38)$	$1524 \pm 13$		

$\bar{\chi}_{\text{eff}}^2 = 11948.57$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.24$ ;  $R - 1 = 0.01907$



## 16.15 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00016$	$z_{\text{re}}$	$7.83^{+0.63}_{-0.74}$	$H(0.51)$	$89.93 \pm 0.61$
$\Omega_c h^2$	$0.1195 \pm 0.0014$	$10^9 A_s$	$2.103^{+0.025}_{-0.031}$	$D_{\text{M}}(0.51)$	$1976 \pm 16$
$100\theta_{MC}$	$1.04093 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.55 \pm 0.61$
$\tau$	$0.0560^{+0.0059}_{-0.0077}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2299 \pm 18$
$\Omega_K$	$0.0006 \pm 0.0019$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$236.4 \pm 1.2$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_{\text{M}}(2.33)$	$5751 \pm 32$
$n_s$	$0.9663 \pm 0.0045$	$D_{1420}$	$816.9 \pm 4.8$	$f\sigma_8(0.15)$	$0.4559 \pm 0.0055$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.7494 \pm 0.0066$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9663 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245390^{+0.000067}_{-0.000057}$	$\sigma_8(0.38)$	$0.6645 \pm 0.0061$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246717^{+0.000067}_{-0.000057}$	$f\sigma_8(0.51)$	$0.4734 \pm 0.0044$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.587^{+0.028}_{-0.031}$	$\sigma_8(0.51)$	$0.6220 \pm 0.0058$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.767 \pm 0.081$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0041$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.88 \pm 0.29$	$\sigma_8(0.61)$	$0.5919 \pm 0.0056$
$A^{kSZ}$	$< 5.23$	$r_*$	$144.57 \pm 0.31$	$f\sigma_8(2.33)$	$0.2985 \pm 0.0028$
$c_{100}$	$0.9986^{+0.0018}_{-0.0011}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3079 \pm 0.0033$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.886 \pm 0.029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$67.84 \pm 0.65$	$z_{\text{drag}}$	$1059.88^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6897 \pm 0.0057$	$r_{\text{drag}}$	$147.24 \pm 0.31$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3097 \pm 0.0062$	$k_{\text{D}}$	$0.14070 \pm 0.00034$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.63$
$\Omega_m h^2$	$0.1425 \pm 0.0013$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3389 \pm 31$	$\chi_{\text{lowl}}^2$	$77 \pm 100$
$\sigma_8$	$0.8108 \pm 0.0071$	$k_{\text{eq}}$	$0.010345 \pm 0.000095$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.53$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8156 \pm 0.0059$	$\chi_{\text{MGS}}^2$	$1.23 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.4512 \pm 0.0059$	$100\theta_{\text{s,eq}}$	$0.4506 \pm 0.0030$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6048 \pm 0.0060$	$H(0.15)$	$73.11 \pm 0.63$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9845 \pm 0.0084$	$D_{\text{M}}(0.15)$	$639.2 \pm 5.8$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$r_{\text{drag}} h$	$99.88 \pm 0.95$	$H(0.38)$	$83.22 \pm 0.61$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.6$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.020$	$D_{\text{M}}(0.38)$	$1525 \pm 13$		

 $\bar{\chi}_{\text{eff}}^2 = 11957.78$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.73$ ;  $R - 1 = 0.03337$



## 16.16 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_Pantheon18\_zre6p5/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00016$	$z_{\text{re}}$	$7.86^{+0.63}_{-0.74}$	$H(0.51)$	$89.98 \pm 0.60$
$\Omega_c h^2$	$0.1194 \pm 0.0014$	$10^9 A_s$	$2.104^{+0.026}_{-0.031}$	$D_{\text{M}}(0.51)$	$1974 \pm 16$
$100\theta_{MC}$	$1.04094 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.59 \pm 0.61$
$\tau$	$0.0562^{+0.0059}_{-0.0077}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2298 \pm 18$
$\Omega_K$	$0.0007 \pm 0.0019$	$D_{220}$	$5731 \pm 39$	$H(2.33)$	$236.3 \pm 1.2$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$D_{810}$	$2538 \pm 13$	$D_{\text{M}}(2.33)$	$5749 \pm 31$
$n_s$	$0.9664 \pm 0.0045$	$D_{1420}$	$817.0 \pm 4.8$	$f\sigma_8(0.15)$	$0.4554 \pm 0.0054$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.7495 \pm 0.0067$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9664 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245393^{+0.000067}_{-0.000057}$	$\sigma_8(0.38)$	$0.6647 \pm 0.0061$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246719^{+0.000067}_{-0.000057}$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0043$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.586 \pm 0.030$	$\sigma_8(0.51)$	$0.6221 \pm 0.0058$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763 \pm 0.080$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0041$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.87 \pm 0.28$	$\sigma_8(0.61)$	$0.5921 \pm 0.0056$
$A^{kSZ}$	$< 5.22$	$r_*$	$144.59 \pm 0.31$	$f\sigma_8(2.33)$	$0.2986 \pm 0.0028$
$c_{100}$	$0.9986^{+0.0018}_{-0.0011}$	$100\theta_*$	$1.04113 \pm 0.00031$	$\sigma_8(2.33)$	$0.3081 \pm 0.0032$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.888 \pm 0.029$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$67.90 \pm 0.64$	$z_{\text{drag}}$	$1059.89^{+0.34}_{-0.31}$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6904 \pm 0.0055$	$r_{\text{drag}}$	$147.25 \pm 0.31$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\Omega_m$	$0.3089 \pm 0.0060$	$k_{\text{D}}$	$0.14069 \pm 0.00034$	$\chi_{\text{lensing}}^2$	$9.19 \pm 0.65$
$\Omega_m h^2$	$0.1424 \pm 0.0013$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{small}}^2$	$344 \pm 100$
$\Omega_m h^3$	$0.0967 \pm 0.0014$	$z_{\text{eq}}$	$3388 \pm 31$	$\chi_{\text{lowl}}^2$	$76 \pm 100$
$\sigma_8$	$0.8108 \pm 0.0071$	$k_{\text{eq}}$	$0.010340 \pm 0.000095$	$\chi_{\text{JLA}}^2$	$1035.02 \pm 0.26$
$S_8$	$0.823 \pm 0.010$	$100\theta_{\text{eq}}$	$0.8160 \pm 0.0059$	$\chi_{6\text{DF}}^2$	$0.25 \pm 0.55$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0057$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0030$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.72$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0059$	$H(0.15)$	$73.17 \pm 0.62$	$\chi_{\text{DR12BAO}}^2$	$4.5 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9840 \pm 0.0083$	$D_{\text{M}}(0.15)$	$638.7 \pm 5.7$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$r_{\text{drag}} h$	$99.99 \pm 0.92$	$H(0.38)$	$83.27 \pm 0.60$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.020$	$D_{\text{M}}(0.38)$	$1524 \pm 13$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.4$

$$\bar{\chi}_{\text{eff}}^2 = 12992.73; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.67; R - 1 = 0.03308$$



16.17 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_lensing/base\_omegak\_plikHM\_TT\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00024$	$\langle d^2 \rangle^{1/2}$	$2.473 \pm 0.030$	$H(0.38)$	$79.1 \pm 2.2$
$\Omega_c h^2$	$0.1178 \pm 0.0022$	$z_{\text{re}}$	$7.07^{+0.89}_{-0.74}$	$D_{\text{M}}(0.38)$	$1621 \pm 53$
$100\theta_{MC}$	$1.04115 \pm 0.00049$	$10^9 A_s$	$2.063 \pm 0.035$	$H(0.51)$	$86.0 \pm 2.1$
$\tau$	$0.0494 \pm 0.0083$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.014$	$D_{\text{M}}(0.51)$	$2093 \pm 65$
$\Omega_K$	$-0.0117^{+0.0082}_{-0.0069}$	$D_{40}$	$1211 \pm 17$	$H(0.61)$	$91.7 \pm 2.1$
$\ln(10^{10} A_s)$	$3.027 \pm 0.017$	$D_{220}$	$5719 \pm 42$	$D_{\text{M}}(0.61)$	$2431 \pm 73$
$n_s$	$0.9699 \pm 0.0063$	$D_{810}$	$2530 \pm 14$	$H(2.33)$	$232.7 \pm 2.5$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$814.2 \pm 5.1$	$D_{\text{M}}(2.33)$	$5957 \pm 120$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.3 \pm 1.8$	$f\sigma_8(0.15)$	$0.472 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9699 \pm 0.0063$	$\sigma_8(0.15)$	$0.728 \pm 0.014$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.24538^{+0.00010}_{-0.000088}$	$f\sigma_8(0.38)$	$0.4813 \pm 0.0062$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.24670^{+0.00010}_{-0.000088}$	$\sigma_8(0.38)$	$0.641 \pm 0.014$
$A_{143}^{PS}$	$43 \pm 9$	$10^5 D/H$	$2.593 \pm 0.045$	$f\sigma_8(0.51)$	$0.4755 \pm 0.0050$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$14.29 \pm 0.30$	$\sigma_8(0.51)$	$0.598 \pm 0.014$
$A^{kSZ}$	$< 5.64$	$z_*$	$1089.77 \pm 0.45$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0048$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$r_*$	$145.05 \pm 0.48$	$\sigma_8(0.61)$	$0.568 \pm 0.014$
$c_{217}$	$0.9997^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04134 \pm 0.00048$	$f\sigma_8(2.33)$	$0.2853 \pm 0.0076$
$H_0$	$63.3 \pm 2.4$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.929 \pm 0.044$	$\sigma_8(2.33)$	$0.2913 \pm 0.0093$
$\Omega_\Lambda$	$0.659 \pm 0.018$	$z_{\text{drag}}$	$1059.69 \pm 0.48$	$f_{2000}^{143}$	$29.8 \pm 3.1$
$\Omega_m$	$0.353^{+0.023}_{-0.026}$	$r_{\text{drag}}$	$147.73 \pm 0.47$	$f_{2000}^{143 \times 217}$	$32.3 \pm 2.2$
$\Omega_m h^2$	$0.1407 \pm 0.0021$	$k_{\text{D}}$	$0.14016 \pm 0.00049$	$f_{2000}^{217}$	$106.9 \pm 2.1$
$\Omega_m h^3$	$0.0891 \pm 0.0042$	$100\theta_{\text{D}}$	$0.16092 \pm 0.00027$	$\chi_{\text{lensing}}^2$	$10.4 \pm 2.2$
$\sigma_8$	$0.792 \pm 0.013$	$z_{\text{eq}}$	$3348 \pm 49$	$\chi_{\text{simall}}^2$	$396.7 \pm 1.5$
$S_8$	$0.858 \pm 0.022$	$k_{\text{eq}}$	$0.01022 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$21.9 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.470 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8234 \pm 0.0096$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6099 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4547 \pm 0.0049$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$\sigma_8/h^{0.5}$	$0.996 \pm 0.011$	$H(0.15)$	$68.7 \pm 2.3$		
$r_{\text{drag}} h$	$93.5 \pm 3.4$	$D_{\text{M}}(0.15)$	$683 \pm 25$		

Best-fit  $\chi_{\text{eff}}^2 = 7478.30$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.08$ ;  $\bar{\chi}_{\text{eff}}^2 = 7499.29$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.15$ ;  $R - 1 = 0.01550$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 9.19 ( $\Delta$  -0.25) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.64 ( $\Delta$  -0.03) commander\_dx12\_v3\_2\_29: 21.85 ( $\Delta$  0.04) CamSpec like\_10.7HM: 7049.24



16.18 base\_omegak\_CamSpecHM\_TT\_lowl\_lowE\_lensing\_post\_zre6p5/base\_omegak\_plikHM\_TT\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00024$	$\langle d^2 \rangle^{1/2}$	$2.473 \pm 0.030$	$H(0.38)$	$79.4 \pm 2.1$
$\Omega_c h^2$	$0.1177 \pm 0.0022$	$z_{\text{re}}$	$7.42^{+0.31}_{-0.83}$	$D_{\text{M}}(0.38)$	$1612 \pm 51$
$100\theta_{MC}$	$1.04117 \pm 0.00049$	$10^9 A_s$	$2.076^{+0.020}_{-0.031}$	$H(0.51)$	$86.3 \pm 2.1$
$\tau$	$0.0526^{+0.0035}_{-0.0074}$	$10^9 A_s e^{-2\tau}$	$1.869 \pm 0.014$	$D_{\text{M}}(0.51)$	$2083 \pm 63$
$\Omega_K$	$-0.0108^{+0.0080}_{-0.0066}$	$D_{40}$	$1211 \pm 17$	$H(0.61)$	$92.0 \pm 2.1$
$\ln(10^{10} A_s)$	$3.033^{+0.010}_{-0.015}$	$D_{220}$	$5718 \pm 42$	$D_{\text{M}}(0.61)$	$2420 \pm 70$
$n_s$	$0.9702 \pm 0.0063$	$D_{810}$	$2529 \pm 14$	$H(2.33)$	$232.8 \pm 2.5$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$814.3 \pm 5.1$	$D_{\text{M}}(2.33)$	$5942 \pm 110$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$230.3 \pm 1.9$	$f\sigma_8(0.15)$	$0.471 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9702 \pm 0.0063$	$\sigma_8(0.15)$	$0.731 \pm 0.013$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.24538^{+0.00010}_{-0.000090}$	$f\sigma_8(0.38)$	$0.4812 \pm 0.0063$
$A_{100}^{PS}$	$250 \pm 30$	$Y_P^{\text{BBN}}$	$0.24671^{+0.00010}_{-0.000090}$	$\sigma_8(0.38)$	$0.644 \pm 0.013$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.591 \pm 0.045$	$f\sigma_8(0.51)$	$0.4759 \pm 0.0050$
$A_{217}^{PS}$	$107^{+20}_{-10}$	Age/Gyr	$14.25 \pm 0.29$	$\sigma_8(0.51)$	$0.601 \pm 0.013$
$A^{kSZ}$	$< 5.60$	$z_*$	$1089.75 \pm 0.45$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0046$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$145.06 \pm 0.48$	$\sigma_8(0.61)$	$0.571 \pm 0.013$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04136 \pm 0.00048$	$f\sigma_8(2.33)$	$0.2869 \pm 0.0070$
$H_0$	$63.7 \pm 2.3$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.930 \pm 0.044$	$\sigma_8(2.33)$	$0.2932 \pm 0.0088$
$\Omega_\Lambda$	$0.663 \pm 0.017$	$z_{\text{drag}}$	$1059.70 \pm 0.48$	$f_{2000}^{143}$	$29.7 \pm 3.1$
$\Omega_m$	$0.348 \pm 0.023$	$r_{\text{drag}}$	$147.75 \pm 0.47$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.2$
$\Omega_m h^2$	$0.1406 \pm 0.0020$	$k_{\text{D}}$	$0.14015 \pm 0.00049$	$f_{2000}^{217}$	$106.8 \pm 2.1$
$\Omega_m h^3$	$0.0896 \pm 0.0041$	$100\theta_{\text{D}}$	$0.16091 \pm 0.00027$	$\chi^2_{\text{lensing}}$	$10.3 \pm 2.2$
$\sigma_8$	$0.795 \pm 0.012$	$z_{\text{eq}}$	$3345 \pm 49$	$\chi^2_{\text{simall}}$	$396.4 \pm 1.2$
$S_8$	$0.855 \pm 0.021$	$k_{\text{eq}}$	$0.01021 \pm 0.00015$	$\chi^2_{\text{lowl}}$	$21.9 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.468 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8238 \pm 0.0096$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6100 \pm 0.0075$	$100\theta_{\text{s,eq}}$	$0.4549 \pm 0.0049$	$\chi^2_{\text{CMB}}$	$4345 \pm 3000$
$\sigma_8/h^{0.5}$	$0.996 \pm 0.011$	$H(0.15)$	$69.1 \pm 2.3$		
$r_{\text{drag}} h$	$94.1 \pm 3.3$	$D_{\text{M}}(0.15)$	$679 \pm 23$		

$\bar{\chi}^2_{\text{eff}} = 7498.95$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6292.24$ ;  $R - 1 = 0.01796$



16.19 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00017$	$\langle d^2 \rangle^{1/2}$	$2.474 \pm 0.028$	$H(0.38)$	$79.4 \pm 2.0$
$\Omega_c h^2$	$0.1183 \pm 0.0015$	$z_{\text{re}}$	$7.05^{+0.90}_{-0.72}$	$D_{\text{M}}(0.38)$	$1614 \pm 48$
$100\theta_{MC}$	$1.04104 \pm 0.00032$	$10^9 A_s$	$2.066 \pm 0.035$	$H(0.51)$	$86.3 \pm 1.9$
$\tau$	$0.0493^{+0.0082}_{-0.0073}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$D_{\text{M}}(0.51)$	$2084 \pm 59$
$\Omega_K$	$-0.0106^{+0.0070}_{-0.0060}$	$D_{40}$	$1214 \pm 14$	$H(0.61)$	$92.0 \pm 1.9$
$\ln(10^{10} A_s)$	$3.028^{+0.017}_{-0.015}$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2421 \pm 66$
$n_s$	$0.9691 \pm 0.0048$	$D_{810}$	$2532 \pm 13$	$H(2.33)$	$233.4 \pm 1.9$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$815.5 \pm 4.8$	$D_{\text{M}}(2.33)$	$5937 \pm 100$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.9 \pm 1.6$	$f\sigma_8(0.15)$	$0.4722 \pm 0.0099$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9691 \pm 0.0048$	$\sigma_8(0.15)$	$0.730 \pm 0.012$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245425 \pm 0.000064$	$f\sigma_8(0.38)$	$0.4821^{+0.0061}_{-0.0054}$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.246751 \pm 0.000065$	$\sigma_8(0.38)$	$0.643 \pm 0.013$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.571 \pm 0.031$	$f\sigma_8(0.51)$	$0.4764 \pm 0.0044$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$14.24 \pm 0.26$	$\sigma_8(0.51)$	$0.600 \pm 0.013$
$A^{kSZ}$	$< 5.20$	$z_*$	$1089.67 \pm 0.30$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0040$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$r_*$	$144.80 \pm 0.33$	$\sigma_8(0.61)$	$0.570 \pm 0.013$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04122 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2863 \pm 0.0069$
$H_0$	$63.6 \pm 2.2$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.907 \pm 0.031$	$\sigma_8(2.33)$	$0.2925 \pm 0.0085$
$\Omega_\Lambda$	$0.659 \pm 0.018$	$z_{\text{drag}}$	$1060.00 \pm 0.34$	$f_{2000}^{143}$	$28.8 \pm 2.8$
$\Omega_m$	$0.351 \pm 0.024$	$r_{\text{drag}}$	$147.44 \pm 0.33$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.0$
$\Omega_m h^2$	$0.1414 \pm 0.0014$	$k_{\text{D}}$	$0.14056 \pm 0.00035$	$f_{2000}^{217}$	$106.2 \pm 1.9$
$\Omega_m h^3$	$0.0899 \pm 0.0036$	$100\theta_{\text{D}}$	$0.16072 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$10.5 \pm 2.2$
$\sigma_8$	$0.794 \pm 0.011$	$z_{\text{eq}}$	$3365 \pm 33$	$\chi_{\text{small}}^2$	$396.7 \pm 1.5$
$S_8$	$0.859 \pm 0.021$	$k_{\text{eq}}$	$0.01027 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.04 \pm 0.97$
$\sigma_8 \Omega_m^{0.5}$	$0.470 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8205 \pm 0.0064$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6111 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4531 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7365 \pm 5000$
$\sigma_8/h^{0.5}$	$0.996 \pm 0.010$	$H(0.15)$	$69.0 \pm 2.1$		
$r_{\text{drag}} h$	$93.7 \pm 3.2$	$D_{\text{M}}(0.15)$	$680 \pm 22$		

Best-fit  $\chi_{\text{eff}}^2 = 11927.06$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.66$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.70$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.00$ ;  $R - 1 = 0.01965$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb.consext8: 9.39 ( $\Delta$  -0.39) small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.63 ( $\Delta$  -0.01) commander\_dx12\_v3\_2\_29: 21.83 ( $\Delta$  -0.01) CamSpec like\_10.7HM\_1400\_unified: 11498.26



16.20 base\_omegak\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_omegak\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02245 \pm 0.00017$	$\langle d^2 \rangle^{1/2}$	$2.474 \pm 0.028$	$H(0.38)$	$79.8 \pm 1.9$
$\Omega_c h^2$	$0.1183 \pm 0.0015$	$z_{\text{re}}$	$7.41^{+0.28}_{-0.86}$	$D_{\text{M}}(0.38)$	$1604 \pm 45$
$100\theta_{MC}$	$1.04104 \pm 0.00032$	$10^9 A_s$	$2.080^{+0.020}_{-0.031}$	$H(0.51)$	$86.6 \pm 1.8$
$\tau$	$0.0526^{+0.0033}_{-0.0074}$	$10^9 A_s e^{-2\tau}$	$1.872 \pm 0.012$	$D_{\text{M}}(0.51)$	$2073 \pm 55$
$\Omega_K$	$-0.0095^{+0.0066}_{-0.0057}$	$D_{40}$	$1215 \pm 14$	$H(0.61)$	$92.4 \pm 1.8$
$\ln(10^{10} A_s)$	$3.035^{+0.010}_{-0.015}$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2408 \pm 62$
$n_s$	$0.9693 \pm 0.0048$	$D_{810}$	$2532 \pm 13$	$H(2.33)$	$233.6 \pm 1.9$
$y_{\text{cal}}$	$1.0000 \pm 0.0025$	$D_{1420}$	$815.6 \pm 4.8$	$D_{\text{M}}(2.33)$	$5919 \pm 96$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.9 \pm 1.6$	$f\sigma_8(0.15)$	$0.4711 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9693 \pm 0.0048$	$\sigma_8(0.15)$	$0.734^{+0.010}_{-0.011}$
$A_{143}^{tSZ}$	$4.8^{+2.4}_{-2.2}$	$Y_P$	$0.245426 \pm 0.000065$	$f\sigma_8(0.38)$	$0.4821^{+0.0061}_{-0.0055}$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P^{\text{BBN}}$	$0.246752 \pm 0.000065$	$\sigma_8(0.38)$	$0.647^{+0.011}_{-0.012}$
$A_{143}^{PS}$	$41 \pm 9$	$10^5 D/H$	$2.571 \pm 0.031$	$f\sigma_8(0.51)$	$0.4769 \pm 0.0043$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$14.19 \pm 0.24$	$\sigma_8(0.51)$	$0.604 \pm 0.011$
$A^{kSZ}$	$< 5.17$	$z_*$	$1089.67 \pm 0.30$	$f\sigma_8(0.61)$	$0.4695 \pm 0.0038$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$r_*$	$144.81 \pm 0.33$	$\sigma_8(0.61)$	$0.573 \pm 0.011$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04122 \pm 0.00032$	$f\sigma_8(2.33)$	$0.2882 \pm 0.0061$
$H_0$	$64.0 \pm 2.1$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.908 \pm 0.031$	$\sigma_8(2.33)$	$0.2946^{+0.0073}_{-0.0082}$
$\Omega_\Lambda$	$0.663 \pm 0.016$	$z_{\text{drag}}$	$1060.01 \pm 0.34$	$f_{2000}^{143}$	$28.7 \pm 2.9$
$\Omega_m$	$0.346 \pm 0.021$	$r_{\text{drag}}$	$147.45 \pm 0.33$	$f_{2000}^{143 \times 217}$	$31.4 \pm 2.0$
$\Omega_m h^2$	$0.1414 \pm 0.0014$	$k_{\text{D}}$	$0.14055 \pm 0.00035$	$f_{2000}^{217}$	$106.2 \pm 1.9$
$\Omega_m h^3$	$0.0905 \pm 0.0035$	$100\theta_{\text{D}}$	$0.16072 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$10.5 \pm 2.2$
$\sigma_8$	$0.7974^{+0.0091}_{-0.010}$	$z_{\text{eq}}$	$3364 \pm 34$	$\chi_{\text{small}}^2$	$396.4 \pm 1.2$
$S_8$	$0.856 \pm 0.020$	$k_{\text{eq}}$	$0.01027 \pm 0.00010$	$\chi_{\text{lowl}}^2$	$22.10 \pm 0.99$
$\sigma_8 \Omega_m^{0.5}$	$0.469 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8206 \pm 0.0065$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6114 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4531 \pm 0.0033$	$\chi_{\text{CMB}}^2$	$7364 \pm 5000$
$\sigma_8/h^{0.5}$	$0.997 \pm 0.010$	$H(0.15)$	$69.4 \pm 2.0$		
$r_{\text{drag}} h$	$94.4^{+2.9}_{-3.2}$	$D_{\text{M}}(0.15)$	$676 \pm 21$		

$\bar{\chi}_{\text{eff}}^2 = 11949.31$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.04$ ;  $R - 1 = 0.03090$



# 17 r

## 17.1 base\_r\_CamSpecHM\_TT\_lowl\_lowE/base\_r\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00022$	$z_{\text{re}}$	$7.46 \pm 0.82$	$H(0.51)$	$89.41 \pm 0.45$
$\Omega_c h^2$	$0.1202 \pm 0.0021$	$10^9 A_s$	$2.087 \pm 0.034$	$D_M(0.51)$	$1993 \pm 19$
$100\theta_{MC}$	$1.04084 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.014$	$H(0.61)$	$95.07 \pm 0.36$
$\tau$	$0.0519 \pm 0.0080$	$D_{40}$	$1242^{+17}_{-19}$	$D_M(0.61)$	$2318 \pm 20$
$\ln(10^{10} A_s)$	$3.038 \pm 0.016$	$D_{220}$	$5705 \pm 42$	$H(2.33)$	$236.5 \pm 1.3$
$n_s$	$0.9646 \pm 0.0058$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5775 \pm 17$
$r$	$< 0.0483$	$D_{1420}$	$814.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.461 \pm 0.012$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.7 \pm 1.8$	$\sigma_8(0.15)$	$0.7480 \pm 0.0076$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9646 \pm 0.0058$	$f\sigma_8(0.38)$	$0.4778 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24529^{+0.00010}_{-0.000087}$	$\sigma_8(0.38)$	$0.6623 \pm 0.0061$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.24662^{+0.00010}_{-0.000088}$	$f\sigma_8(0.51)$	$0.4756 \pm 0.0083$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.631 \pm 0.042$	$\sigma_8(0.51)$	$0.6195 \pm 0.0055$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.824 \pm 0.037$	$f\sigma_8(0.61)$	$0.4701 \pm 0.0074$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.24 \pm 0.41$	$\sigma_8(0.61)$	$0.5893 \pm 0.0052$
$A^{kSZ}$	$< 5.63$	$r_*$	$144.55 \pm 0.48$	$f\sigma_8(2.33)$	$0.2969 \pm 0.0025$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04105 \pm 0.00047$	$\sigma_8(2.33)$	$0.3058 \pm 0.0027$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.885 \pm 0.045$	$r_{0.002}$	$< 0.0440$
$H_0$	$67.06 \pm 0.94$	$z_{\text{drag}}$	$1059.40 \pm 0.46$	$r_{0.01}$	$< 0.0461$
$\Omega_\Lambda$	$0.682 \pm 0.013$	$r_{\text{drag}}$	$147.30 \pm 0.48$	$\ln(10^{10} A_t)$	$-0.69^{+1.4}_{-0.60}$
$\Omega_m$	$0.318 \pm 0.013$	$k_D$	$0.14047 \pm 0.00052$	$r_{L=10}$	$< 0.0226$
$\Omega_m h^2$	$0.1430 \pm 0.0020$	$100\theta_D$	$0.16107 \pm 0.00026$	$10^9 A_t$	$< 0.101$
$\Omega_m h^3$	$0.09589 \pm 0.00045$	$z_{\text{eq}}$	$3402 \pm 48$	$10^9 A_t e^{-2\tau}$	$< 0.0908$
$\sigma_8$	$0.8102 \pm 0.0091$	$k_{\text{eq}}$	$0.01038 \pm 0.00015$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$S_8$	$0.834 \pm 0.024$	$100\theta_{\text{eq}}$	$0.8127 \pm 0.0090$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4493 \pm 0.0046$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\sigma_8 \Omega_m^{0.25}$	$0.608 \pm 0.012$	$H(0.15)$	$72.41 \pm 0.80$	$\chi_{\text{small}}^2$	$397.1 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.016$	$D_M(0.15)$	$646.1 \pm 8.1$	$\chi_{\text{lowl}}^2$	$24.8 \pm 1.8$
$r_{\text{drag}} h$	$98.8 \pm 1.6$	$H(0.38)$	$82.63 \pm 0.58$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.039$	$D_M(0.38)$	$1539 \pm 16$	$\chi_{\text{CMB}}^2$	$4340 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7471.85$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.24$ ;  $\bar{\chi}_{\text{eff}}^2 = 7493.09$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.06$ ;  $R - 1 = 0.00732$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  -0.15) commander\_dx12\_v3\_2\_29: 23.22 ( $\Delta$  -0.39) CamSpec like\_10.7HM: 7050.52



## 17.2 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_r\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.012$	$H(2.33)$	$235.64 \pm 0.79$
$\Omega_c h^2$	$0.1188 \pm 0.0012$	$D_{40}$	$1236^{+15}_{-19}$	$D_M(2.33)$	$5766 \pm 12$
$100\theta_{MC}$	$1.04103 \pm 0.00042$	$D_{220}$	$5711 \pm 42$	$f\sigma_8(0.15)$	$0.4531 \pm 0.0077$
$\tau$	$0.0533 \pm 0.0079$	$D_{810}$	$2534 \pm 14$	$\sigma_8(0.15)$	$0.7452 \pm 0.0069$
$\ln(10^{10} A_s)$	$3.038 \pm 0.017$	$D_{1420}$	$815.5 \pm 5.1$	$f\sigma_8(0.38)$	$0.4718 \pm 0.0065$
$n_s$	$0.9678 \pm 0.0043$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.38)$	$0.6608 \pm 0.0059$
$r$	$< 0.0518$	$n_{s,0.002}$	$0.9678 \pm 0.0043$	$f\sigma_8(0.51)$	$0.4707 \pm 0.0059$
$y_{cal}$	$1.0005 \pm 0.0025$	$Y_P$	$0.245330^{+0.000088}_{-0.000076}$	$\sigma_8(0.51)$	$0.6185 \pm 0.0054$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P^{BBN}$	$0.246656^{+0.000088}_{-0.000076}$	$f\sigma_8(0.61)$	$0.4659 \pm 0.0054$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.615 \pm 0.037$	$\sigma_8(0.61)$	$0.5885 \pm 0.0051$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	Age/Gyr	$13.805 \pm 0.028$	$f\sigma_8(2.33)$	$0.2968 \pm 0.0026$
$A_{100}^{PS}$	$251 \pm 30$	$z_*$	$1090.01 \pm 0.30$	$\sigma_8(2.33)$	$0.3061 \pm 0.0026$
$A_{143}^{PS}$	$44 \pm 9$	$r_*$	$144.86 \pm 0.32$	$r_{0.002}$	$< 0.0477$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$100\theta_*$	$1.04123 \pm 0.00041$	$r_{0.01}$	$< 0.0497$
$A^{kSZ}$	$< 5.61$	$D_M(z_*)/\text{Gpc}$	$13.912 \pm 0.031$	$\ln(10^{10} A_t)$	$-0.62^{+1.4}_{-0.59}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$z_{drag}$	$1059.49 \pm 0.45$	$r_{L=10}$	$< 0.0244$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$r_{drag}$	$147.58 \pm 0.35$	$10^9 A_t$	$< 0.108$
$H_0$	$67.68 \pm 0.55$	$k_D$	$0.14024 \pm 0.00045$	$10^9 A_t e^{-2\tau}$	$< 0.0971$
$\Omega_\Lambda$	$0.6907 \pm 0.0073$	$100\theta_D$	$0.16103 \pm 0.00026$	$f_{2000}^{143}$	$30.5 \pm 3.0$
$\Omega_m$	$0.3093 \pm 0.0073$	$z_{eq}$	$3370 \pm 29$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m h^2$	$0.1417 \pm 0.0012$	$k_{eq}$	$0.010286 \pm 0.000088$	$f_{2000}^{217}$	$107.5 \pm 2.0$
$\Omega_m h^3$	$0.09589 \pm 0.00046$	$100\theta_{eq}$	$0.8188 \pm 0.0053$	$\chi_{small}^2$	$397.2 \pm 1.7$
$\sigma_8$	$0.8062 \pm 0.0078$	$100\theta_{s,eq}$	$0.4523 \pm 0.0028$	$\chi_{lowl}^2$	$24.2 \pm 1.6$
$S_8$	$0.819 \pm 0.015$	$H(0.15)$	$72.94 \pm 0.47$	$\chi_{6DF}^2$	$0.052 \pm 0.070$
$\sigma_8 \Omega_m^{0.5}$	$0.4484 \pm 0.0082$	$D_M(0.15)$	$640.7 \pm 4.7$	$\chi_{MGS}^2$	$1.42 \pm 0.53$
$\sigma_8 \Omega_m^{0.25}$	$0.6012 \pm 0.0080$	$H(0.38)$	$83.00 \pm 0.35$	$\chi_{DR12BAO}^2$	$4.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.980 \pm 0.012$	$D_M(0.38)$	$1528.5 \pm 9.4$	$\chi_{prior}^2$	$7.5 \pm 3.6$
$r_{drag} h$	$99.89 \pm 0.94$	$H(0.51)$	$89.69 \pm 0.29$	$\chi_{BAO}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.421 \pm 0.028$	$D_M(0.51)$	$1980 \pm 11$	$\chi_{CMB}^2$	$4340 \pm 3000$
$z_{re}$	$7.57 \pm 0.81$	$H(0.61)$	$95.29 \pm 0.25$		
$10^9 A_s$	$2.086 \pm 0.034$	$D_M(0.61)$	$2305 \pm 12$		

$$\bar{\chi}_{\text{eff}}^2 = 7499.09; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.80; R - 1 = 0.01122$$



### 17.3 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02214 \pm 0.00022$	$z_{\text{re}}$	$7.65^{+0.51}_{-0.83}$	$H(0.51)$	$89.43 \pm 0.45$
$\Omega_c h^2$	$0.1201 \pm 0.0021$	$10^9 A_s$	$2.094^{+0.024}_{-0.034}$	$D_M(0.51)$	$1992 \pm 19$
$100\theta_{MC}$	$1.04086 \pm 0.00047$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.014$	$H(0.61)$	$95.09 \pm 0.36$
$\tau$	$0.0536^{+0.0045}_{-0.0084}$	$D_{40}$	$1242^{+17}_{-19}$	$D_M(0.61)$	$2317 \pm 20$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.016}$	$D_{220}$	$5705 \pm 42$	$H(2.33)$	$236.4 \pm 1.3$
$n_s$	$0.9648 \pm 0.0058$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5774 \pm 16$
$r$	$< 0.0482$	$D_{1420}$	$814.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.461 \pm 0.012$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.7490 \pm 0.0071$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9648 \pm 0.0058$	$f\sigma_8(0.38)$	$0.4782 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.24530^{+0.00010}_{-0.000087}$	$\sigma_8(0.38)$	$0.6633^{+0.0051}_{-0.0058}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.24662^{+0.00010}_{-0.000087}$	$f\sigma_8(0.51)$	$0.4761 \pm 0.0083$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.629 \pm 0.042$	$\sigma_8(0.51)$	$0.6205^{+0.0045}_{-0.0053}$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.823 \pm 0.037$	$f\sigma_8(0.61)$	$0.4706 \pm 0.0073$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.23 \pm 0.41$	$\sigma_8(0.61)$	$0.5902^{+0.0041}_{-0.0049}$
$A^{kSZ}$	$< 5.58$	$r_*$	$144.57 \pm 0.48$	$f\sigma_8(2.33)$	$0.2974^{+0.0019}_{-0.0025}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04106 \pm 0.00046$	$\sigma_8(2.33)$	$0.3063^{+0.0019}_{-0.0026}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.887 \pm 0.045$	$r_{0.002}$	$< 0.0439$
$H_0$	$67.10 \pm 0.93$	$z_{\text{drag}}$	$1059.41 \pm 0.45$	$r_{0.01}$	$< 0.0460$
$\Omega_\Lambda$	$0.682 \pm 0.013$	$r_{\text{drag}}$	$147.31 \pm 0.48$	$\ln(10^{10} A_t)$	$-0.69^{+1.4}_{-0.60}$
$\Omega_m$	$0.318 \pm 0.013$	$k_D$	$0.14046 \pm 0.00052$	$r_{L=10}$	$< 0.0225$
$\Omega_m h^2$	$0.1429 \pm 0.0020$	$100\theta_D$	$0.16107 \pm 0.00026$	$10^9 A_t$	$< 0.101$
$\Omega_m h^3$	$0.09589 \pm 0.00045$	$z_{\text{eq}}$	$3400 \pm 48$	$10^9 A_t e^{-2\tau}$	$< 0.0906$
$\sigma_8$	$0.8113 \pm 0.0086$	$k_{\text{eq}}$	$0.01038 \pm 0.00015$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$S_8$	$0.835 \pm 0.024$	$100\theta_{\text{eq}}$	$0.8131 \pm 0.0090$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4494 \pm 0.0046$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\sigma_8 \Omega_m^{0.25}$	$0.609 \pm 0.012$	$H(0.15)$	$72.44 \pm 0.79$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.6$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.016$	$D_M(0.15)$	$645.7 \pm 8.0$	$\chi_{\text{lowl}}^2$	$24.8 \pm 1.8$
$r_{\text{drag}} h$	$98.9 \pm 1.6$	$H(0.38)$	$82.65 \pm 0.57$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.038$	$D_M(0.38)$	$1539 \pm 16$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 7492.76; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.03; R - 1 = 0.00713$$



17.4 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$10^9 A_s e^{-2\tau}$	$1.875 \pm 0.012$	$H(2.33)$	$235.62 \pm 0.79$
$\Omega_c h^2$	$0.1188 \pm 0.0012$	$D_{40}$	$1236^{+15}_{-18}$	$D_M(2.33)$	$5766 \pm 12$
$100\theta_{MC}$	$1.04103 \pm 0.00042$	$D_{220}$	$5711 \pm 41$	$f\sigma_8(0.15)$	$0.4536 \pm 0.0076$
$\tau$	$0.0547^{+0.0048}_{-0.0083}$	$D_{810}$	$2534 \pm 14$	$\sigma_8(0.15)$	$0.7461^{+0.0057}_{-0.0067}$
$\ln(10^{10} A_s)$	$3.040^{+0.012}_{-0.017}$	$D_{1420}$	$815.5 \pm 5.1$	$f\sigma_8(0.38)$	$0.4724 \pm 0.0063$
$n_s$	$0.9679 \pm 0.0043$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.38)$	$0.6616^{+0.0047}_{-0.0058}$
$r$	$< 0.0516$	$n_{s,0.002}$	$0.9679 \pm 0.0043$	$f\sigma_8(0.51)$	$0.4712 \pm 0.0056$
$y_{cal}$	$1.0005 \pm 0.0025$	$Y_P$	$0.245331^{+0.000087}_{-0.000076}$	$\sigma_8(0.51)$	$0.6193^{+0.0042}_{-0.0054}$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P^{BBN}$	$0.246657^{+0.000088}_{-0.000076}$	$f\sigma_8(0.61)$	$0.4665 \pm 0.0052$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.615 \pm 0.037$	$\sigma_8(0.61)$	$0.5893^{+0.0039}_{-0.0051}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	Age/Gyr	$13.804 \pm 0.028$	$f\sigma_8(2.33)$	$0.2972^{+0.0019}_{-0.0026}$
$A_{100}^{PS}$	$251 \pm 30$	$z_*$	$1090.01 \pm 0.30$	$\sigma_8(2.33)$	$0.3066^{+0.0019}_{-0.0027}$
$A_{143}^{PS}$	$44 \pm 9$	$r_*$	$144.86 \pm 0.32$	$r_{0.002}$	$< 0.0475$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$100\theta_*$	$1.04123 \pm 0.00041$	$r_{0.01}$	$< 0.0496$
$A^{kSZ}$	$< 5.58$	$D_M(z_*)/\text{Gpc}$	$13.912 \pm 0.031$	$\ln(10^{10} A_t)$	$-0.62^{+1.4}_{-0.59}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$z_{\text{drag}}$	$1059.50 \pm 0.45$	$r_{L=10}$	$< 0.0243$
$c_{217}$	$0.9997 \pm 0.0019$	$r_{\text{drag}}$	$147.58 \pm 0.35$	$10^9 A_t$	$< 0.108$
$H_0$	$67.70 \pm 0.55$	$k_D$	$0.14023 \pm 0.00045$	$10^9 A_t e^{-2\tau}$	$< 0.0969$
$\Omega_\Lambda$	$0.6908 \pm 0.0073$	$100\theta_D$	$0.16103 \pm 0.00026$	$f_{2000}^{143}$	$30.5 \pm 3.0$
$\Omega_m$	$0.3092 \pm 0.0073$	$z_{\text{eq}}$	$3370 \pm 29$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m h^2$	$0.1417 \pm 0.0012$	$k_{\text{eq}}$	$0.010285 \pm 0.000088$	$f_{2000}^{217}$	$107.5 \pm 2.0$
$\Omega_m h^3$	$0.09589 \pm 0.00046$	$100\theta_{\text{eq}}$	$0.8189 \pm 0.0053$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\sigma_8$	$0.8072^{+0.0066}_{-0.0076}$	$100\theta_{s,\text{eq}}$	$0.4524 \pm 0.0028$	$\chi_{\text{lowl}}^2$	$24.2 \pm 1.6$
$S_8$	$0.819 \pm 0.015$	$H(0.15)$	$72.95 \pm 0.47$	$\chi_{6\text{DF}}^2$	$0.051 \pm 0.069$
$\sigma_8 \Omega_m^{0.5}$	$0.4488 \pm 0.0081$	$D_M(0.15)$	$640.6 \pm 4.6$	$\chi_{\text{MGS}}^2$	$1.43 \pm 0.54$
$\sigma_8 \Omega_m^{0.25}$	$0.6019 \pm 0.0078$	$H(0.38)$	$83.01 \pm 0.35$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.5$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$D_M(0.38)$	$1528.4 \pm 9.4$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$r_{\text{drag}} h$	$99.91 \pm 0.94$	$H(0.51)$	$89.70 \pm 0.29$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.027$	$D_M(0.51)$	$1980 \pm 11$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$z_{\text{re}}$	$7.72^{+0.55}_{-0.82}$	$H(0.61)$	$95.29 \pm 0.25$		
$10^9 A_s$	$2.092^{+0.024}_{-0.035}$	$D_M(0.61)$	$2305 \pm 12$		

$\bar{\chi}_{\text{eff}}^2 = 7498.81$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.81$ ;  $R - 1 = 0.01239$



17.5 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_r\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00016$	$z_{\text{re}}$	$7.54 \pm 0.79$	$H(0.51)$	$89.63 \pm 0.30$
$\Omega_c h^2$	$0.1197 \pm 0.0014$	$10^9 A_s$	$2.091 \pm 0.034$	$D_{\text{M}}(0.51)$	$1985 \pm 13$
$100\theta_{MC}$	$1.04091 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.27 \pm 0.24$
$\tau$	$0.0531 \pm 0.0078$	$D_{40}$	$1244^{+15}_{-19}$	$D_{\text{M}}(0.61)$	$2309 \pm 13$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{220}$	$5721 \pm 39$	$H(2.33)$	$236.31 \pm 0.88$
$n_s$	$0.9665 \pm 0.0046$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5765 \pm 11$
$r$	$< 0.0633$	$D_{1420}$	$816.9 \pm 4.8$	$f\sigma_8(0.15)$	$0.4577 \pm 0.0087$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.7474 \pm 0.0068$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9665 \pm 0.0046$	$f\sigma_8(0.38)$	$0.4754 \pm 0.0071$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245377^{+0.000067}_{-0.000057}$	$\sigma_8(0.38)$	$0.6623 \pm 0.0057$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246704^{+0.000068}_{-0.000058}$	$f\sigma_8(0.51)$	$0.4737 \pm 0.0063$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.594 \pm 0.030$	$\sigma_8(0.51)$	$0.6197 \pm 0.0053$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.800 \pm 0.025$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0057$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.94 \pm 0.28$	$\sigma_8(0.61)$	$0.5896 \pm 0.0050$
$A^{kSZ}$	$< 5.19$	$r_*$	$144.54 \pm 0.33$	$f\sigma_8(2.33)$	$0.2972 \pm 0.0025$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04109 \pm 0.00031$	$\sigma_8(2.33)$	$0.3063 \pm 0.0026$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.884 \pm 0.031$	$r_{0.002}$	$< 0.0583$
$H_0$	$67.43 \pm 0.63$	$z_{\text{drag}}$	$1059.82 \pm 0.33$	$r_{0.01}$	$< 0.0608$
$\Omega_\Lambda$	$0.6861 \pm 0.0087$	$r_{\text{drag}}$	$147.22 \pm 0.33$	$\ln(10^{10} A_t)$	$-0.38^{+1.3}_{-0.53}$
$\Omega_m$	$0.3139 \pm 0.0087$	$k_{\text{D}}$	$0.14070 \pm 0.00037$	$r_{L=10}$	$< 0.0299$
$\Omega_m h^2$	$0.1427 \pm 0.0014$	$100\theta_{\text{D}}$	$0.16082 \pm 0.00019$	$10^9 A_t$	$< 0.132$
$\Omega_m h^3$	$0.09619 \pm 0.00033$	$z_{\text{eq}}$	$3394 \pm 33$	$10^9 A_t e^{-2\tau}$	$< 0.119$
$\sigma_8$	$0.8091 \pm 0.0078$	$k_{\text{eq}}$	$0.01036 \pm 0.00010$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$S_8$	$0.828 \pm 0.017$	$100\theta_{\text{eq}}$	$0.8147 \pm 0.0061$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4533 \pm 0.0093$	$100\theta_{s,\text{eq}}$	$0.4502 \pm 0.0032$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6056 \pm 0.0088$	$H(0.15)$	$72.74 \pm 0.54$	$\chi_{\text{small}}^2$	$397.2 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.985 \pm 0.012$	$D_{\text{M}}(0.15)$	$642.8 \pm 5.4$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.8$
$r_{\text{drag}} h$	$99.3 \pm 1.1$	$H(0.38)$	$82.89 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.030$	$D_{\text{M}}(0.38)$	$1532 \pm 11$	$\chi_{\text{CMB}}^2$	$7359 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11920.72$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.95$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.49$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.31$ ;  $R - 1 = 0.01020$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.84 ( $\Delta$  -0.21) commander\_dx12\_v3\_2\_29: 23.20 ( $\Delta$  -0.05) CamSpec like\_10.7HM\_1400\_unified: 11499.52



17.6 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$H(2.33)$	$235.91 \pm 0.66$
$\Omega_c h^2$	$0.1190 \pm 0.0010$	$D_{40}$	$1241^{+14}_{-19}$	$D_M(2.33)$	$5760.1 \pm 9.2$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$D_{220}$	$5724 \pm 39$	$f\sigma_8(0.15)$	$0.4539 \pm 0.0068$
$\tau$	$0.0540 \pm 0.0078$	$D_{810}$	$2537 \pm 13$	$\sigma_8(0.15)$	$0.7462 \pm 0.0066$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{1420}$	$817.4 \pm 4.8$	$f\sigma_8(0.38)$	$0.4726 \pm 0.0059$
$n_s$	$0.9682 \pm 0.0040$	$D_{2000}$	$230.9 \pm 1.6$	$\sigma_8(0.38)$	$0.6616 \pm 0.0057$
$r$	$< 0.0668$	$n_{s,0.002}$	$0.9682 \pm 0.0040$	$f\sigma_8(0.51)$	$0.4714 \pm 0.0053$
$y_{cal}$	$1.0007 \pm 0.0025$	$Y_P$	$0.245396^{+0.000061}_{-0.000052}$	$\sigma_8(0.51)$	$0.6193 \pm 0.0053$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P^{BBN}$	$0.246722^{+0.000061}_{-0.000052}$	$f\sigma_8(0.61)$	$0.4666 \pm 0.0050$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.585 \pm 0.027$	$\sigma_8(0.61)$	$0.5893 \pm 0.0050$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	Age/Gyr	$13.791 \pm 0.021$	$f\sigma_8(2.33)$	$0.2972 \pm 0.0025$
$A_{100}^{PS}$	$248 \pm 30$	$z_*$	$1089.83 \pm 0.23$	$\sigma_8(2.33)$	$0.3065 \pm 0.0026$
$A_{143}^{PS}$	$42 \pm 9$	$r_*$	$144.69 \pm 0.26$	$r_{0.002}$	$< 0.0620$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$100\theta_*$	$1.04117 \pm 0.00029$	$r_{0.01}$	$< 0.0644$
$A^{kSZ}$	$< 5.16$	$D_M(z_*)/\text{Gpc}$	$13.897 \pm 0.025$	$\ln(10^{10} A_t)$	$-0.32^{+1.3}_{-0.51}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_{drag}$	$1059.88 \pm 0.32$	$r_{L=10}$	$< 0.0318$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$r_{drag}$	$147.35 \pm 0.27$	$10^9 A_t$	$< 0.140$
$H_0$	$67.74 \pm 0.46$	$k_D$	$0.14060 \pm 0.00034$	$10^9 A_t e^{-2\tau}$	$< 0.125$
$\Omega_\Lambda$	$0.6904 \pm 0.0062$	$100\theta_D$	$0.16079 \pm 0.00019$	$f_{2000}^{143}$	$29.2 \pm 2.8$
$\Omega_m$	$0.3096 \pm 0.0062$	$z_{eq}$	$3378 \pm 24$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.1420 \pm 0.0010$	$k_{eq}$	$0.010311 \pm 0.000074$	$f_{2000}^{217}$	$106.7 \pm 1.8$
$\Omega_m h^3$	$0.09619 \pm 0.00032$	$100\theta_{eq}$	$0.8177 \pm 0.0045$	$\chi_{simall}^2$	$860 \pm 800$
$\sigma_8$	$0.8073 \pm 0.0074$	$100\theta_{s,eq}$	$0.4517 \pm 0.0023$	$\chi_{lowl}^2$	$24.6 \pm 1.7$
$S_8$	$0.820 \pm 0.013$	$H(0.15)$	$73.00 \pm 0.39$	$\chi_{6DF}^2$	$0.046 \pm 0.058$
$\sigma_8 \Omega_m^{0.5}$	$0.4492 \pm 0.0072$	$D_M(0.15)$	$640.2 \pm 3.9$	$\chi_{MGS}^2$	$1.36 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6022 \pm 0.0072$	$H(0.38)$	$83.08 \pm 0.29$	$\chi_{DR12BAO}^2$	$4.6 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.981 \pm 0.011$	$D_M(0.38)$	$1527.3 \pm 7.8$	$\chi_{prior}^2$	$9.6 \pm 4.4$
$r_{drag} h$	$99.81 \pm 0.80$	$H(0.51)$	$89.78 \pm 0.23$	$\chi_{BAO}^2$	$6.0 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.424 \pm 0.026$	$D_M(0.51)$	$1978.7 \pm 9.1$	$\chi_{CMB}^2$	$7358 \pm 5000$
$z_{re}$	$7.62 \pm 0.79$	$H(0.61)$	$95.38 \pm 0.19$		
$10^9 A_s$	$2.092 \pm 0.034$	$D_M(0.61)$	$2302.8 \pm 9.9$		

$\bar{\chi}_{eff}^2 = 11949.07$ ;  $\Delta\bar{\chi}_{eff}^2 = 9149.90$ ;  $R - 1 = 0.01061$



17.7 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00016$	$z_{\text{re}}$	$7.69^{+0.53}_{-0.80}$	$H(0.51)$	$89.64 \pm 0.30$
$\Omega_c h^2$	$0.1196 \pm 0.0014$	$10^9 A_s$	$2.097^{+0.024}_{-0.034}$	$D_M(0.51)$	$1984 \pm 12$
$100\theta_{MC}$	$1.04091 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.28 \pm 0.24$
$\tau$	$0.0545^{+0.0047}_{-0.0083}$	$D_{40}$	$1244^{+15}_{-19}$	$D_M(0.61)$	$2309 \pm 13$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.016}$	$D_{220}$	$5721 \pm 40$	$H(2.33)$	$236.29 \pm 0.88$
$n_s$	$0.9667 \pm 0.0046$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5764 \pm 11$
$r$	$< 0.0632$	$D_{1420}$	$816.9 \pm 4.9$	$f\sigma_8(0.15)$	$0.4580 \pm 0.0086$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.7483^{+0.0058}_{-0.0066}$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9667 \pm 0.0046$	$f\sigma_8(0.38)$	$0.4759 \pm 0.0070$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245379^{+0.000067}_{-0.000057}$	$\sigma_8(0.38)$	$0.6631^{+0.0046}_{-0.0056}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246705^{+0.000067}_{-0.000057}$	$f\sigma_8(0.51)$	$0.4742 \pm 0.0061$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.593 \pm 0.029$	$\sigma_8(0.51)$	$0.6204^{+0.0041}_{-0.0052}$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.800 \pm 0.025$	$f\sigma_8(0.61)$	$0.4691 \pm 0.0055$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.94 \pm 0.28$	$\sigma_8(0.61)$	$0.5903^{+0.0038}_{-0.0049}$
$A^{kSZ}$	$< 5.18$	$r_*$	$144.55 \pm 0.33$	$f\sigma_8(2.33)$	$0.2976^{+0.0018}_{-0.0025}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04110 \pm 0.00031$	$\sigma_8(2.33)$	$0.3067^{+0.0018}_{-0.0026}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$D_M(z_*)/\text{Gpc}$	$13.885 \pm 0.031$	$r_{0.002}$	$< 0.0583$
$H_0$	$67.45 \pm 0.63$	$z_{\text{drag}}$	$1059.83 \pm 0.33$	$r_{0.01}$	$< 0.0607$
$\Omega_\Lambda$	$0.6864 \pm 0.0087$	$r_{\text{drag}}$	$147.23 \pm 0.33$	$\ln(10^{10} A_t)$	$-0.38^{+1.3}_{-0.53}$
$\Omega_m$	$0.3136 \pm 0.0087$	$k_D$	$0.14070 \pm 0.00037$	$r_{L=10}$	$< 0.0299$
$\Omega_m h^2$	$0.1426 \pm 0.0014$	$100\theta_D$	$0.16082 \pm 0.00019$	$10^9 A_t$	$< 0.132$
$\Omega_m h^3$	$0.09619 \pm 0.00033$	$z_{\text{eq}}$	$3393 \pm 33$	$10^9 A_t e^{-2\tau}$	$< 0.119$
$\sigma_8$	$0.8100 \pm 0.0073$	$k_{\text{eq}}$	$0.01036 \pm 0.00010$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$S_8$	$0.828 \pm 0.017$	$100\theta_{\text{eq}}$	$0.8149 \pm 0.0061$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4536 \pm 0.0093$	$100\theta_{s,\text{eq}}$	$0.4503 \pm 0.0032$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\sigma_8 \Omega_m^{0.25}$	$0.6062 \pm 0.0086$	$H(0.15)$	$72.75 \pm 0.54$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.986 \pm 0.012$	$D_M(0.15)$	$642.6 \pm 5.4$	$\chi_{\text{lowl}}^2$	$24.9 \pm 1.8$
$r_{\text{drag}} h$	$99.3 \pm 1.1$	$H(0.38)$	$82.90 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.029$	$D_M(0.38)$	$1532 \pm 11$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 11943.24; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.30; R - 1 = 0.00947$$



17.8 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$H(2.33)$	$235.90 \pm 0.66$
$\Omega_c h^2$	$0.1190 \pm 0.0010$	$D_{40}$	$1241^{+14}_{-19}$	$D_M(2.33)$	$5759.9 \pm 9.2$
$100\theta_{MC}$	$1.04099 \pm 0.00030$	$D_{220}$	$5724 \pm 39$	$f\sigma_8(0.15)$	$0.4543 \pm 0.0067$
$\tau$	$0.0552^{+0.0051}_{-0.0081}$	$D_{810}$	$2537 \pm 14$	$\sigma_8(0.15)$	$0.7470^{+0.0054}_{-0.0065}$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.016}$	$D_{1420}$	$817.4 \pm 4.8$	$f\sigma_8(0.38)$	$0.4730 \pm 0.0057$
$n_s$	$0.9683 \pm 0.0040$	$D_{2000}$	$230.9 \pm 1.6$	$\sigma_8(0.38)$	$0.6624^{+0.0045}_{-0.0056}$
$r$	$< 0.0666$	$n_{s,0.002}$	$0.9683 \pm 0.0040$	$f\sigma_8(0.51)$	$0.4719 \pm 0.0051$
$y_{cal}$	$1.0007 \pm 0.0025$	$Y_P$	$0.245397^{+0.000061}_{-0.000052}$	$\sigma_8(0.51)$	$0.6200^{+0.0041}_{-0.0052}$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P^{BBN}$	$0.246723^{+0.000061}_{-0.000052}$	$f\sigma_8(0.61)$	$0.4671 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.585^{+0.025}_{-0.028}$	$\sigma_8(0.61)$	$0.5900^{+0.0039}_{-0.0050}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	Age/Gyr	$13.790 \pm 0.021$	$f\sigma_8(2.33)$	$0.2976^{+0.0019}_{-0.0025}$
$A_{100}^{PS}$	$248 \pm 30$	$z_*$	$1089.82 \pm 0.23$	$\sigma_8(2.33)$	$0.3069^{+0.0019}_{-0.0026}$
$A_{143}^{PS}$	$42 \pm 9$	$r_*$	$144.69 \pm 0.26$	$r_{0.002}$	$< 0.0619$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$100\theta_*$	$1.04118 \pm 0.00029$	$r_{0.01}$	$< 0.0642$
$A^{kSZ}$	$< 5.16$	$D_M(z_*)/\text{Gpc}$	$13.897 \pm 0.025$	$\ln(10^{10} A_t)$	$-0.32^{+1.3}_{-0.52}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$z_{drag}$	$1059.88 \pm 0.32$	$r_{L=10}$	$< 0.0317$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$r_{drag}$	$147.36 \pm 0.27$	$10^9 A_t$	$< 0.140$
$H_0$	$67.75 \pm 0.46$	$k_D$	$0.14059 \pm 0.00034$	$10^9 A_t e^{-2\tau}$	$< 0.125$
$\Omega_\Lambda$	$0.6905 \pm 0.0062$	$100\theta_D$	$0.16079 \pm 0.00019$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m$	$0.3095 \pm 0.0062$	$z_{eq}$	$3378 \pm 24$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.1420 \pm 0.0010$	$k_{eq}$	$0.010310 \pm 0.000074$	$f_{2000}^{217}$	$106.7 \pm 1.8$
$\Omega_m h^3$	$0.09620 \pm 0.00032$	$100\theta_{eq}$	$0.8178 \pm 0.0045$	$\chi_{small}^2$	$860 \pm 800$
$\sigma_8$	$0.8082^{+0.0062}_{-0.0072}$	$100\theta_{s,eq}$	$0.4517 \pm 0.0023$	$\chi_{lowl}^2$	$24.6 \pm 1.7$
$S_8$	$0.821 \pm 0.013$	$H(0.15)$	$73.01 \pm 0.39$	$\chi_{6DF}^2$	$0.045 \pm 0.057$
$\sigma_8 \Omega_m^{0.5}$	$0.4496 \pm 0.0071$	$D_M(0.15)$	$640.1 \pm 3.9$	$\chi_{MGS}^2$	$1.37 \pm 0.45$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0070$	$H(0.38)$	$83.08 \pm 0.29$	$\chi_{DR12BAO}^2$	$4.6 \pm 1.3$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.010$	$D_M(0.38)$	$1527.1 \pm 7.8$	$\chi_{prior}^2$	$9.6 \pm 4.4$
$r_{drag} h$	$99.83 \pm 0.80$	$H(0.51)$	$89.78 \pm 0.23$	$\chi_{BAO}^2$	$6.0 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.427 \pm 0.025$	$D_M(0.51)$	$1978.5 \pm 9.1$	$\chi_{CMB}^2$	$7358 \pm 5000$
$z_{re}$	$7.74^{+0.56}_{-0.80}$	$H(0.61)$	$95.38 \pm 0.19$		
$10^9 A_s$	$2.097^{+0.025}_{-0.034}$	$D_M(0.61)$	$2302.5 \pm 9.9$		

$\bar{\chi}_{eff}^2 = 11948.86$ ;  $\Delta\bar{\chi}_{eff}^2 = 9149.91$ ;  $R - 1 = 0.01058$



# 17.9 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$10^9 A_s$	$2.095 \pm 0.030$	$H(0.61)$	$95.27 \pm 0.22$
$\Omega_c h^2$	$0.1197 \pm 0.0012$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_M(0.61)$	$2309 \pm 12$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$D_{40}$	$1244^{+14}_{-19}$	$H(2.33)$	$236.33 \pm 0.74$
$\tau$	$0.0541 \pm 0.0074$	$D_{220}$	$5723 \pm 39$	$D_M(2.33)$	$5765 \pm 10$
$\ln(10^{10} A_s)$	$3.042 \pm 0.014$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4581 \pm 0.0066$
$n_s$	$0.9664 \pm 0.0042$	$D_{1420}$	$817.0 \pm 4.8$	$\sigma_8(0.15)$	$0.7481 \pm 0.0054$
$r$	$< 0.0607$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.38)$	$0.4759 \pm 0.0053$
$y_{cal}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9664 \pm 0.0042$	$\sigma_8(0.38)$	$0.6629 \pm 0.0047$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245380^{+0.000065}_{-0.000056}$	$f\sigma_8(0.51)$	$0.4742 \pm 0.0047$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.246706^{+0.000065}_{-0.000056}$	$\sigma_8(0.51)$	$0.6203 \pm 0.0045$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.593 \pm 0.029$	$f\sigma_8(0.61)$	$0.4691 \pm 0.0042$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.800 \pm 0.023$	$\sigma_8(0.61)$	$0.5901 \pm 0.0043$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.94 \pm 0.26$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0022$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.54 \pm 0.28$	$\sigma_8(2.33)$	$0.3066 \pm 0.0024$
$A^{kSZ}$	$< 5.10$	$100\theta_*$	$1.04109 \pm 0.00030$	$r_{0.002}$	$< 0.0559$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.883 \pm 0.027$	$r_{0.01}$	$< 0.0582$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{drag}$	$1059.83 \pm 0.33$	$\ln(10^{10} A_t)$	$-0.43^{+1.4}_{-0.53}$
$H_0$	$67.42 \pm 0.54$	$r_{drag}$	$147.21 \pm 0.29$	$r_{L=10}$	$< 0.0286$
$\Omega_\Lambda$	$0.6860 \pm 0.0074$	$k_D$	$0.14071 \pm 0.00034$	$10^9 A_t$	$< 0.127$
$\Omega_m$	$0.3140 \pm 0.0074$	$100\theta_D$	$0.16081 \pm 0.00019$	$10^9 A_t e^{-2\tau}$	$< 0.114$
$\Omega_m h^2$	$0.1427 \pm 0.0012$	$z_{eq}$	$3394 \pm 28$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_m h^3$	$0.09620 \pm 0.00032$	$k_{eq}$	$0.010360 \pm 0.000084$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\sigma_8$	$0.8099 \pm 0.0060$	$100\theta_{eq}$	$0.8146 \pm 0.0052$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$S_8$	$0.828 \pm 0.013$	$100\theta_{s,eq}$	$0.4501 \pm 0.0027$	$\chi^2_{lensing}$	$9.31 \pm 0.72$
$\sigma_8 \Omega_m^{0.5}$	$0.4538 \pm 0.0071$	$H(0.15)$	$72.73 \pm 0.46$	$\chi^2_{simall}$	$397.2 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6062 \pm 0.0065$	$D_M(0.15)$	$642.8 \pm 4.6$	$\chi^2_{lowl}$	$24.9 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9863 \pm 0.0092$	$H(0.38)$	$82.89 \pm 0.34$	$\chi^2_{prior}$	$9.7 \pm 4.4$
$r_{drag} h$	$99.26 \pm 0.94$	$D_M(0.38)$	$1532.5 \pm 9.3$	$\chi^2_{CMB}$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.022$	$H(0.51)$	$89.63 \pm 0.27$		
$z_{re}$	$7.64 \pm 0.75$	$D_M(0.51)$	$1985 \pm 11$		

Best-fit  $\chi^2_{eff} = 11929.59$ ;  $\Delta\chi^2_{eff} = 9154.96$ ;  $\bar{\chi}^2_{eff} = 11952.27$ ;  $\Delta\bar{\chi}^2_{eff} = 9150.31$ ;  $R - 1 = 0.00977$   
 $\chi^2_{eff}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.86 ( $\Delta$  0.02) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.87 ( $\Delta$  -0.18) commander\_dx12\_v3\_2\_29: 23.23 ( $\Delta$  0.03) CamSpec like\_10.7HM\_1400\_unified: 11499.43



17.10 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(2.33)$	$235.99 \pm 0.60$
$\Omega_c h^2$	$0.11911 \pm 0.00096$	$D_{40}$	$1242^{+14}_{-19}$	$D_M(2.33)$	$5760.5 \pm 9.1$
$100\theta_{MC}$	$1.04098 \pm 0.00029$	$D_{220}$	$5727 \pm 39$	$f\sigma_8(0.15)$	$0.4553 \pm 0.0055$
$\tau$	$0.0556 \pm 0.0073$	$D_{810}$	$2538 \pm 13$	$\sigma_8(0.15)$	$0.7478 \pm 0.0054$
$\ln(10^{10} A_s)$	$3.044 \pm 0.014$	$D_{1420}$	$817.6 \pm 4.8$	$f\sigma_8(0.38)$	$0.4739 \pm 0.0047$
$n_s$	$0.9679 \pm 0.0039$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.38)$	$0.6630 \pm 0.0048$
$r$	$< 0.0627$	$n_{s,0.002}$	$0.9679 \pm 0.0039$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0042$
$y_{cal}$	$1.0008 \pm 0.0024$	$Y_P$	$0.245396^{+0.000061}_{-0.000052}$	$\sigma_8(0.51)$	$0.6205 \pm 0.0045$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P^{BBN}$	$0.246723^{+0.000061}_{-0.000052}$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0039$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.585 \pm 0.027$	$\sigma_8(0.61)$	$0.5905 \pm 0.0043$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	Age/Gyr	$13.791 \pm 0.021$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0022$
$A_{100}^{PS}$	$248 \pm 30$	$z_*$	$1089.84 \pm 0.22$	$\sigma_8(2.33)$	$0.3071 \pm 0.0023$
$A_{143}^{PS}$	$42 \pm 9$	$r_*$	$144.66 \pm 0.24$	$r_{0.002}$	$< 0.0579$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$100\theta_*$	$1.04116 \pm 0.00029$	$r_{0.01}$	$< 0.0602$
$A^{kSZ}$	$< 5.01$	$D_M(z_*)/\text{Gpc}$	$13.894 \pm 0.023$	$\ln(10^{10} A_t)$	$-0.39^{+1.3}_{-0.52}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_{drag}$	$1059.89 \pm 0.32$	$r_{L=10}$	$< 0.0296$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$r_{drag}$	$147.32 \pm 0.25$	$10^9 A_t$	$< 0.131$
$H_0$	$67.69 \pm 0.43$	$k_D$	$0.14063^{+0.00033}_{-0.00030}$	$10^9 A_t e^{-2\tau}$	$< 0.118$
$\Omega_\Lambda$	$0.6898 \pm 0.0057$	$100\theta_D$	$0.16079 \pm 0.00019$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m$	$0.3102 \pm 0.0057$	$z_{eq}$	$3381 \pm 22$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.14213 \pm 0.00092$	$k_{eq}$	$0.010320 \pm 0.000067$	$f_{2000}^{217}$	$106.7 \pm 1.8$
$\Omega_m h^3$	$0.09621 \pm 0.00032$	$100\theta_{eq}$	$0.8172 \pm 0.0041$	$\chi^2_{lensing}$	$9.27 \pm 0.73$
$\sigma_8$	$0.8091 \pm 0.0060$	$100\theta_{s,eq}$	$0.4514 \pm 0.0021$	$\chi^2_{small}$	$846 \pm 800$
$S_8$	$0.823 \pm 0.011$	$H(0.15)$	$72.96 \pm 0.37$	$\chi^2_{lowl}$	$24.7 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4507 \pm 0.0059$	$D_M(0.15)$	$640.6 \pm 3.6$	$\chi^2_{6DF}$	$0.047 \pm 0.056$
$\sigma_8 \Omega_m^{0.25}$	$0.6039 \pm 0.0058$	$H(0.38)$	$83.05 \pm 0.27$	$\chi^2_{MGS}$	$1.31 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9835 \pm 0.0084$	$D_M(0.38)$	$1528.0 \pm 7.3$	$\chi^2_{DR12BAO}$	$4.7 \pm 1.2$
$r_{drag} h$	$99.72 \pm 0.73$	$H(0.51)$	$89.76 \pm 0.22$	$\chi^2_{prior}$	$9.7 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.021$	$D_M(0.51)$	$1979.6 \pm 8.6$	$\chi^2_{CMB}$	$7367 \pm 5000$
$z_{re}$	$7.78 \pm 0.73$	$H(0.61)$	$95.37 \pm 0.19$	$\chi^2_{BAO}$	$6.01 \pm 0.97$
$10^9 A_s$	$2.100 \pm 0.030$	$D_M(0.61)$	$2303.7 \pm 9.3$		

$$\bar{\chi}^2_{\text{eff}} = 11958.11; \Delta\bar{\chi}^2_{\text{eff}} = 9150.04; R - 1 = 0.01271$$



17.11 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$10^9 A_s$	$2.099^{+0.023}_{-0.031}$	$H(0.61)$	$95.28 \pm 0.22$
$\Omega_c h^2$	$0.1196 \pm 0.0012$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_M(0.61)$	$2309 \pm 12$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$D_{40}$	$1244^{+14}_{-19}$	$H(2.33)$	$236.29 \pm 0.73$
$\tau$	$0.0551^{+0.0053}_{-0.0078}$	$D_{220}$	$5722 \pm 39$	$D_M(2.33)$	$5764 \pm 10$
$\ln(10^{10} A_s)$	$3.044^{+0.011}_{-0.014}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4582 \pm 0.0066$
$n_s$	$0.9666 \pm 0.0042$	$D_{1420}$	$816.9 \pm 4.8$	$\sigma_8(0.15)$	$0.7487 \pm 0.0050$
$r$	$< 0.0607$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.38)$	$0.4761 \pm 0.0053$
$y_{cal}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9666 \pm 0.0042$	$\sigma_8(0.38)$	$0.6634^{+0.0040}_{-0.0047}$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245381^{+0.000064}_{-0.000056}$	$f\sigma_8(0.51)$	$0.4744 \pm 0.0046$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.246708^{+0.000064}_{-0.000056}$	$\sigma_8(0.51)$	$0.6208^{+0.0037}_{-0.0045}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.592 \pm 0.028$	$f\sigma_8(0.61)$	$0.4693 \pm 0.0042$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.799 \pm 0.023$	$\sigma_8(0.61)$	$0.5906^{+0.0035}_{-0.0043}$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.93 \pm 0.26$	$f\sigma_8(2.33)$	$0.2977^{+0.0018}_{-0.0022}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.55 \pm 0.28$	$\sigma_8(2.33)$	$0.3068^{+0.0019}_{-0.0024}$
$A^{kSZ}$	$< 5.08$	$100\theta_*$	$1.04109 \pm 0.00030$	$r_{0.002}$	$< 0.0558$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_M(z_*)/\text{Gpc}$	$13.884 \pm 0.026$	$r_{0.01}$	$< 0.0582$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{drag}$	$1059.84 \pm 0.32$	$\ln(10^{10} A_t)$	$-0.43^{+1.4}_{-0.53}$
$H_0$	$67.45 \pm 0.53$	$r_{drag}$	$147.22 \pm 0.29$	$r_{L=10}$	$< 0.0286$
$\Omega_\Lambda$	$0.6864 \pm 0.0073$	$k_D$	$0.14071^{+0.00035}_{-0.00032}$	$10^9 A_t$	$< 0.127$
$\Omega_m$	$0.3136 \pm 0.0073$	$100\theta_D$	$0.16081 \pm 0.00019$	$10^9 A_t e^{-2\tau}$	$< 0.114$
$\Omega_m h^2$	$0.1426 \pm 0.0011$	$z_{eq}$	$3393 \pm 27$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$\Omega_m h^3$	$0.09620 \pm 0.00032$	$k_{eq}$	$0.010356 \pm 0.000083$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\sigma_8$	$0.8104 \pm 0.0057$	$100\theta_{eq}$	$0.8149 \pm 0.0051$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$S_8$	$0.829 \pm 0.013$	$100\theta_{s,eq}$	$0.4502 \pm 0.0026$	$\chi^2_{lensing}$	$9.27 \pm 0.68$
$\sigma_8 \Omega_m^{0.5}$	$0.4538 \pm 0.0071$	$H(0.15)$	$72.75 \pm 0.46$	$\chi^2_{simall}$	$397.2 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6065 \pm 0.0064$	$D_M(0.15)$	$642.6 \pm 4.6$	$\chi^2_{lowl}$	$24.9 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.9868 \pm 0.0090$	$H(0.38)$	$82.90 \pm 0.33$	$\chi^2_{prior}$	$9.6 \pm 4.4$
$r_{drag} h$	$99.30 \pm 0.92$	$D_M(0.38)$	$1532.1 \pm 9.1$	$\chi^2_{CMB}$	$7367 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.439 \pm 0.022$	$H(0.51)$	$89.64 \pm 0.27$		
$z_{re}$	$7.74^{+0.58}_{-0.75}$	$D_M(0.51)$	$1984 \pm 11$		

$\bar{\chi}^2_{eff} = 11952.03$ ;  $\Delta\bar{\chi}^2_{eff} = 9150.31$ ;  $R - 1 = 0.00998$



17.12 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_lensing\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00015$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$H(2.33)$	$235.97 \pm 0.59$
$\Omega_c h^2$	$0.11909 \pm 0.00095$	$D_{40}$	$1242^{+14}_{-19}$	$D_M(2.33)$	$5760.4 \pm 9.1$
$100\theta_{MC}$	$1.04098 \pm 0.00029$	$D_{220}$	$5727 \pm 39$	$f\sigma_8(0.15)$	$0.4555 \pm 0.0055$
$\tau$	$0.0563^{+0.0058}_{-0.0076}$	$D_{810}$	$2538 \pm 13$	$\sigma_8(0.15)$	$0.7482^{+0.0048}_{-0.0055}$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{1420}$	$817.5 \pm 4.8$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0046$
$n_s$	$0.9679 \pm 0.0038$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.38)$	$0.6634^{+0.0041}_{-0.0049}$
$r$	$< 0.0624$	$n_{s,0.002}$	$0.9679 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0041$
$y_{cal}$	$1.0007 \pm 0.0024$	$Y_P$	$0.245397^{+0.000061}_{-0.000052}$	$\sigma_8(0.51)$	$0.6209^{+0.0038}_{-0.0046}$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P^{BBN}$	$0.246723^{+0.000061}_{-0.000052}$	$f\sigma_8(0.61)$	$0.4680 \pm 0.0038$
$\xi^{tSZ-CIB}$	—	$10^5 D/H$	$2.585 \pm 0.027$	$\sigma_8(0.61)$	$0.5908^{+0.0036}_{-0.0044}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	Age/Gyr	$13.791 \pm 0.021$	$f\sigma_8(2.33)$	$0.2979^{+0.0018}_{-0.0022}$
$A_{100}^{PS}$	$248 \pm 30$	$z_*$	$1089.83 \pm 0.22$	$\sigma_8(2.33)$	$0.3072^{+0.0019}_{-0.0024}$
$A_{143}^{PS}$	$42 \pm 9$	$r_*$	$144.66 \pm 0.23$	$r_{0.002}$	$< 0.0577$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$100\theta_*$	$1.04116 \pm 0.00029$	$r_{0.01}$	$< 0.0600$
$A^{kSZ}$	$< 5.00$	$D_M(z_*)/\text{Gpc}$	$13.894 \pm 0.023$	$\ln(10^{10} A_t)$	$-0.39^{+1.3}_{-0.53}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_{\text{drag}}$	$1059.89 \pm 0.32$	$r_{L=10}$	$< 0.0295$
$c_{217}$	$0.9996^{+0.0021}_{-0.0023}$	$r_{\text{drag}}$	$147.32 \pm 0.25$	$10^9 A_t$	$< 0.131$
$H_0$	$67.70 \pm 0.42$	$k_D$	$0.14063^{+0.00033}_{-0.00030}$	$10^9 A_t e^{-2\tau}$	$< 0.117$
$\Omega_\Lambda$	$0.6899 \pm 0.0057$	$100\theta_D$	$0.16079 \pm 0.00019$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m$	$0.3101 \pm 0.0057$	$z_{\text{eq}}$	$3381 \pm 22$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.14211 \pm 0.00091$	$k_{\text{eq}}$	$0.010318 \pm 0.000067$	$f_{2000}^{217}$	$106.7 \pm 1.8$
$\Omega_m h^3$	$0.09621 \pm 0.00032$	$100\theta_{\text{eq}}$	$0.8173 \pm 0.0041$	$\chi^2_{\text{lensing}}$	$9.23 \pm 0.67$
$\sigma_8$	$0.8095 \pm 0.0057$	$100\theta_{s,\text{eq}}$	$0.4515 \pm 0.0021$	$\chi^2_{\text{small}}$	$844 \pm 800$
$S_8$	$0.823 \pm 0.011$	$H(0.15)$	$72.97 \pm 0.37$	$\chi^2_{\text{lowl}}$	$24.7 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4508 \pm 0.0058$	$D_M(0.15)$	$640.5 \pm 3.6$	$\chi^2_{6\text{DF}}$	$0.045 \pm 0.054$
$\sigma_8 \Omega_m^{0.25}$	$0.6041 \pm 0.0057$	$H(0.38)$	$83.06 \pm 0.27$	$\chi^2_{\text{MGS}}$	$1.32 \pm 0.41$
$\sigma_8/h^{0.5}$	$0.9839 \pm 0.0082$	$D_M(0.38)$	$1527.8 \pm 7.3$	$\chi^2_{\text{DR12BAO}}$	$4.6 \pm 1.2$
$r_{\text{drag}} h$	$99.74 \pm 0.73$	$H(0.51)$	$89.76 \pm 0.22$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.5$
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.020$	$D_M(0.51)$	$1979.3 \pm 8.6$	$\chi^2_{\text{CMB}}$	$7367 \pm 5000$
$z_{\text{re}}$	$7.85^{+0.62}_{-0.73}$	$H(0.61)$	$95.37 \pm 0.19$	$\chi^2_{\text{BAO}}$	$5.99 \pm 0.94$
$10^9 A_s$	$2.102^{+0.025}_{-0.031}$	$D_M(0.61)$	$2303.4 \pm 9.3$		

$\bar{\chi}^2_{\text{eff}} = 11957.91$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.02$ ;  $R - 1 = 0.01331$



17.13 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02208 \pm 0.00022$	$\sigma_8 \Omega_m^{0.25}$	$0.614 \pm 0.012$	$D_M(0.38)$	$1546 \pm 16$
$\Omega_c h^2$	$0.1211 \pm 0.0021$	$\sigma_8/h^{0.5}$	$0.997 \pm 0.016$	$H(0.51)$	$89.24 \pm 0.43$
$100\theta_{MC}$	$1.04075 \pm 0.00047$	$r_{\text{drag}} h$	$98.1 \pm 1.6$	$D_M(0.51)$	$2000 \pm 18$
$\tau$	$0.0525 \pm 0.0079$	$\langle d^2 \rangle^{1/2}$	$2.461 \pm 0.037$	$H(0.61)$	$94.94 \pm 0.35$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$z_{\text{re}}$	$7.55 \pm 0.81$	$D_M(0.61)$	$2326 \pm 20$
$n_s$	$0.9623 \pm 0.0057$	$10^9 A_s$	$2.095 \pm 0.034$	$H(2.33)$	$237.0 \pm 1.3$
$r$	$< 0.0313$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.014$	$D_M(2.33)$	$5780 \pm 16$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1243 \pm 16$	$f\sigma_8(0.15)$	$0.467 \pm 0.012$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5706 \pm 41$	$\sigma_8(0.15)$	$0.7509 \pm 0.0073$
$A_{B,\text{sync}}$	$1.64^{+0.53}_{-1.4}$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.38)$	$0.4822 \pm 0.0094$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$814.5 \pm 5.2$	$\sigma_8(0.38)$	$0.6643 \pm 0.0059$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.096$	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.51)$	$0.4793 \pm 0.0080$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9623 \pm 0.0057$	$\sigma_8(0.51)$	$0.6212 \pm 0.0054$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.24527^{+0.00011}_{-0.000087}$	$f\sigma_8(0.61)$	$0.4734 \pm 0.0071$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.24660^{+0.00011}_{-0.000087}$	$\sigma_8(0.61)$	$0.5907 \pm 0.0050$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.641 \pm 0.042$	$f\sigma_8(2.33)$	$0.2974 \pm 0.0025$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.836 \pm 0.036$	$\sigma_8(2.33)$	$0.3061 \pm 0.0026$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$z_*$	$1090.38 \pm 0.40$	$r_{0.002}$	$< 0.0281$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.37 \pm 0.48$	$r_{0.01}$	$< 0.0296$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04096 \pm 0.00046$	$\ln(10^{10} A_t)$	$-0.99^{+1.1}_{-0.42}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.869 \pm 0.044$	$r_{L=10}$	$< 0.0144$
$A^{kSZ}$	$< 5.72$	$z_{\text{drag}}$	$1059.34 \pm 0.45$	$10^9 A_t$	$< 0.0655$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.13 \pm 0.48$	$10^9 A_t e^{-2\tau}$	$< 0.0590$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$k_D$	$0.14060 \pm 0.00052$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$H_0$	$66.69 \pm 0.91$	$100\theta_D$	$0.16111 \pm 0.00026$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\Lambda$	$0.676 \pm 0.013$	$z_{\text{eq}}$	$3421 \pm 47$	$f_{2000}^{217}$	$108.0 \pm 2.0$
$\Omega_m$	$0.324 \pm 0.013$	$k_{\text{eq}}$	$0.01044 \pm 0.00014$	$\chi_{\text{BKPLANCK}}^2$	$739.2 \pm 2.7$
$\Omega_m h^2$	$0.1438 \pm 0.0020$	$100\theta_{\text{eq}}$	$0.8091 \pm 0.0088$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.7$
$\Omega_m h^3$	$0.09589 \pm 0.00046$	$100\theta_{s,\text{eq}}$	$0.4474 \pm 0.0045$	$\chi_{\text{lowl}}^2$	$24.8 \pm 1.5$
$\sigma_8$	$0.8139 \pm 0.0087$	$H(0.15)$	$72.09 \pm 0.77$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.845 \pm 0.024$	$D_M(0.15)$	$649.3 \pm 7.9$	$\chi_{\text{CMB}}^2$	$5078 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.463 \pm 0.013$	$H(0.38)$	$82.41 \pm 0.55$		

Best-fit  $\chi_{\text{eff}}^2 = 8207.30$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.23$ ;  $\bar{\chi}_{\text{eff}}^2 = 8233.28$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.07$ ;  $R - 1 = 0.00244$   
 $\chi_{\text{eff}}^2$ : CMB - BK15\_dust: 734.95 ( $\Delta$  0.08) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.00 ( $\Delta$  -0.00) commander\_dx12\_v3\_2\_29: 24.16 ( $\Delta$  -0.10) CamSpec like\_10.7HM: 7049.91



## 17.14 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00019$	$\sigma_8/h^{0.5}$	$0.984 \pm 0.011$	$D_M(0.51)$	$1983 \pm 11$
$\Omega_c h^2$	$0.1191 \pm 0.0012$	$r_{\text{drag}} h$	$99.65 \pm 0.93$	$H(0.61)$	$95.24 \pm 0.24$
$100\theta_{MC}$	$1.04100 \pm 0.00042$	$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.027$	$D_M(0.61)$	$2308 \pm 12$
$\tau$	$0.0546 \pm 0.0077$	$z_{\text{re}}$	$7.72 \pm 0.78$	$H(2.33)$	$235.82 \pm 0.78$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$10^9 A_s$	$2.095 \pm 0.034$	$D_M(2.33)$	$5768 \pm 12$
$n_s$	$0.9668 \pm 0.0043$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$f\sigma_8(0.15)$	$0.4557 \pm 0.0076$
$r$	$< 0.0339$	$D_{40}$	$1234 \pm 14$	$\sigma_8(0.15)$	$0.7473 \pm 0.0067$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{220}$	$5715 \pm 41$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0064$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{810}$	$2536 \pm 14$	$\sigma_8(0.38)$	$0.6625 \pm 0.0057$
$A_{B,\text{sync}}$	$1.64^{+0.52}_{-1.4}$	$D_{1420}$	$815.7 \pm 5.1$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0057$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$230.1 \pm 1.8$	$\sigma_8(0.51)$	$0.6200 \pm 0.0053$
$\beta_{B,\text{dust}}$	$1.595 \pm 0.096$	$n_{s,0.002}$	$0.9668 \pm 0.0043$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0053$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245321^{+0.000088}_{-0.000074}$	$\sigma_8(0.61)$	$0.5899 \pm 0.0050$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246647^{+0.000088}_{-0.000075}$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0025$
$\epsilon_{\text{dust,sync}}$	$-0.34 \pm 0.28$	$10^5 D/H$	$2.619 \pm 0.037$	$\sigma_8(2.33)$	$0.3067 \pm 0.0026$
$A_{217}^{CIB}$	$44 \pm 8$	Age/Gyr	$13.809 \pm 0.028$	$r_{0.002}$	$< 0.0308$
$\xi^{tSZ-CIB}$	—	$z_*$	$1090.07 \pm 0.29$	$r_{0.01}$	$< 0.0323$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$r_*$	$144.79 \pm 0.31$	$\ln(10^{10} A_t)$	$-0.89^{+1.1}_{-0.40}$
$A_{100}^{PS}$	$252 \pm 30$	$100\theta_*$	$1.04121 \pm 0.00041$	$r_{L=10}$	$< 0.0158$
$A_{143}^{PS}$	$45 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.906 \pm 0.031$	$10^9 A_t$	$< 0.0709$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_{\text{drag}}$	$1059.47 \pm 0.44$	$10^9 A_t e^{-2\tau}$	$< 0.0636$
$A^{kSZ}$	$< 5.66$	$r_{\text{drag}}$	$147.52 \pm 0.34$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$c_{100}$	$0.9985^{+0.0017}_{-0.0015}$	$k_D$	$0.14028 \pm 0.00044$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_D$	$0.16104 \pm 0.00026$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$H_0$	$67.55 \pm 0.54$	$z_{\text{eq}}$	$3377 \pm 28$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.7$
$\Omega_\Lambda$	$0.6888 \pm 0.0073$	$k_{\text{eq}}$	$0.010307 \pm 0.000087$	$\chi_{\text{simall}}^2$	$397.3 \pm 1.9$
$\Omega_m$	$0.3112 \pm 0.0073$	$100\theta_{\text{eq}}$	$0.8174 \pm 0.0052$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.1$
$\Omega_m h^2$	$0.1420 \pm 0.0012$	$100\theta_{s,\text{eq}}$	$0.4517 \pm 0.0027$	$\chi_{6\text{DF}}^2$	$0.065 \pm 0.083$
$\Omega_m h^3$	$0.09589 \pm 0.00046$	$H(0.15)$	$72.82 \pm 0.47$	$\chi_{\text{MGS}}^2$	$1.29 \pm 0.51$
$\sigma_8$	$0.8087 \pm 0.0076$	$D_M(0.15)$	$641.9 \pm 4.6$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.7$
$S_8$	$0.824 \pm 0.015$	$H(0.38)$	$82.92 \pm 0.35$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0081$	$D_M(0.38)$	$1530.8 \pm 9.3$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6040 \pm 0.0079$	$H(0.51)$	$89.63 \pm 0.29$	$\chi_{\text{CMB}}^2$	$5079 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8214.03$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.09$ ;  $\bar{\chi}_{\text{eff}}^2 = 8239.80$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.72$ ;  $R - 1 = 0.00717$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.03 ( $\Delta$  -0.01) MGS: 1.22 ( $\Delta$  0.06) DR12BAO: 4.37 ( $\Delta$  -0.19) CMB - BK15\_dust: 735.63 ( $\Delta$  0.08) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.19 ( $\Delta$  0.00) commander\_dx12\_v3.2.29: 23.46 ( $\Delta$  -0.06) CamSpec like\_10.7HM: 7050.82



17.15 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_lensing/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02212 \pm 0.00021$	$\sigma_8 \Omega_m^{0.25}$	$0.6103 \pm 0.0076$	$D_M(0.38)$	$1541 \pm 12$
$\Omega_c h^2$	$0.1205 \pm 0.0016$	$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$H(0.51)$	$89.35 \pm 0.36$
$100\theta_{MC}$	$1.04080 \pm 0.00045$	$r_{\text{drag}} h$	$98.6 \pm 1.2$	$D_M(0.51)$	$1995 \pm 14$
$\tau$	$0.0525 \pm 0.0078$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.025$	$H(0.61)$	$95.03 \pm 0.30$
$\ln(10^{10} A_s)$	$3.041 \pm 0.015$	$z_{\text{re}}$	$7.54^{+0.80}_{-0.72}$	$D_M(0.61)$	$2320 \pm 16$
$n_s$	$0.9635 \pm 0.0049$	$10^9 A_s$	$2.092 \pm 0.031$	$H(2.33)$	$236.60 \pm 0.96$
$r$	$< 0.0321$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.011$	$D_M(2.33)$	$5777 \pm 14$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1240 \pm 14$	$f\sigma_8(0.15)$	$0.4628 \pm 0.0081$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5710 \pm 41$	$\sigma_8(0.15)$	$0.7492 \pm 0.0055$
$A_{B,\text{sync}}$	$1.64^{+0.53}_{-1.4}$	$D_{810}$	$2536 \pm 13$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0062$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$814.7 \pm 5.2$	$\sigma_8(0.38)$	$0.6633 \pm 0.0048$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.096$	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.51)$	$0.4769 \pm 0.0053$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9635 \pm 0.0049$	$\sigma_8(0.51)$	$0.6203 \pm 0.0045$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245286^{+0.000099}_{-0.000081}$	$f\sigma_8(0.61)$	$0.4713 \pm 0.0047$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246613^{+0.000099}_{-0.000081}$	$\sigma_8(0.61)$	$0.5900 \pm 0.0044$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.634 \pm 0.040$	$f\sigma_8(2.33)$	$0.2972 \pm 0.0023$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.828 \pm 0.032$	$\sigma_8(2.33)$	$0.3061 \pm 0.0026$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$z_*$	$1090.28 \pm 0.35$	$r_{0.002}$	$< 0.0289$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.51 \pm 0.37$	$r_{0.01}$	$< 0.0305$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04101 \pm 0.00044$	$\ln(10^{10} A_t)$	$-0.96^{+1.1}_{-0.41}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.881 \pm 0.035$	$r_{L=10}$	$< 0.0148$
$A^{kSZ}$	$< 5.77$	$z_{\text{drag}}$	$1059.38 \pm 0.45$	$10^9 A_t$	$< 0.0671$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.25 \pm 0.38$	$10^9 A_t e^{-2\tau}$	$< 0.0604$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$k_D$	$0.14050 \pm 0.00045$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$H_0$	$66.95 \pm 0.71$	$100\theta_D$	$0.16108 \pm 0.00026$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\Lambda$	$0.6803 \pm 0.0099$	$z_{\text{eq}}$	$3407 \pm 36$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m$	$0.3197 \pm 0.0099$	$k_{\text{eq}}$	$0.01040 \pm 0.00011$	$\chi_{\text{lensing}}^2$	$9.55 \pm 0.93$
$\Omega_m h^2$	$0.1432 \pm 0.0015$	$100\theta_{\text{eq}}$	$0.8117 \pm 0.0067$	$\chi_{\text{BKPLANCK}}^2$	$739.4 \pm 2.6$
$\Omega_m h^3$	$0.09588 \pm 0.00045$	$100\theta_{s,\text{eq}}$	$0.4487 \pm 0.0034$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.6$
$\sigma_8$	$0.8117 \pm 0.0062$	$H(0.15)$	$72.31 \pm 0.61$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.2$
$S_8$	$0.838 \pm 0.016$	$D_M(0.15)$	$647.0 \pm 6.1$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4589 \pm 0.0089$	$H(0.38)$	$82.56 \pm 0.45$	$\chi_{\text{CMB}}^2$	$5087 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8216.43$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.11$ ;  $\bar{\chi}_{\text{eff}}^2 = 8242.24$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.88$ ;  $R - 1 = 0.00337$   
 $\chi_{\text{eff}}^2$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 9.00 ( $\Delta$  0.02) BK15\_dust: 735.17 ( $\Delta$  -0.03) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.01 ( $\Delta$  0.01) com-  
mander\_dx12\_v3\_2\_29: 23.99 ( $\Delta$  -0.08) CamSpec like\_10.7HM: 7049.83



17.16 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00019$	$r_{\text{drag}} h$	$99.57 \pm 0.84$	$D_{\text{M}}(0.61)$	$2308 \pm 11$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.021$	$H(2.33)$	$235.89 \pm 0.70$
$100\theta_{MC}$	$1.04099 \pm 0.00042$	$z_{\text{re}}$	$7.83 \pm 0.73$	$D_{\text{M}}(2.33)$	$5768 \pm 12$
$\tau$	$0.0557 \pm 0.0073$	$10^9 A_s$	$2.101 \pm 0.030$	$f\sigma_8(0.15)$	$0.4569 \pm 0.0060$
$\ln(10^{10} A_s)$	$3.045 \pm 0.014$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$\sigma_8(0.15)$	$0.7485 \pm 0.0055$
$n_s$	$0.9664 \pm 0.0041$	$D_{40}$	$1236 \pm 13$	$f\sigma_8(0.38)$	$0.4751 \pm 0.0050$
$r$	$< 0.0334$	$D_{220}$	$5719 \pm 40$	$\sigma_8(0.38)$	$0.6635 \pm 0.0048$
$y_{\text{cal}}$	$1.0010 \pm 0.0025$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.51)$	$0.4737 \pm 0.0045$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{1420}$	$815.9 \pm 5.0$	$\sigma_8(0.51)$	$0.6209 \pm 0.0045$
$A_{B,\text{sync}}$	$1.64^{+0.52}_{-1.4}$	$D_{2000}$	$230.1 \pm 1.8$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0041$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$n_{s,0.002}$	$0.9664 \pm 0.0041$	$\sigma_8(0.61)$	$0.5908 \pm 0.0043$
$\beta_{B,\text{dust}}$	$1.595 \pm 0.096$	$Y_P$	$0.245323^{+0.000087}_{-0.000074}$	$f\sigma_8(2.33)$	$0.2979 \pm 0.0022$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246649^{+0.000087}_{-0.000074}$	$\sigma_8(2.33)$	$0.3071 \pm 0.0024$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.618 \pm 0.037$	$r_{0.002}$	$< 0.0304$
$\epsilon_{\text{dust,sync}}$	$-0.34 \pm 0.28$	Age/Gyr	$13.809 \pm 0.027$	$r_{0.01}$	$< 0.0319$
$A_{217}^{CIB}$	$44 \pm 8$	$z_*$	$1090.07 \pm 0.29$	$\ln(10^{10} A_t)$	$-0.90^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.76 \pm 0.28$	$r_{L=10}$	$< 0.0155$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$100\theta_*$	$1.04119 \pm 0.00041$	$10^9 A_t$	$< 0.0701$
$A_{100}^{PS}$	$252 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.903 \pm 0.028$	$10^9 A_t e^{-2\tau}$	$< 0.0627$
$A_{143}^{PS}$	$45 \pm 9$	$z_{\text{drag}}$	$1059.49 \pm 0.44$	$f_{2000}^{143}$	$30.6 \pm 2.9$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_{\text{drag}}$	$147.49 \pm 0.32$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$A^{kSZ}$	$< 5.62$	$k_{\text{D}}$	$0.14032 \pm 0.00042$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.28 \pm 0.70$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$z_{\text{eq}}$	$3380 \pm 25$	$\chi_{\text{BKPLANCK}}^2$	$739.8 \pm 2.6$
$H_0$	$67.51 \pm 0.49$	$k_{\text{eq}}$	$0.010316 \pm 0.000077$	$\chi_{\text{simall}}^2$	$397.3 \pm 1.9$
$\Omega_{\Lambda}$	$0.6882 \pm 0.0066$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0047$	$\chi_{\text{lowl}}^2$	$24.0 \pm 1.1$
$\Omega_m$	$0.3118 \pm 0.0066$	$100\theta_{s,\text{eq}}$	$0.4514 \pm 0.0024$	$\chi_{6\text{DF}}^2$	$0.064 \pm 0.076$
$\Omega_m h^2$	$0.1421 \pm 0.0011$	$H(0.15)$	$72.79 \pm 0.43$	$\chi_{\text{MGS}}^2$	$1.23 \pm 0.45$
$\Omega_m h^3$	$0.09591 \pm 0.00045$	$D_{\text{M}}(0.15)$	$642.2 \pm 4.2$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.6$
$\sigma_8$	$0.8101 \pm 0.0061$	$H(0.38)$	$82.90 \pm 0.33$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.826 \pm 0.012$	$D_{\text{M}}(0.38)$	$1531.5 \pm 8.6$	$\chi_{\text{CMB}}^2$	$5087 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4523 \pm 0.0065$	$H(0.51)$	$89.61 \pm 0.27$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6053 \pm 0.0061$	$D_{\text{M}}(0.51)$	$1984 \pm 10$		
$\sigma_8/h^{0.5}$	$0.9859 \pm 0.0088$	$H(0.61)$	$95.23 \pm 0.24$		

Best-fit  $\chi_{\text{eff}}^2 = 8223.00$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.23$ ;  $\bar{\chi}_{\text{eff}}^2 = 8248.72$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.85$ ;  $R - 1 = 0.00847$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.05 ( $\Delta$  0.00) MGS: 1.10 ( $\Delta$  0.00) DR12BAO: 4.77 ( $\Delta$  -0.00) CMB - smicadx12.Dec5.ftl\_mv2.ndclpp-p.teb.consext8: 8.90 ( $\Delta$  0.09) BK15.dust: 735.61 ( $\Delta$  0.13) simall\_100x143\_offlike5.EE.Aplanck\_B: 396.19 ( $\Delta$  -0.01) commander.dx12.v3.2.29: 23.50 ( $\Delta$  -0.10) CamSpec like\_10.7HM: 7050.59



17.17 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02209 \pm 0.00022$	$\sigma_8 \Omega_m^{0.25}$	$0.614 \pm 0.011$	$D_M(0.38)$	$1545 \pm 16$
$\Omega_c h^2$	$0.1210 \pm 0.0021$	$\sigma_8/h^{0.5}$	$0.998 \pm 0.016$	$H(0.51)$	$89.26 \pm 0.43$
$100\theta_{MC}$	$1.04076 \pm 0.00047$	$r_{\text{drag}} h$	$98.2 \pm 1.6$	$D_M(0.51)$	$2000 \pm 18$
$\tau$	$0.0539^{+0.0049}_{-0.0082}$	$\langle d^2 \rangle^{1/2}$	$2.463 \pm 0.037$	$H(0.61)$	$94.96 \pm 0.34$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.016}$	$z_{\text{re}}$	$7.70^{+0.55}_{-0.80}$	$D_M(0.61)$	$2325 \pm 20$
$n_s$	$0.9626 \pm 0.0057$	$10^9 A_s$	$2.101^{+0.024}_{-0.033}$	$H(2.33)$	$236.9 \pm 1.3$
$r$	$< 0.0313$	$10^9 A_s e^{-2\tau}$	$1.886 \pm 0.014$	$D_M(2.33)$	$5780 \pm 16$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1243 \pm 16$	$f\sigma_8(0.15)$	$0.467 \pm 0.012$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5706 \pm 41$	$\sigma_8(0.15)$	$0.7518 \pm 0.0069$
$A_{B,\text{sync}}$	$1.64^{+0.52}_{-1.4}$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.38)$	$0.4825 \pm 0.0094$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.33}$	$D_{1420}$	$814.6 \pm 5.2$	$\sigma_8(0.38)$	$0.6652^{+0.0050}_{-0.0056}$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.096$	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.51)$	$0.4797 \pm 0.0080$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9626 \pm 0.0057$	$\sigma_8(0.51)$	$0.6220^{+0.0044}_{-0.0052}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.24527^{+0.00011}_{-0.000086}$	$f\sigma_8(0.61)$	$0.4738 \pm 0.0070$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.24660^{+0.00011}_{-0.000087}$	$\sigma_8(0.61)$	$0.5915^{+0.0040}_{-0.0049}$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.639 \pm 0.042$	$f\sigma_8(2.33)$	$0.2978^{+0.0019}_{-0.0025}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.834 \pm 0.036$	$\sigma_8(2.33)$	$0.3066^{+0.0019}_{-0.0026}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$z_*$	$1090.37 \pm 0.40$	$r_{0.002}$	$< 0.0281$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.39 \pm 0.47$	$r_{0.01}$	$< 0.0296$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04097 \pm 0.00046$	$\ln(10^{10} A_t)$	$-0.99^{+1.1}_{-0.42}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.870 \pm 0.044$	$r_{L=10}$	$< 0.0144$
$A^{kSZ}$	$< 5.68$	$z_{\text{drag}}$	$1059.36 \pm 0.45$	$10^9 A_t$	$< 0.0657$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$r_{\text{drag}}$	$147.14 \pm 0.48$	$10^9 A_t e^{-2\tau}$	$< 0.0589$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$k_D$	$0.14060 \pm 0.00052$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$H_0$	$66.73 \pm 0.90$	$100\theta_D$	$0.16110 \pm 0.00026$	$f_{2000}^{143 \times 217}$	$33.3 \pm 2.1$
$\Omega_\Lambda$	$0.677 \pm 0.013$	$z_{\text{eq}}$	$3420 \pm 47$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m$	$0.323 \pm 0.013$	$k_{\text{eq}}$	$0.01044 \pm 0.00014$	$\chi_{\text{BKPLANCK}}^2$	$739.2 \pm 2.7$
$\Omega_m h^2$	$0.1437 \pm 0.0020$	$100\theta_{\text{eq}}$	$0.8094 \pm 0.0088$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$\Omega_m h^3$	$0.09590 \pm 0.00046$	$100\theta_{s,\text{eq}}$	$0.4476 \pm 0.0045$	$\chi_{\text{lowl}}^2$	$24.8 \pm 1.5$
$\sigma_8$	$0.8148 \pm 0.0083$	$H(0.15)$	$72.12 \pm 0.77$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.846 \pm 0.024$	$D_M(0.15)$	$649.0 \pm 7.9$	$\chi_{\text{CMB}}^2$	$5078 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.463 \pm 0.013$	$H(0.38)$	$82.43 \pm 0.55$		

$\bar{\chi}_{\text{eff}}^2 = 8233.01$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.07$ ;  $R - 1 = 0.00318$



17.18 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00019$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.011$	$D_M(0.51)$	$1983 \pm 11$
$\Omega_c h^2$	$0.1191 \pm 0.0012$	$r_{\text{drag}} h$	$99.67 \pm 0.93$	$H(0.61)$	$95.24 \pm 0.24$
$100\theta_{MC}$	$1.04101 \pm 0.00042$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.026$	$D_M(0.61)$	$2307 \pm 12$
$\tau$	$0.0556^{+0.0055}_{-0.0080}$	$z_{\text{re}}$	$7.82^{+0.61}_{-0.78}$	$H(2.33)$	$235.81 \pm 0.78$
$\ln(10^{10} A_s)$	$3.044^{+0.013}_{-0.016}$	$10^9 A_s$	$2.099^{+0.026}_{-0.034}$	$D_M(2.33)$	$5768 \pm 12$
$n_s$	$0.9669 \pm 0.0043$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$f\sigma_8(0.15)$	$0.4561 \pm 0.0075$
$r$	$< 0.0338$	$D_{40}$	$1234 \pm 14$	$\sigma_8(0.15)$	$0.7480^{+0.0058}_{-0.0067}$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{220}$	$5715 \pm 41$	$f\sigma_8(0.38)$	$0.4745 \pm 0.0063$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{810}$	$2536 \pm 14$	$\sigma_8(0.38)$	$0.6631^{+0.0047}_{-0.0057}$
$A_{B,\text{sync}}$	$1.64^{+0.52}_{-1.4}$	$D_{1420}$	$815.7 \pm 5.1$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0056$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$230.1 \pm 1.8$	$\sigma_8(0.51)$	$0.6206^{+0.0043}_{-0.0053}$
$\beta_{B,\text{dust}}$	$1.595 \pm 0.096$	$n_{s,0.002}$	$0.9669 \pm 0.0043$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0051$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245322^{+0.000087}_{-0.000074}$	$\sigma_8(0.61)$	$0.5905^{+0.0041}_{-0.0050}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246649^{+0.000088}_{-0.000074}$	$f\sigma_8(2.33)$	$0.2977^{+0.0020}_{-0.0025}$
$\epsilon_{\text{dust,sync}}$	$-0.34 \pm 0.28$	$10^5 D/H$	$2.618 \pm 0.037$	$\sigma_8(2.33)$	$0.3070^{+0.0021}_{-0.0026}$
$A_{217}^{CIB}$	$44 \pm 8$	Age/Gyr	$13.808 \pm 0.028$	$r_{0.002}$	$< 0.0308$
$\xi^{tSZ-CIB}$	—	$z_*$	$1090.06 \pm 0.29$	$r_{0.01}$	$< 0.0323$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$r_*$	$144.79 \pm 0.31$	$\ln(10^{10} A_t)$	$-0.89^{+1.1}_{-0.40}$
$A_{100}^{PS}$	$252 \pm 30$	$100\theta_*$	$1.04121 \pm 0.00041$	$r_{L=10}$	$< 0.0158$
$A_{143}^{PS}$	$44 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.906 \pm 0.031$	$10^9 A_t$	$< 0.0710$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_{\text{drag}}$	$1059.47 \pm 0.44$	$10^9 A_t e^{-2\tau}$	$< 0.0636$
$A^{kSZ}$	$< 5.64$	$r_{\text{drag}}$	$147.52 \pm 0.34$	$f_{2000}^{143}$	$30.6 \pm 2.9$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$k_D$	$0.14028 \pm 0.00044$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$100\theta_D$	$0.16104 \pm 0.00026$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$H_0$	$67.56 \pm 0.54$	$z_{\text{eq}}$	$3377 \pm 28$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.7$
$\Omega_\Lambda$	$0.6889 \pm 0.0072$	$k_{\text{eq}}$	$0.010306 \pm 0.000086$	$\chi_{\text{small}}^2$	$397.2 \pm 1.9$
$\Omega_m$	$0.3111 \pm 0.0072$	$100\theta_{\text{eq}}$	$0.8175 \pm 0.0052$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.1$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_{s,\text{eq}}$	$0.4517 \pm 0.0027$	$\chi_{6\text{DF}}^2$	$0.064 \pm 0.081$
$\Omega_m h^3$	$0.09589 \pm 0.00046$	$H(0.15)$	$72.83 \pm 0.46$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.51$
$\sigma_8$	$0.8094^{+0.0067}_{-0.0075}$	$D_M(0.15)$	$641.8 \pm 4.6$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.7$
$S_8$	$0.824 \pm 0.015$	$H(0.38)$	$82.93 \pm 0.35$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0080$	$D_M(0.38)$	$1530.7 \pm 9.3$	$\chi_{\text{BAO}}^2$	$6.3 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0077$	$H(0.51)$	$89.63 \pm 0.29$	$\chi_{\text{CMB}}^2$	$5078 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 8239.57; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.71; R - 1 = 0.00860$$



17.19 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00021$	$\sigma_8 \Omega_m^{0.25}$	$0.6104 \pm 0.0076$	$D_M(0.38)$	$1540 \pm 12$
$\Omega_c h^2$	$0.1203 \pm 0.0015$	$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$H(0.51)$	$89.38 \pm 0.35$
$100\theta_{MC}$	$1.04082 \pm 0.00045$	$r_{\text{drag}} h$	$98.7 \pm 1.2$	$D_M(0.51)$	$1994 \pm 14$
$\tau$	$0.0540^{+0.0049}_{-0.0081}$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.025$	$H(0.61)$	$95.05 \pm 0.29$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.014}$	$z_{\text{re}}$	$7.69^{+0.56}_{-0.78}$	$D_M(0.61)$	$2319 \pm 15$
$n_s$	$0.9639 \pm 0.0048$	$10^9 A_s$	$2.097^{+0.023}_{-0.030}$	$H(2.33)$	$236.53 \pm 0.93$
$r$	$< 0.0321$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.011$	$D_M(2.33)$	$5776 \pm 14$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{40}$	$1240 \pm 14$	$f\sigma_8(0.15)$	$0.4626 \pm 0.0081$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5710 \pm 41$	$\sigma_8(0.15)$	$0.7499 \pm 0.0051$
$A_{B,\text{sync}}$	$1.64^{+0.53}_{-1.4}$	$D_{810}$	$2536 \pm 13$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0062$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$814.7 \pm 5.2$	$\sigma_8(0.38)$	$0.6640^{+0.0040}_{-0.0046}$
$\beta_{B,\text{dust}}$	$1.597 \pm 0.096$	$D_{2000}$	$229.7 \pm 1.8$	$f\sigma_8(0.51)$	$0.4771 \pm 0.0053$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9639 \pm 0.0048$	$\sigma_8(0.51)$	$0.6210^{+0.0036}_{-0.0044}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245291^{+0.000097}_{-0.000080}$	$f\sigma_8(0.61)$	$0.4715 \pm 0.0047$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246617^{+0.000097}_{-0.000081}$	$\sigma_8(0.61)$	$0.5907^{+0.0034}_{-0.0043}$
$A_{217}^{CIB}$	$44 \pm 8$	$10^5 D/H$	$2.632 \pm 0.039$	$f\sigma_8(2.33)$	$0.2976^{+0.0018}_{-0.0023}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.826 \pm 0.032$	$\sigma_8(2.33)$	$0.3065^{+0.0019}_{-0.0025}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$z_*$	$1090.26 \pm 0.34$	$r_{0.002}$	$< 0.0290$
$A_{100}^{PS}$	$253 \pm 30$	$r_*$	$144.53 \pm 0.36$	$r_{0.01}$	$< 0.0305$
$A_{143}^{PS}$	$45 \pm 9$	$100\theta_*$	$1.04103 \pm 0.00044$	$\ln(10^{10} A_t)$	$-0.95^{+1.1}_{-0.41}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.884 \pm 0.034$	$r_{L=10}$	$< 0.0149$
$A^{kSZ}$	$< 5.74$	$z_{\text{drag}}$	$1059.39 \pm 0.45$	$10^9 A_t$	$< 0.0675$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$r_{\text{drag}}$	$147.28 \pm 0.37$	$10^9 A_t e^{-2\tau}$	$< 0.0605$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$k_D$	$0.14048 \pm 0.00045$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$H_0$	$67.01 \pm 0.69$	$100\theta_D$	$0.16108 \pm 0.00026$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6812 \pm 0.0095$	$z_{\text{eq}}$	$3404 \pm 35$	$f_{2000}^{217}$	$107.9 \pm 2.0$
$\Omega_m$	$0.3188 \pm 0.0095$	$k_{\text{eq}}$	$0.01039 \pm 0.00011$	$\chi_{\text{lensing}}^2$	$9.53 \pm 0.94$
$\Omega_m h^2$	$0.1431 \pm 0.0015$	$100\theta_{\text{eq}}$	$0.8123 \pm 0.0065$	$\chi_{\text{BKPLANCK}}^2$	$739.4 \pm 2.6$
$\Omega_m h^3$	$0.09588 \pm 0.00045$	$100\theta_{s,\text{eq}}$	$0.4490 \pm 0.0033$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.6$
$\sigma_8$	$0.8123 \pm 0.0059$	$H(0.15)$	$72.36 \pm 0.59$	$\chi_{\text{lowl}}^2$	$24.5 \pm 1.2$
$S_8$	$0.837 \pm 0.016$	$D_M(0.15)$	$646.5 \pm 6.0$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$\sigma_8 \Omega_m^{0.5}$	$0.4587 \pm 0.0088$	$H(0.38)$	$82.59 \pm 0.43$	$\chi_{\text{CMB}}^2$	$5087 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 8241.99; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.89; R - 1 = 0.00437$$



17.20 base\_r\_CamSpecHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing\_zre6p5/base\_r\_plikHM\_TT\_lowl\_lowE\_BK15\_post\_BAO\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00019$	$r_{\text{drag}} h$	$99.59 \pm 0.83$	$D_{\text{M}}(0.61)$	$2308 \pm 11$
$\Omega_c h^2$	$0.1192 \pm 0.0011$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.021$	$H(2.33)$	$235.88 \pm 0.69$
$100\theta_{MC}$	$1.04099 \pm 0.00042$	$z_{\text{re}}$	$7.89^{+0.62}_{-0.72}$	$D_{\text{M}}(2.33)$	$5768 \pm 12$
$\tau$	$0.0563^{+0.0059}_{-0.0074}$	$10^9 A_s$	$2.103^{+0.025}_{-0.031}$	$f\sigma_8(0.15)$	$0.4570 \pm 0.0060$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.014}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$\sigma_8(0.15)$	$0.7489 \pm 0.0052$
$n_s$	$0.9665 \pm 0.0041$	$D_{40}$	$1236 \pm 13$	$f\sigma_8(0.38)$	$0.4753 \pm 0.0050$
$r$	$< 0.0334$	$D_{220}$	$5719 \pm 40$	$\sigma_8(0.38)$	$0.6638^{+0.0042}_{-0.0049}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.51)$	$0.4739 \pm 0.0044$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{1420}$	$815.9 \pm 5.0$	$\sigma_8(0.51)$	$0.6212^{+0.0039}_{-0.0046}$
$A_{B,\text{sync}}$	$1.64^{+0.52}_{-1.4}$	$D_{2000}$	$230.2 \pm 1.8$	$f\sigma_8(0.61)$	$0.4689 \pm 0.0040$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$n_{s,0.002}$	$0.9665 \pm 0.0041$	$\sigma_8(0.61)$	$0.5911^{+0.0037}_{-0.0044}$
$\beta_{B,\text{dust}}$	$1.595 \pm 0.096$	$Y_P$	$0.245324^{+0.000086}_{-0.000074}$	$f\sigma_8(2.33)$	$0.2980^{+0.0019}_{-0.0023}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246650^{+0.000087}_{-0.000074}$	$\sigma_8(2.33)$	$0.3072^{+0.0020}_{-0.0024}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.618 \pm 0.037$	$r_{0.002}$	$< 0.0304$
$\epsilon_{\text{dust,sync}}$	$-0.34 \pm 0.28$	Age/Gyr	$13.809 \pm 0.027$	$r_{0.01}$	$< 0.0319$
$A_{217}^{CIB}$	$44 \pm 8$	$z_*$	$1090.06 \pm 0.28$	$\ln(10^{10} A_t)$	$-0.90^{+1.1}_{-0.40}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.77 \pm 0.28$	$r_{L=10}$	$< 0.0155$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$100\theta_*$	$1.04120 \pm 0.00041$	$10^9 A_t$	$< 0.0703$
$A_{100}^{PS}$	$252 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.028$	$10^9 A_t e^{-2\tau}$	$< 0.0628$
$A_{143}^{PS}$	$44 \pm 9$	$z_{\text{drag}}$	$1059.49 \pm 0.44$	$f_{2000}^{143}$	$30.6 \pm 2.9$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_{\text{drag}}$	$147.49 \pm 0.31$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$A^{kSZ}$	$< 5.61$	$k_{\text{D}}$	$0.14032 \pm 0.00042$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00025$	$\chi_{\text{lensing}}^2$	$9.25 \pm 0.66$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$z_{\text{eq}}$	$3379 \pm 25$	$\chi_{\text{BKPLANCK}}^2$	$739.8 \pm 2.6$
$H_0$	$67.52 \pm 0.49$	$k_{\text{eq}}$	$0.010314 \pm 0.000076$	$\chi_{\text{small}}^2$	$397.3 \pm 1.9$
$\Omega_{\Lambda}$	$0.6884 \pm 0.0065$	$100\theta_{\text{eq}}$	$0.8171 \pm 0.0046$	$\chi_{\text{lowl}}^2$	$24.0 \pm 1.1$
$\Omega_m$	$0.3116 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4515 \pm 0.0024$	$\chi_{6\text{DF}}^2$	$0.062 \pm 0.074$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$H(0.15)$	$72.80 \pm 0.42$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.45$
$\Omega_m h^3$	$0.09591 \pm 0.00045$	$D_{\text{M}}(0.15)$	$642.1 \pm 4.2$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.6$
$\sigma_8$	$0.8104 \pm 0.0058$	$H(0.38)$	$82.91 \pm 0.32$	$\chi_{\text{prior}}^2$	$9.1 \pm 3.9$
$S_8$	$0.826 \pm 0.012$	$D_{\text{M}}(0.38)$	$1531.3 \pm 8.5$	$\chi_{\text{CMB}}^2$	$5087 \pm 3000$
$\sigma_8 \Omega_m^{0.5}$	$0.4524 \pm 0.0065$	$H(0.51)$	$89.62 \pm 0.27$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6055 \pm 0.0061$	$D_{\text{M}}(0.51)$	$1984 \pm 10$		
$\sigma_8/h^{0.5}$	$0.9863 \pm 0.0087$	$H(0.61)$	$95.23 \pm 0.23$		

$\bar{\chi}_{\text{eff}}^2 = 8248.57$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.85$ ;  $R - 1 = 0.00954$



**17.21**    **base\_r\_CamSpecHM\_TTTEE\_lowl\_lowE\_BK15/base\_r\_plikHM\_TTTEE\_lowl\_lowE\_BK15**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00016$	$\sigma_8 \Omega_m^{0.25}$	$0.6086 \pm 0.0086$	$D_M(0.38)$	$1535 \pm 11$
$\Omega_c h^2$	$0.1201 \pm 0.0014$	$\sigma_8/h^{0.5}$	$0.990 \pm 0.012$	$H(0.51)$	$89.56 \pm 0.30$
$100\theta_{MC}$	$1.04087 \pm 0.00032$	$r_{\text{drag}} h$	$99.0 \pm 1.1$	$D_M(0.51)$	$1988 \pm 12$
$\tau$	$0.0543 \pm 0.0079$	$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.029$	$H(0.61)$	$95.22 \pm 0.24$
$\ln(10^{10} A_s)$	$3.044 \pm 0.016$	$z_{\text{re}}$	$7.67 \pm 0.80$	$D_M(0.61)$	$2313 \pm 13$
$n_s$	$0.9654 \pm 0.0045$	$10^9 A_s$	$2.099 \pm 0.034$	$H(2.33)$	$236.55 \pm 0.86$
$r$	$0.0294^{+0.0090}_{-0.027}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_M(2.33)$	$5767 \pm 11$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{40}$	$1240 \pm 14$	$f\sigma_8(0.15)$	$0.4606 \pm 0.0085$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5725 \pm 40$	$\sigma_8(0.15)$	$0.7495 \pm 0.0068$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{810}$	$2539 \pm 14$	$f\sigma_8(0.38)$	$0.4779 \pm 0.0070$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.38)$	$0.6639 \pm 0.0057$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.096$	$D_{2000}$	$230.7 \pm 1.7$	$f\sigma_8(0.51)$	$0.4759 \pm 0.0062$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9654 \pm 0.0045$	$\sigma_8(0.51)$	$0.6211 \pm 0.0053$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245369^{+0.000067}_{-0.000058}$	$f\sigma_8(0.61)$	$0.4706 \pm 0.0056$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246695^{+0.000068}_{-0.000059}$	$\sigma_8(0.61)$	$0.5908 \pm 0.0050$
$A_{217}^{CIB}$	$43 \pm 8$	$10^5 D/H$	$2.597 \pm 0.030$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0025$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.805 \pm 0.025$	$\sigma_8(2.33)$	$0.3067 \pm 0.0026$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$z_*$	$1090.00 \pm 0.28$	$r_{0.002}$	$0.0268^{+0.0076}_{-0.025}$
$A_{100}^{PS}$	$249 \pm 30$	$r_*$	$144.46 \pm 0.33$	$r_{0.01}$	$0.0281^{+0.0083}_{-0.026}$
$A_{143}^{PS}$	$43 \pm 9$	$100\theta_*$	$1.04106 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.79^{+1.1}_{-0.39}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.876 \pm 0.030$	$r_{L=10}$	$0.0137^{+0.0039}_{-0.013}$
$A^{kSZ}$	$< 5.19$	$z_{\text{drag}}$	$1059.80 \pm 0.33$	$10^9 A_t$	$0.062^{+0.019}_{-0.057}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.14 \pm 0.33$	$10^9 A_t e^{-2\tau}$	$0.055^{+0.017}_{-0.051}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$k_D$	$0.14077 \pm 0.00037$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$67.26 \pm 0.61$	$100\theta_D$	$0.16083 \pm 0.00019$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6837 \pm 0.0086$	$z_{\text{eq}}$	$3403 \pm 32$	$f_{2000}^{217}$	$107.0 \pm 1.9$
$\Omega_m$	$0.3163 \pm 0.0086$	$k_{\text{eq}}$	$0.010385 \pm 0.000098$	$\chi_{\text{BKPLANCK}}^2$	$739.7 \pm 2.7$
$\Omega_m h^2$	$0.1430 \pm 0.0013$	$100\theta_{\text{eq}}$	$0.8131 \pm 0.0060$	$\chi_{\text{simall}}^2$	$397.3 \pm 1.9$
$\Omega_m h^3$	$0.09620 \pm 0.00033$	$100\theta_{s,\text{eq}}$	$0.4493 \pm 0.0031$	$\chi_{\text{lowl}}^2$	$24.4 \pm 1.2$
$\sigma_8$	$0.8116 \pm 0.0077$	$H(0.15)$	$72.60 \pm 0.53$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.7$
$S_8$	$0.833 \pm 0.017$	$D_M(0.15)$	$644.2 \pm 5.3$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4564 \pm 0.0091$	$H(0.38)$	$82.79 \pm 0.38$		

Best-fit  $\chi_{\text{eff}}^2 = 12656.30$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.79$ ;  $\bar{\chi}_{\text{eff}}^2 = 12684.27$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.56$ ;  $R - 1 = 0.00430$   
 $\chi_{\text{eff}}^2$ : CMB - BK15\_dust: 735.45 ( $\Delta$  0.25) simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.96 ( $\Delta$  -0.21) commander\_dx12\_v3\_2\_29: 23.74 ( $\Delta$  -0.23) CamSpec like\_10.7HM\_1400\_unified: 11498.91



**17.22**    **base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$\sigma_8/h^{0.5}$	$0.984 \pm 0.011$	$D_M(0.51)$	$1980.5 \pm 9.1$
$\Omega_c h^2$	$0.1192 \pm 0.0010$	$r_{\text{drag}} h$	$99.64 \pm 0.79$	$H(0.61)$	$95.35 \pm 0.19$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.026$	$D_M(0.61)$	$2304.6 \pm 9.8$
$\tau$	$0.0555 \pm 0.0079$	$z_{\text{re}}$	$7.77 \pm 0.79$	$H(2.33)$	$236.05 \pm 0.65$
$\ln(10^{10} A_s)$	$3.045 \pm 0.017$	$10^9 A_s$	$2.101 \pm 0.035$	$D_M(2.33)$	$5761.2 \pm 9.4$
$n_s$	$0.9674 \pm 0.0039$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0067$
$r$	$0.031^{+0.010}_{-0.027}$	$D_{40}$	$1236 \pm 13$	$\sigma_8(0.15)$	$0.7481 \pm 0.0067$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{220}$	$5729 \pm 40$	$f\sigma_8(0.38)$	$0.4744 \pm 0.0058$
$A_{B,\text{dust}}$	$4.88^{+0.81}_{-1.2}$	$D_{810}$	$2539 \pm 14$	$\sigma_8(0.38)$	$0.6632 \pm 0.0058$
$A_{B,\text{sync}}$	$1.61^{+0.52}_{-1.3}$	$D_{1420}$	$817.6 \pm 4.9$	$f\sigma_8(0.51)$	$0.4731 \pm 0.0053$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.51)$	$0.6207 \pm 0.0053$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.096$	$n_{s,0.002}$	$0.9674 \pm 0.0039$	$f\sigma_8(0.61)$	$0.4682 \pm 0.0050$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245392^{+0.000062}_{-0.000054}$	$\sigma_8(0.61)$	$0.5906 \pm 0.0051$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246718^{+0.000062}_{-0.000054}$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0025$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$10^5 D/H$	$2.587 \pm 0.028$	$\sigma_8(2.33)$	$0.3071 \pm 0.0026$
$A_{217}^{CIB}$	$43 \pm 8$	Age/Gyr	$13.793 \pm 0.021$	$r_{0.002}$	$0.0281^{+0.0091}_{-0.025}$
$\xi^{tSZ-CIB}$	—	$z_*$	$1089.86 \pm 0.23$	$r_{0.01}$	$0.0294^{+0.0097}_{-0.026}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$r_*$	$144.64 \pm 0.26$	$\ln(10^{10} A_t)$	$-0.74^{+1.0}_{-0.38}$
$A_{100}^{PS}$	$248 \pm 30$	$100\theta_*$	$1.04116 \pm 0.00030$	$r_{L=10}$	$0.0144^{+0.0046}_{-0.013}$
$A_{143}^{PS}$	$42 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.892 \pm 0.025$	$10^9 A_t$	$0.064^{+0.022}_{-0.057}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_{\text{drag}}$	$1059.87 \pm 0.33$	$10^9 A_t e^{-2\tau}$	$0.058^{+0.020}_{-0.051}$
$A^{kSZ}$	$< 5.16$	$r_{\text{drag}}$	$147.30 \pm 0.27$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$k_D$	$0.14064 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_D$	$0.16080 \pm 0.00019$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$H_0$	$67.65 \pm 0.45$	$z_{\text{eq}}$	$3384 \pm 24$	$\chi_{\text{BKPLANCK}}^2$	$740.0 \pm 2.7$
$\Omega_\Lambda$	$0.6891 \pm 0.0062$	$k_{\text{eq}}$	$0.010327 \pm 0.000073$	$\chi_{\text{small}}^2$	$397.4 \pm 2.1$
$\Omega_m$	$0.3109 \pm 0.0062$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0044$	$\chi_{\text{lowl}}^2$	$24.0 \pm 1.1$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0023$	$\chi_{6\text{DF}}^2$	$0.056 \pm 0.066$
$\Omega_m h^3$	$0.09621 \pm 0.00033$	$H(0.15)$	$72.92 \pm 0.39$	$\chi_{\text{MGS}}^2$	$1.27 \pm 0.43$
$\sigma_8$	$0.8095 \pm 0.0074$	$D_M(0.15)$	$641.0 \pm 3.9$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$S_8$	$0.824 \pm 0.013$	$H(0.38)$	$83.02 \pm 0.29$	$\chi_{\text{prior}}^2$	$11.4 \pm 4.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0071$	$D_M(0.38)$	$1528.8 \pm 7.8$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0072$	$H(0.51)$	$89.74 \pm 0.23$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 12662.21$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.32$ ;  $\bar{\chi}_{\text{eff}}^2 = 12690.24$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.94$ ;  $R - 1 = 0.00669$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.02 ( $\Delta$  -0.02) MGS: 1.28 ( $\Delta$  0.12) DR12BAO: 4.24 ( $\Delta$  -0.42) CMB - BK15\_dust: 735.72 ( $\Delta$  0.23) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.17 ( $\Delta$  -0.31) commander\_dx12\_v3.2\_29: 23.32 ( $\Delta$  -0.25) CamSpec like\_10.7HM\_1400\_unified: 11499.19



**17.23**    **base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_lensing/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00016$	$\sigma_8 \Omega_m^{0.25}$	$0.6079 \pm 0.0065$	$D_M(0.38)$	$1534.3 \pm 9.3$
$\Omega_c h^2$	$0.1199 \pm 0.0012$	$\sigma_8/h^{0.5}$	$0.9887 \pm 0.0091$	$H(0.51)$	$89.58 \pm 0.27$
$100\theta_{MC}$	$1.04088 \pm 0.00031$	$r_{\text{drag}} h$	$99.07 \pm 0.94$	$D_M(0.51)$	$1987 \pm 11$
$\tau$	$0.0544 \pm 0.0075$	$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.022$	$H(0.61)$	$95.23 \pm 0.22$
$\ln(10^{10} A_s)$	$3.044 \pm 0.015$	$z_{\text{re}}$	$7.69 \pm 0.75$	$D_M(0.61)$	$2312 \pm 12$
$n_s$	$0.9654 \pm 0.0042$	$10^9 A_s$	$2.099 \pm 0.031$	$H(2.33)$	$236.47 \pm 0.74$
$r$	$0.0294^{+0.0087}_{-0.028}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.011$	$D_M(2.33)$	$5766 \pm 11$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{40}$	$1240 \pm 13$	$f\sigma_8(0.15)$	$0.4598 \pm 0.0065$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{220}$	$5727 \pm 39$	$\sigma_8(0.15)$	$0.7492 \pm 0.0054$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.38)$	$0.4773 \pm 0.0053$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.38)$	$0.6637 \pm 0.0048$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.096$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.51)$	$0.4754 \pm 0.0046$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9654 \pm 0.0042$	$\sigma_8(0.51)$	$0.6209 \pm 0.0045$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245373^{+0.000067}_{-0.000057}$	$f\sigma_8(0.61)$	$0.4701 \pm 0.0042$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246699^{+0.000067}_{-0.000057}$	$\sigma_8(0.61)$	$0.5907 \pm 0.0043$
$A_{217}^{CIB}$	$43 \pm 8$	$10^5 D/H$	$2.596^{+0.028}_{-0.031}$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0022$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.804 \pm 0.024$	$\sigma_8(2.33)$	$0.3068 \pm 0.0024$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$z_*$	$1089.98 \pm 0.26$	$r_{0.002}$	$0.0268^{+0.0073}_{-0.026}$
$A_{100}^{PS}$	$249 \pm 30$	$r_*$	$144.49 \pm 0.28$	$r_{0.01}$	$0.0280^{+0.0080}_{-0.027}$
$A_{143}^{PS}$	$43 \pm 9$	$100\theta_*$	$1.04107 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.80^{+1.1}_{-0.40}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.879 \pm 0.026$	$r_{L=10}$	$0.0137^{+0.0037}_{-0.013}$
$A^{kSZ}$	$< 5.23$	$z_{\text{drag}}$	$1059.81 \pm 0.33$	$10^9 A_t$	$0.062^{+0.018}_{-0.058}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.17 \pm 0.29$	$10^9 A_t e^{-2\tau}$	$0.055^{+0.016}_{-0.052}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$k_D$	$0.14075 \pm 0.00034$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$67.32 \pm 0.54$	$100\theta_D$	$0.16083 \pm 0.00019$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\Omega_\Lambda$	$0.6846 \pm 0.0075$	$z_{\text{eq}}$	$3400 \pm 27$	$f_{2000}^{217}$	$107.0 \pm 1.9$
$\Omega_m$	$0.3154 \pm 0.0075$	$k_{\text{eq}}$	$0.010376 \pm 0.000084$	$\chi^2_{\text{lensing}}$	$9.28 \pm 0.70$
$\Omega_m h^2$	$0.1429 \pm 0.0012$	$100\theta_{\text{eq}}$	$0.8136 \pm 0.0051$	$\chi^2_{\text{BKPLANCK}}$	$739.7 \pm 2.6$
$\Omega_m h^3$	$0.09620 \pm 0.00033$	$100\theta_{s,\text{eq}}$	$0.4496 \pm 0.0026$	$\chi^2_{\text{small}}$	$397.2 \pm 1.8$
$\sigma_8$	$0.8112 \pm 0.0061$	$H(0.15)$	$72.64 \pm 0.46$	$\chi^2_{\text{lowl}}$	$24.3 \pm 1.1$
$S_8$	$0.832 \pm 0.013$	$D_M(0.15)$	$643.7 \pm 4.6$	$\chi^2_{\text{prior}}$	$11.3 \pm 4.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4556 \pm 0.0071$	$H(0.38)$	$82.83 \pm 0.34$	$\chi^2_{\text{CMB}}$	$8107 \pm 5000$

Best-fit  $\chi^2_{\text{eff}} = 12665.14$ ;  $\Delta\chi^2_{\text{eff}} = 9154.73$ ;  $\bar{\chi}^2_{\text{eff}} = 12693.08$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9150.41$ ;  $R - 1 = 0.00549$   
 $\chi^2_{\text{eff}}$ : CMB - smicadx12\_Dec5\_ftl\_mv2\_ndclpp\_p\_teb\_consext8: 8.85 ( $\Delta$  -0.02) BK15\_dust: 735.41 ( $\Delta$  0.06) small\_100x143\_offlike5\_EE\_Aplanck\_B: 396.01 ( $\Delta$  -0.17) com-  
mander\_dx12\_v3\_2\_29: 23.74 ( $\Delta$  -0.05) CamSpec like\_10.7HM\_1400\_unified: 11498.88



**17.24**    **base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_lensing/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing\_post\_BAO**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$r_{\text{drag}} h$	$99.61 \pm 0.73$	$D_{\text{M}}(0.61)$	$2304.9 \pm 9.3$
$\Omega_c h^2$	$0.11926 \pm 0.00095$	$\langle d^2 \rangle^{1/2}$	$2.437 \pm 0.021$	$H(2.33)$	$236.07 \pm 0.59$
$100\theta_{MC}$	$1.04097 \pm 0.00030$	$z_{\text{re}}$	$7.86 \pm 0.73$	$D_{\text{M}}(2.33)$	$5761.3 \pm 9.2$
$\tau$	$0.0563 \pm 0.0073$	$10^9 A_s$	$2.105 \pm 0.031$	$f\sigma_8(0.15)$	$0.4566 \pm 0.0055$
$\ln(10^{10} A_s)$	$3.047 \pm 0.015$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$\sigma_8(0.15)$	$0.7489 \pm 0.0055$
$n_s$	$0.9671 \pm 0.0038$	$D_{40}$	$1238 \pm 13$	$f\sigma_8(0.38)$	$0.4750 \pm 0.0047$
$r$	$0.0302^{+0.0095}_{-0.028}$	$D_{220}$	$5732 \pm 39$	$\sigma_8(0.38)$	$0.6638 \pm 0.0049$
$y_{\text{cal}}$	$1.0010 \pm 0.0025$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.51)$	$0.4737 \pm 0.0042$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{1420}$	$817.6 \pm 4.8$	$\sigma_8(0.51)$	$0.6213 \pm 0.0046$
$A_{B,\text{sync}}$	$1.62^{+0.52}_{-1.3}$	$D_{2000}$	$231.0 \pm 1.6$	$f\sigma_8(0.61)$	$0.4687 \pm 0.0040$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$n_{s,0.002}$	$0.9671 \pm 0.0038$	$\sigma_8(0.61)$	$0.5912 \pm 0.0044$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.096$	$Y_P$	$0.245393^{+0.000062}_{-0.000052}$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0022$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246719^{+0.000062}_{-0.000052}$	$\sigma_8(2.33)$	$0.3073 \pm 0.0024$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.586^{+0.025}_{-0.029}$	$r_{0.002}$	$0.0276^{+0.0081}_{-0.026}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	Age/Gyr	$13.793 \pm 0.021$	$r_{0.01}$	$0.0289^{+0.0088}_{-0.027}$
$A_{217}^{CIB}$	$43 \pm 8$	$z_*$	$1089.86 \pm 0.23$	$\ln(10^{10} A_t)$	$-0.76^{+1.0}_{-0.39}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.62 \pm 0.24$	$r_{L=10}$	$0.0141^{+0.0041}_{-0.013}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$100\theta_*$	$1.04116 \pm 0.00029$	$10^9 A_t$	$0.063^{+0.020}_{-0.058}$
$A_{100}^{PS}$	$249 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.891 \pm 0.023$	$10^9 A_t e^{-2\tau}$	$0.057^{+0.018}_{-0.052}$
$A_{143}^{PS}$	$42 \pm 9$	$z_{\text{drag}}$	$1059.88 \pm 0.32$	$f_{2000}^{143}$	$29.3 \pm 2.7$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_{\text{drag}}$	$147.29 \pm 0.25$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$A^{kSZ}$	$< 5.15$	$k_{\text{D}}$	$0.14065 \pm 0.00032$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.17 \pm 0.64$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{eq}}$	$3384 \pm 22$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.6$
$H_0$	$67.63 \pm 0.43$	$k_{\text{eq}}$	$0.010330 \pm 0.000067$	$\chi_{\text{simall}}^2$	$397.4 \pm 2.0$
$\Omega_{\Lambda}$	$0.6889 \pm 0.0057$	$100\theta_{\text{eq}}$	$0.8165 \pm 0.0041$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.1$
$\Omega_m$	$0.3111 \pm 0.0057$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0021$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.061$
$\Omega_m h^2$	$0.14227 \pm 0.00092$	$H(0.15)$	$72.91 \pm 0.37$	$\chi_{\text{MGS}}^2$	$1.25 \pm 0.40$
$\Omega_m h^3$	$0.09622 \pm 0.00033$	$D_{\text{M}}(0.15)$	$641.1 \pm 3.6$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8$	$0.8104 \pm 0.0060$	$H(0.38)$	$83.02 \pm 0.27$	$\chi_{\text{prior}}^2$	$11.4 \pm 4.7$
$S_8$	$0.825 \pm 0.011$	$D_{\text{M}}(0.38)$	$1529.0 \pm 7.3$	$\chi_{\text{CMB}}^2$	$8107 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4520 \pm 0.0059$	$H(0.51)$	$89.73 \pm 0.22$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.6052 \pm 0.0058$	$D_{\text{M}}(0.51)$	$1980.8 \pm 8.6$		
$\sigma_8/h^{0.5}$	$0.9854 \pm 0.0084$	$H(0.61)$	$95.35 \pm 0.19$		

Best-fit  $\chi_{\text{eff}}^2 = 12671.15$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.51$ ;  $\bar{\chi}_{\text{eff}}^2 = 12699.13$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.10$ ;  $R - 1 = 0.00878$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.04 ( $\Delta$  0.00) MGS: 1.16 ( $\Delta$  0.00) DR12BAO: 4.59 ( $\Delta$  -0.02) CMB - smicadx12.Dec5.ftl\_mv2\_ndclpp\_p.teb\_consext8: 8.87 ( $\Delta$  0.13) BK15\_dust: 735.58  
( $\Delta$  0.08) simall\_100x143\_offlike5.EE\_Aplanck\_B: 396.18 ( $\Delta$  -0.24) commander\_dx12.v3.2.29: 23.52 ( $\Delta$  -0.02) CamSpec like\_10.7HM.1400\_unified: 11498.90



17.25 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00016$	$\sigma_8 \Omega_m^{0.25}$	$0.6091 \pm 0.0084$	$D_M(0.38)$	$1535 \pm 10$
$\Omega_c h^2$	$0.1200 \pm 0.0014$	$\sigma_8/h^{0.5}$	$0.990 \pm 0.012$	$H(0.51)$	$89.57 \pm 0.30$
$100\theta_{MC}$	$1.04088 \pm 0.00032$	$r_{\text{drag}} h$	$99.0 \pm 1.1$	$D_M(0.51)$	$1988 \pm 12$
$\tau$	$0.0554^{+0.0054}_{-0.0083}$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.028$	$H(0.61)$	$95.22 \pm 0.24$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.017}$	$z_{\text{re}}$	$7.79^{+0.59}_{-0.80}$	$D_M(0.61)$	$2312 \pm 13$
$n_s$	$0.9655 \pm 0.0045$	$10^9 A_s$	$2.104^{+0.026}_{-0.035}$	$H(2.33)$	$236.53 \pm 0.86$
$r$	$0.0293^{+0.0090}_{-0.027}$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.012$	$D_M(2.33)$	$5767 \pm 11$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{40}$	$1240 \pm 14$	$f\sigma_8(0.15)$	$0.4609 \pm 0.0084$
$A_{B,\text{dust}}$	$4.87^{+0.81}_{-1.2}$	$D_{220}$	$5724 \pm 40$	$\sigma_8(0.15)$	$0.7502^{+0.0059}_{-0.0067}$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{810}$	$2539 \pm 14$	$f\sigma_8(0.38)$	$0.4782 \pm 0.0068$
$\alpha_{B,\text{dust}}$	$-0.57^{+0.21}_{-0.32}$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.38)$	$0.6645^{+0.0047}_{-0.0057}$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.096$	$D_{2000}$	$230.8 \pm 1.7$	$f\sigma_8(0.51)$	$0.4763 \pm 0.0060$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9655 \pm 0.0045$	$\sigma_8(0.51)$	$0.6217^{+0.0043}_{-0.0053}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245370^{+0.000067}_{-0.000058}$	$f\sigma_8(0.61)$	$0.4710 \pm 0.0054$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246697^{+0.000067}_{-0.000059}$	$\sigma_8(0.61)$	$0.5914^{+0.0040}_{-0.0050}$
$A_{217}^{CIB}$	$43 \pm 8$	$10^5 D/H$	$2.597 \pm 0.030$	$f\sigma_8(2.33)$	$0.2980^{+0.0019}_{-0.0025}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.805 \pm 0.025$	$\sigma_8(2.33)$	$0.3071^{+0.0020}_{-0.0027}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$z_*$	$1090.00 \pm 0.28$	$r_{0.002}$	$0.0267^{+0.0076}_{-0.025}$
$A_{100}^{PS}$	$249 \pm 30$	$r_*$	$144.46 \pm 0.33$	$r_{0.01}$	$0.0280^{+0.0083}_{-0.026}$
$A_{143}^{PS}$	$43 \pm 9$	$100\theta_*$	$1.04106 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.79^{+1.0}_{-0.39}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.877 \pm 0.030$	$r_{L=10}$	$0.0137^{+0.0038}_{-0.013}$
$A^{kSZ}$	$< 5.17$	$z_{\text{drag}}$	$1059.81 \pm 0.33$	$10^9 A_t$	$0.062^{+0.019}_{-0.057}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.15 \pm 0.33$	$10^9 A_t e^{-2\tau}$	$0.055^{+0.017}_{-0.051}$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$k_D$	$0.14077 \pm 0.00037$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$67.28 \pm 0.61$	$100\theta_D$	$0.16083 \pm 0.00019$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6839 \pm 0.0086$	$z_{\text{eq}}$	$3402 \pm 32$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3161 \pm 0.0086$	$k_{\text{eq}}$	$0.010383 \pm 0.000098$	$\chi_{\text{BKPLANCK}}^2$	$739.6 \pm 2.7$
$\Omega_m h^2$	$0.1430 \pm 0.0013$	$100\theta_{\text{eq}}$	$0.8132 \pm 0.0060$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\Omega_m h^3$	$0.09620 \pm 0.00033$	$100\theta_{s,\text{eq}}$	$0.4494 \pm 0.0031$	$\chi_{\text{lowl}}^2$	$24.4 \pm 1.2$
$\sigma_8$	$0.8124 \pm 0.0073$	$H(0.15)$	$72.61 \pm 0.52$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.7$
$S_8$	$0.834 \pm 0.017$	$D_M(0.15)$	$644.1 \pm 5.3$	$\chi_{\text{CMB}}^2$	$8097 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4567 \pm 0.0091$	$H(0.38)$	$82.80 \pm 0.38$		

$\bar{\chi}_{\text{eff}}^2 = 12684.04$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.53$ ;  $R - 1 = 0.00482$



**17.26**    **base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$\sigma_8/h^{0.5}$	$0.985 \pm 0.010$	$D_M(0.51)$	$1980.3 \pm 9.1$
$\Omega_c h^2$	$0.1192 \pm 0.0010$	$r_{\text{drag}} h$	$99.66 \pm 0.79$	$H(0.61)$	$95.35 \pm 0.19$
$100\theta_{MC}$	$1.04098 \pm 0.00030$	$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.025$	$D_M(0.61)$	$2304.5 \pm 9.8$
$\tau$	$0.0564^{+0.0058}_{-0.0082}$	$z_{\text{re}}$	$7.87^{+0.63}_{-0.80}$	$H(2.33)$	$236.04 \pm 0.65$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.017}$	$10^9 A_s$	$2.104^{+0.027}_{-0.036}$	$D_M(2.33)$	$5761.1 \pm 9.4$
$n_s$	$0.9675 \pm 0.0039$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$f\sigma_8(0.15)$	$0.4563 \pm 0.0066$
$r$	$0.031^{+0.010}_{-0.027}$	$D_{40}$	$1236 \pm 13$	$\sigma_8(0.15)$	$0.7487^{+0.0055}_{-0.0067}$
$y_{\text{cal}}$	$1.0009 \pm 0.0025$	$D_{220}$	$5729 \pm 40$	$f\sigma_8(0.38)$	$0.4748 \pm 0.0056$
$A_{B,\text{dust}}$	$4.88^{+0.81}_{-1.2}$	$D_{810}$	$2538 \pm 14$	$\sigma_8(0.38)$	$0.6638^{+0.0046}_{-0.0058}$
$A_{B,\text{sync}}$	$1.61^{+0.53}_{-1.3}$	$D_{1420}$	$817.6 \pm 4.9$	$f\sigma_8(0.51)$	$0.4735 \pm 0.0051$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{2000}$	$231.0 \pm 1.6$	$\sigma_8(0.51)$	$0.6212^{+0.0043}_{-0.0054}$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.095$	$n_{s,0.002}$	$0.9675 \pm 0.0039$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0047$
$\alpha_{B,\text{sync}}$	—	$Y_P$	$0.245393^{+0.000061}_{-0.000054}$	$\sigma_8(0.61)$	$0.5911^{+0.0040}_{-0.0051}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246719^{+0.000061}_{-0.000054}$	$f\sigma_8(2.33)$	$0.2981^{+0.0020}_{-0.0026}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$10^5 D/H$	$2.586 \pm 0.027$	$\sigma_8(2.33)$	$0.3073^{+0.0021}_{-0.0027}$
$A_{217}^{CIB}$	$43 \pm 8$	Age/Gyr	$13.793 \pm 0.021$	$r_{0.002}$	$0.0281^{+0.0091}_{-0.025}$
$\xi^{tSZ-CIB}$	—	$z_*$	$1089.85 \pm 0.23$	$r_{0.01}$	$0.0293^{+0.0097}_{-0.026}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$r_*$	$144.64 \pm 0.26$	$\ln(10^{10} A_t)$	$-0.74^{+1.0}_{-0.38}$
$A_{100}^{PS}$	$248 \pm 30$	$100\theta_*$	$1.04116 \pm 0.00030$	$r_{L=10}$	$0.0144^{+0.0046}_{-0.013}$
$A_{143}^{PS}$	$42 \pm 9$	$D_M(z_*)/\text{Gpc}$	$13.892 \pm 0.025$	$10^9 A_t$	$0.064^{+0.022}_{-0.057}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_{\text{drag}}$	$1059.87 \pm 0.33$	$10^9 A_t e^{-2\tau}$	$0.058^{+0.020}_{-0.051}$
$A^{kSZ}$	$< 5.14$	$r_{\text{drag}}$	$147.30 \pm 0.27$	$f_{2000}^{143}$	$29.3 \pm 2.7$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$k_D$	$0.14064 \pm 0.00034$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$100\theta_D$	$0.16080 \pm 0.00019$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$H_0$	$67.65 \pm 0.45$	$z_{\text{eq}}$	$3383 \pm 24$	$\chi_{\text{BKPLANCK}}^2$	$740.0 \pm 2.6$
$\Omega_\Lambda$	$0.6892 \pm 0.0062$	$k_{\text{eq}}$	$0.010326 \pm 0.000073$	$\chi_{\text{small}}^2$	$397.4 \pm 2.1$
$\Omega_m$	$0.3108 \pm 0.0062$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0044$	$\chi_{\text{lowl}}^2$	$24.0 \pm 1.1$
$\Omega_m h^2$	$0.1422 \pm 0.0010$	$100\theta_{s,\text{eq}}$	$0.4512 \pm 0.0023$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.065$
$\Omega_m h^3$	$0.09621 \pm 0.00033$	$H(0.15)$	$72.93 \pm 0.39$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.43$
$\sigma_8$	$0.8102^{+0.0063}_{-0.0074}$	$D_M(0.15)$	$640.9 \pm 3.9$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$S_8$	$0.825 \pm 0.013$	$H(0.38)$	$83.03 \pm 0.29$	$\chi_{\text{prior}}^2$	$11.4 \pm 4.8$
$\sigma_8 \Omega_m^{0.5}$	$0.4517 \pm 0.0070$	$D_M(0.38)$	$1528.6 \pm 7.8$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.6049 \pm 0.0069$	$H(0.51)$	$89.74 \pm 0.23$	$\chi_{\text{CMB}}^2$	$8098 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 12690.02; \Delta\bar{\chi}_{\text{eff}}^2 = 9149.88; R - 1 = 0.00713$$



17.27 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_lensing\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00015$	$\sigma_8 \Omega_m^{0.25}$	$0.6081 \pm 0.0064$	$D_M(0.38)$	$1533.9 \pm 9.2$
$\Omega_c h^2$	$0.1199 \pm 0.0012$	$\sigma_8/h^{0.5}$	$0.9891 \pm 0.0090$	$H(0.51)$	$89.60 \pm 0.27$
$100\theta_{MC}$	$1.04089 \pm 0.00031$	$r_{\text{drag}} h$	$99.11 \pm 0.92$	$D_M(0.51)$	$1986 \pm 11$
$\tau$	$0.0553^{+0.0054}_{-0.0079}$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.022$	$H(0.61)$	$95.24 \pm 0.22$
$\ln(10^{10} A_s)$	$3.046^{+0.012}_{-0.015}$	$z_{\text{re}}$	$7.78^{+0.59}_{-0.76}$	$D_M(0.61)$	$2311 \pm 12$
$n_s$	$0.9656 \pm 0.0042$	$10^9 A_s$	$2.103^{+0.024}_{-0.032}$	$H(2.33)$	$236.44 \pm 0.73$
$r$	$0.0294^{+0.0087}_{-0.028}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.011$	$D_M(2.33)$	$5766 \pm 10$
$y_{\text{cal}}$	$1.0008 \pm 0.0025$	$D_{40}$	$1240 \pm 13$	$f\sigma_8(0.15)$	$0.4599 \pm 0.0065$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{220}$	$5727 \pm 39$	$\sigma_8(0.15)$	$0.7497^{+0.0048}_{-0.0054}$
$A_{B,\text{sync}}$	$1.63^{+0.53}_{-1.3}$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.38)$	$0.4775 \pm 0.0052$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.38)$	$0.6642^{+0.0040}_{-0.0048}$
$\beta_{B,\text{dust}}$	$1.599 \pm 0.096$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.51)$	$0.4756 \pm 0.0046$
$\alpha_{B,\text{sync}}$	—	$n_{s,0.002}$	$0.9656 \pm 0.0042$	$\sigma_8(0.51)$	$0.6214^{+0.0037}_{-0.0045}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$Y_P$	$0.245374^{+0.000067}_{-0.000056}$	$f\sigma_8(0.61)$	$0.4704 \pm 0.0041$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	$Y_P^{\text{BBN}}$	$0.246701^{+0.000067}_{-0.000057}$	$\sigma_8(0.61)$	$0.5912^{+0.0035}_{-0.0044}$
$A_{217}^{CIB}$	$43 \pm 8$	$10^5 D/H$	$2.595^{+0.027}_{-0.031}$	$f\sigma_8(2.33)$	$0.2979^{+0.0018}_{-0.0023}$
$\xi^{tSZ-CIB}$	—	Age/Gyr	$13.803 \pm 0.024$	$\sigma_8(2.33)$	$0.3070^{+0.0019}_{-0.0025}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$z_*$	$1089.97 \pm 0.26$	$r_{0.002}$	$0.0268^{+0.0074}_{-0.026}$
$A_{100}^{PS}$	$249 \pm 30$	$r_*$	$144.50 \pm 0.28$	$r_{0.01}$	$0.0280^{+0.0080}_{-0.027}$
$A_{143}^{PS}$	$43 \pm 9$	$100\theta_*$	$1.04107 \pm 0.00031$	$\ln(10^{10} A_t)$	$-0.79^{+1.0}_{-0.40}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$D_M(z_*)/\text{Gpc}$	$13.880 \pm 0.026$	$r_{L=10}$	$0.0137^{+0.0037}_{-0.013}$
$A^{kSZ}$	$< 5.21$	$z_{\text{drag}}$	$1059.82 \pm 0.33$	$10^9 A_t$	$0.062^{+0.018}_{-0.058}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_{\text{drag}}$	$147.17 \pm 0.28$	$10^9 A_t e^{-2\tau}$	$0.055^{+0.016}_{-0.052}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$k_D$	$0.14074 \pm 0.00034$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$67.34 \pm 0.53$	$100\theta_D$	$0.16082 \pm 0.00019$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6849 \pm 0.0073$	$z_{\text{eq}}$	$3398 \pm 27$	$f_{2000}^{217}$	$107.0 \pm 1.9$
$\Omega_m$	$0.3151 \pm 0.0073$	$k_{\text{eq}}$	$0.010372 \pm 0.000083$	$\chi_{\text{lensing}}^2$	$9.26 \pm 0.68$
$\Omega_m h^2$	$0.1429 \pm 0.0011$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0051$	$\chi_{\text{BKPLANK}}^2$	$739.7 \pm 2.6$
$\Omega_m h^3$	$0.09620 \pm 0.00033$	$100\theta_{s,\text{eq}}$	$0.4497 \pm 0.0026$	$\chi_{\text{small}}^2$	$397.1 \pm 1.8$
$\sigma_8$	$0.8117 \pm 0.0057$	$H(0.15)$	$72.66 \pm 0.46$	$\chi_{\text{lowl}}^2$	$24.3 \pm 1.1$
$S_8$	$0.832 \pm 0.013$	$D_M(0.15)$	$643.5 \pm 4.6$	$\chi_{\text{prior}}^2$	$11.3 \pm 4.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4556 \pm 0.0071$	$H(0.38)$	$82.84 \pm 0.34$	$\chi_{\text{CMB}}^2$	$8106 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 12692.90$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.41$ ;  $R - 1 = 0.00651$



17.28 base\_r\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BK15\_post\_BAO\_lensing\_zre6p5/base\_r\_plikHM\_TTTEEE\_lowl\_lowE\_BK15\_lensing\_post

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$r_{\text{drag}} h$	$99.63 \pm 0.73$	$D_{\text{M}}(0.61)$	$2304.7 \pm 9.3$
$\Omega_c h^2$	$0.11924 \pm 0.00095$	$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.020$	$H(2.33)$	$236.06 \pm 0.59$
$100\theta_{MC}$	$1.04097 \pm 0.00030$	$z_{\text{re}}$	$7.91^{+0.62}_{-0.74}$	$D_{\text{M}}(2.33)$	$5761.2 \pm 9.2$
$\tau$	$0.0568^{+0.0059}_{-0.0077}$	$10^9 A_s$	$2.107^{+0.026}_{-0.032}$	$f\sigma_8(0.15)$	$0.4567 \pm 0.0055$
$\ln(10^{10} A_s)$	$3.048^{+0.012}_{-0.015}$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$\sigma_8(0.15)$	$0.7492^{+0.0048}_{-0.0056}$
$n_s$	$0.9671 \pm 0.0038$	$D_{40}$	$1237 \pm 13$	$f\sigma_8(0.38)$	$0.4752 \pm 0.0046$
$r$	$0.0302^{+0.0095}_{-0.028}$	$D_{220}$	$5732 \pm 39$	$\sigma_8(0.38)$	$0.6641^{+0.0042}_{-0.0050}$
$y_{\text{cal}}$	$1.0010 \pm 0.0025$	$D_{810}$	$2539 \pm 13$	$f\sigma_8(0.51)$	$0.4738 \pm 0.0042$
$A_{B,\text{dust}}$	$4.86^{+0.82}_{-1.2}$	$D_{1420}$	$817.6 \pm 4.8$	$\sigma_8(0.51)$	$0.6216^{+0.0039}_{-0.0047}$
$A_{B,\text{sync}}$	$1.62^{+0.53}_{-1.3}$	$D_{2000}$	$231.0 \pm 1.6$	$f\sigma_8(0.61)$	$0.4689 \pm 0.0039$
$\alpha_{B,\text{dust}}$	$-0.56^{+0.22}_{-0.32}$	$n_{s,0.002}$	$0.9671 \pm 0.0038$	$\sigma_8(0.61)$	$0.5914^{+0.0037}_{-0.0045}$
$\beta_{B,\text{dust}}$	$1.598 \pm 0.096$	$Y_P$	$0.245393^{+0.000062}_{-0.000052}$	$f\sigma_8(2.33)$	$0.2982^{+0.0019}_{-0.0023}$
$\alpha_{B,\text{sync}}$	—	$Y_P^{\text{BBN}}$	$0.246720^{+0.000062}_{-0.000052}$	$\sigma_8(2.33)$	$0.3075^{+0.0020}_{-0.0024}$
$\beta_{B,\text{sync}}$	$-3.10 \pm 0.27$	$10^5 D/H$	$2.586^{+0.025}_{-0.029}$	$r_{0.002}$	$0.0277^{+0.0081}_{-0.026}$
$\epsilon_{\text{dust,sync}}$	$-0.35 \pm 0.28$	Age/Gyr	$13.793 \pm 0.021$	$r_{0.01}$	$0.0289^{+0.0088}_{-0.027}$
$A_{217}^{CIB}$	$43 \pm 8$	$z_*$	$1089.86 \pm 0.22$	$\ln(10^{10} A_t)$	$-0.76^{+1.0}_{-0.39}$
$\xi^{tSZ-CIB}$	—	$r_*$	$144.63 \pm 0.23$	$r_{L=10}$	$0.0141^{+0.0041}_{-0.013}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$100\theta_*$	$1.04116 \pm 0.00030$	$10^9 A_t$	$0.064^{+0.020}_{-0.058}$
$A_{100}^{PS}$	$248 \pm 30$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.891 \pm 0.023$	$10^9 A_t e^{-2\tau}$	$0.057^{+0.018}_{-0.052}$
$A_{143}^{PS}$	$42 \pm 9$	$z_{\text{drag}}$	$1059.88 \pm 0.32$	$f_{2000}^{143}$	$29.3 \pm 2.7$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_{\text{drag}}$	$147.29 \pm 0.25$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$A^{kSZ}$	$< 5.15$	$k_{\text{D}}$	$0.14065 \pm 0.00032$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$9.15 \pm 0.59$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{eq}}$	$3384 \pm 22$	$\chi_{\text{BKPLANCK}}^2$	$739.9 \pm 2.6$
$H_0$	$67.64 \pm 0.42$	$k_{\text{eq}}$	$0.010328 \pm 0.000066$	$\chi_{\text{simall}}^2$	$397.4 \pm 2.0$
$\Omega_{\Lambda}$	$0.6890 \pm 0.0057$	$100\theta_{\text{eq}}$	$0.8166 \pm 0.0041$	$\chi_{\text{lowl}}^2$	$24.1 \pm 1.1$
$\Omega_m$	$0.3110 \pm 0.0057$	$100\theta_{s,\text{eq}}$	$0.4511 \pm 0.0021$	$\chi_{6\text{DF}}^2$	$0.053 \pm 0.060$
$\Omega_m h^2$	$0.14225 \pm 0.00091$	$H(0.15)$	$72.92 \pm 0.37$	$\chi_{\text{MGS}}^2$	$1.26 \pm 0.40$
$\Omega_m h^3$	$0.09622 \pm 0.00033$	$D_{\text{M}}(0.15)$	$641.0 \pm 3.6$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8$	$0.8107^{+0.0054}_{-0.0061}$	$H(0.38)$	$83.02 \pm 0.27$	$\chi_{\text{prior}}^2$	$11.4 \pm 4.7$
$S_8$	$0.825 \pm 0.011$	$D_{\text{M}}(0.38)$	$1528.9 \pm 7.3$	$\chi_{\text{CMB}}^2$	$8106 \pm 5000$
$\sigma_8 \Omega_m^{0.5}$	$0.4521 \pm 0.0058$	$H(0.51)$	$89.73 \pm 0.22$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.0$
$\sigma_8 \Omega_m^{0.25}$	$0.6054 \pm 0.0057$	$D_{\text{M}}(0.51)$	$1980.6 \pm 8.6$		
$\sigma_8/h^{0.5}$	$0.9857 \pm 0.0082$	$H(0.61)$	$95.35 \pm 0.19$		

$\bar{\chi}_{\text{eff}}^2 = 12699.00$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.10$ ;  $R - 1 = 0.00924$



# 18 w

## 18.1 base\_w\_CamSpecHM\_TT\_lowl\_lowE/base\_w\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02216 \pm 0.00022$	$r_{\text{drag}} h$	$125^{+20}_{-8}$	$H(0.15)$	$81.7^{+6.7}_{-2.8}$
$\Omega_c h^2$	$0.1204 \pm 0.0021$	$\langle d^2 \rangle^{1/2}$	$2.501^{+0.048}_{-0.041}$	$D_{\text{M}}(0.15)$	$547^{+20}_{-66}$
$100\theta_{MC}$	$1.04084 \pm 0.00047$	$z_{\text{re}}$	$7.42^{+0.84}_{-0.75}$	$H(0.38)$	$84.0^{+1.1}_{-0.88}$
$\tau$	$0.0519 \pm 0.0081$	$10^9 A_s$	$2.088 \pm 0.034$	$D_{\text{M}}(0.38)$	$1387^{+34}_{-99}$
$w$	$-1.55^{+0.19}_{-0.39}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.013$	$H(0.51)$	$88.2^{+1.4}_{-0.85}$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$D_{40}$	$1228 \pm 15$	$D_{\text{M}}(0.51)$	$1841^{+35}_{-98}$
$n_s$	$0.9636 \pm 0.0057$	$D_{220}$	$5711 \pm 41$	$H(0.61)$	$92.5 \pm 1.6$
$y_{\text{cal}}$	$1.0004 \pm 0.0024$	$D_{810}$	$2534 \pm 14$	$D_{\text{M}}(0.61)$	$2173^{+34}_{-93}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$813.9 \pm 5.1$	$H(2.33)$	$232.3^{+1.4}_{-2.7}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.7 \pm 1.8$	$D_{\text{M}}(2.33)$	$5749^{+18}_{-23}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.9636 \pm 0.0057$	$f\sigma_8(0.15)$	$0.490 \pm 0.021$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P$	$0.24530^{+0.00010}_{-0.000081}$	$\sigma_8(0.15)$	$0.898^{+0.11}_{-0.052}$
$A_{143}^{PS}$	$45 \pm 9$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00010}_{-0.000082}$	$f\sigma_8(0.38)$	$0.572^{+0.066}_{-0.045}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.626 \pm 0.042$	$\sigma_8(0.38)$	$0.801^{+0.10}_{-0.046}$
$A^{kSZ}$	$< 5.67$	Age/Gyr	$13.592^{+0.056}_{-0.15}$	$f\sigma_8(0.51)$	$0.588^{+0.081}_{-0.049}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1090.22 \pm 0.40$	$\sigma_8(0.51)$	$0.749^{+0.093}_{-0.042}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$r_*$	$144.50 \pm 0.47$	$f\sigma_8(0.61)$	$0.589^{+0.086}_{-0.049}$
$H_0$	$> 80.2$	$100\theta_*$	$1.04104 \pm 0.00047$	$\sigma_8(0.61)$	$0.711^{+0.088}_{-0.039}$
$\Omega_\Lambda$	$0.791^{+0.066}_{-0.017}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.881 \pm 0.044$	$f\sigma_8(2.33)$	$0.356^{+0.042}_{-0.017}$
$\Omega_m$	$0.209^{+0.017}_{-0.066}$	$z_{\text{drag}}$	$1059.47 \pm 0.45$	$\sigma_8(2.33)$	$0.359^{+0.039}_{-0.017}$
$\Omega_m h^2$	$0.1432 \pm 0.0020$	$r_{\text{drag}}$	$147.23 \pm 0.48$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$\Omega_m h^3$	$0.121^{+0.020}_{-0.0092}$	$k_{\text{D}}$	$0.14055 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\sigma_8$	$0.961^{+0.11}_{-0.053}$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$S_8$	$0.786^{+0.030}_{-0.042}$	$z_{\text{eq}}$	$3406 \pm 47$	$\chi_{\text{small}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.431^{+0.016}_{-0.023}$	$k_{\text{eq}}$	$0.01039 \pm 0.00014$	$\chi_{\text{lowl}}^2$	$23.1 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.642^{+0.023}_{-0.018}$	$100\theta_{\text{eq}}$	$0.8122 \pm 0.0088$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$1.044^{+0.037}_{-0.026}$	$100\theta_{\text{s,eq}}$	$0.4489 \pm 0.0045$	$\chi_{\text{CMB}}^2$	$4336 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 7468.79$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.49$ ;  $\bar{\chi}_{\text{eff}}^2 = 7489.40$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.20$ ;  $R - 1 = 0.00889$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.72 ( $\Delta$  -0.01) commander\_dx12\_v3\_2\_29: 22.46 ( $\Delta$  -0.18) CamSpec like\_10.7HM: 7048.57



## 18.2 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_w\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00021$	$\langle d^2 \rangle^{1/2}$	$2.481^{+0.031}_{-0.027}$	$H(0.38)$	$84.5^{+1.0}_{-0.71}$
$\Omega_c h^2$	$0.1193 \pm 0.0016$	$z_{\text{re}}$	$7.32^{+0.83}_{-0.74}$	$D_{\text{M}}(0.38)$	$1378^{+33}_{-96}$
$100\theta_{MC}$	$1.04094 \pm 0.00046$	$10^9 A_s$	$2.080 \pm 0.032$	$H(0.51)$	$88.5^{+1.1}_{-0.71}$
$\tau$	$0.0512 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.51)$	$1829^{+34}_{-95}$
$w$	$-1.54^{+0.18}_{-0.36}$	$D_{40}$	$1222 \pm 13$	$H(0.61)$	$92.7 \pm 1.4$
$\ln(10^{10} A_s)$	$3.035 \pm 0.015$	$D_{220}$	$5714 \pm 41$	$D_{\text{M}}(0.61)$	$2161^{+33}_{-90}$
$n_s$	$0.9658 \pm 0.0050$	$D_{810}$	$2532 \pm 13$	$H(2.33)$	$231.5^{+1.1}_{-2.6}$
$y_{\text{cal}}$	$1.0003 \pm 0.0024$	$D_{1420}$	$814.0 \pm 5.1$	$D_{\text{M}}(2.33)$	$5742^{+16}_{-22}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.7 \pm 1.8$	$f\sigma_8(0.15)$	$0.482 \pm 0.015$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9658 \pm 0.0050$	$\sigma_8(0.15)$	$0.893^{+0.099}_{-0.047}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P$	$0.245328^{+0.000096}_{-0.000079}$	$f\sigma_8(0.38)$	$0.564^{+0.058}_{-0.038}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246654^{+0.000096}_{-0.000079}$	$\sigma_8(0.38)$	$0.798^{+0.093}_{-0.042}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.616 \pm 0.040$	$f\sigma_8(0.51)$	$0.581^{+0.073}_{-0.043}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.575^{+0.056}_{-0.14}$	$\sigma_8(0.51)$	$0.746^{+0.087}_{-0.038}$
$A^{kSZ}$	$< 5.80$	$z_*$	$1090.06 \pm 0.35$	$f\sigma_8(0.61)$	$0.583^{+0.078}_{-0.043}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.73 \pm 0.37$	$\sigma_8(0.61)$	$0.709^{+0.082}_{-0.036}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04114 \pm 0.00045$	$f\sigma_8(2.33)$	$0.356^{+0.039}_{-0.016}$
$H_0$	$> 80.8$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.901 \pm 0.035$	$\sigma_8(2.33)$	$0.359^{+0.036}_{-0.016}$
$\Omega_\Lambda$	$0.796^{+0.062}_{-0.016}$	$z_{\text{drag}}$	$1059.52 \pm 0.45$	$f_{2000}^{143}$	$30.7 \pm 3.0$
$\Omega_m$	$0.204^{+0.016}_{-0.062}$	$r_{\text{drag}}$	$147.45 \pm 0.39$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_m h^2$	$0.1422 \pm 0.0015$	$k_{\text{D}}$	$0.14037 \pm 0.00046$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m h^3$	$0.121^{+0.019}_{-0.0088}$	$100\theta_{\text{D}}$	$0.16100 \pm 0.00026$	$\chi^2_{\text{lensing}}$	$9.0 \pm 1.1$
$\sigma_8$	$0.954^{+0.098}_{-0.048}$	$z_{\text{eq}}$	$3382 \pm 36$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.4$
$S_8$	$0.774^{+0.025}_{-0.042}$	$k_{\text{eq}}$	$0.01032 \pm 0.00011$	$\chi^2_{\text{lowl}}$	$22.65 \pm 0.92$
$\sigma_8 \Omega_m^{0.5}$	$0.424^{+0.013}_{-0.023}$	$100\theta_{\text{eq}}$	$0.8165 \pm 0.0069$	$\chi^2_{\text{prior}}$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.635^{+0.018}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0035$	$\chi^2_{\text{CMB}}$	$4345 \pm 3000$
$\sigma_8/h^{0.5}$	$1.034^{+0.029}_{-0.019}$	$H(0.15)$	$82.2^{+6.6}_{-2.7}$		
$r_{\text{drag}} h$	$126^{+20}_{-8}$	$D_{\text{M}}(0.15)$	$543^{+20}_{-63}$		

$\bar{\chi}^2_{\text{eff}} = 7497.94$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 6291.96$ ;  $R - 1 = 0.01572$



### 18.3 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00022$	$r_{\text{drag}} h$	$125^{+20}_{-8}$	$H(0.15)$	$81.7^{+6.7}_{-2.8}$
$\Omega_c h^2$	$0.1203 \pm 0.0021$	$\langle d^2 \rangle^{1/2}$	$2.504^{+0.047}_{-0.041}$	$D_{\text{M}}(0.15)$	$547^{+20}_{-66}$
$100\theta_{MC}$	$1.04085 \pm 0.00047$	$z_{\text{re}}$	$7.62^{+0.50}_{-0.82}$	$H(0.38)$	$84.1^{+1.1}_{-0.87}$
$\tau$	$0.0538^{+0.0044}_{-0.0083}$	$10^9 A_s$	$2.096^{+0.024}_{-0.033}$	$D_{\text{M}}(0.38)$	$1387^{+34}_{-100}$
$w$	$-1.55^{+0.19}_{-0.39}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.013$	$H(0.51)$	$88.2^{+1.3}_{-0.85}$
$\ln(10^{10} A_s)$	$3.042^{+0.011}_{-0.016}$	$D_{40}$	$1228 \pm 15$	$D_{\text{M}}(0.51)$	$1840^{+35}_{-98}$
$n_s$	$0.9639 \pm 0.0056$	$D_{220}$	$5711 \pm 41$	$H(0.61)$	$92.5 \pm 1.6$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2534 \pm 14$	$D_{\text{M}}(0.61)$	$2172^{+34}_{-93}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.0 \pm 5.1$	$H(2.33)$	$232.3^{+1.4}_{-2.7}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.8 \pm 1.8$	$D_{\text{M}}(2.33)$	$5749^{+17}_{-23}$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.9639 \pm 0.0056$	$f\sigma_8(0.15)$	$0.490 \pm 0.021$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P$	$0.24531^{+0.00010}_{-0.000081}$	$\sigma_8(0.15)$	$0.899^{+0.11}_{-0.052}$
$A_{143}^{PS}$	$44 \pm 9$	$Y_P^{\text{BBN}}$	$0.24663^{+0.00010}_{-0.000081}$	$f\sigma_8(0.38)$	$0.572^{+0.066}_{-0.046}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$10^5 D/H$	$2.624 \pm 0.041$	$\sigma_8(0.38)$	$0.802^{+0.10}_{-0.046}$
$A^{kSZ}$	$< 5.63$	Age/Gyr	$13.591^{+0.056}_{-0.15}$	$f\sigma_8(0.51)$	$0.588^{+0.080}_{-0.050}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$z_*$	$1090.20 \pm 0.40$	$\sigma_8(0.51)$	$0.750^{+0.093}_{-0.042}$
$c_{217}$	$0.9997^{+0.0020}_{-0.0023}$	$r_*$	$144.52 \pm 0.47$	$f\sigma_8(0.61)$	$0.589^{+0.086}_{-0.049}$
$H_0$	$> 80.2$	$100\theta_*$	$1.04106 \pm 0.00047$	$\sigma_8(0.61)$	$0.712^{+0.088}_{-0.039}$
$\Omega_\Lambda$	$0.791^{+0.066}_{-0.017}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.044$	$f\sigma_8(2.33)$	$0.357^{+0.042}_{-0.017}$
$\Omega_m$	$0.209^{+0.017}_{-0.066}$	$z_{\text{drag}}$	$1059.49 \pm 0.45$	$\sigma_8(2.33)$	$0.360^{+0.039}_{-0.017}$
$\Omega_m h^2$	$0.1431 \pm 0.0020$	$r_{\text{drag}}$	$147.25 \pm 0.47$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_m h^3$	$0.121^{+0.020}_{-0.0093}$	$k_{\text{D}}$	$0.14054 \pm 0.00052$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\sigma_8$	$0.962^{+0.11}_{-0.054}$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$S_8$	$0.787^{+0.030}_{-0.042}$	$z_{\text{eq}}$	$3404 \pm 47$	$\chi_{\text{simall}}^2$	$396.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.431^{+0.016}_{-0.023}$	$k_{\text{eq}}$	$0.01039 \pm 0.00014$	$\chi_{\text{lowl}}^2$	$23.1 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.643^{+0.023}_{-0.018}$	$100\theta_{\text{eq}}$	$0.8125 \pm 0.0087$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$1.045^{+0.037}_{-0.026}$	$100\theta_{\text{s,eq}}$	$0.4491 \pm 0.0045$	$\chi_{\text{CMB}}^2$	$4336 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7489.13$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.25$ ;  $R - 1 = 0.01149$



18.4 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02223 \pm 0.00021$	$\langle d^2 \rangle^{1/2}$	$2.483^{+0.031}_{-0.027}$	$H(0.38)$	$84.5^{+1.1}_{-0.68}$
$\Omega_c h^2$	$0.1191 \pm 0.0016$	$z_{\text{re}}$	$7.55^{+0.44}_{-0.82}$	$D_{\text{M}}(0.38)$	$1379^{+34}_{-98}$
$100\theta_{MC}$	$1.04097 \pm 0.00045$	$10^9 A_s$	$2.088^{+0.021}_{-0.029}$	$H(0.51)$	$88.6^{+1.1}_{-0.68}$
$\tau$	$0.0534^{+0.0041}_{-0.0081}$	$10^9 A_s e^{-2\tau}$	$1.876 \pm 0.011$	$D_{\text{M}}(0.51)$	$1830^{+34}_{-97}$
$w$	$-1.53^{+0.18}_{-0.37}$	$D_{40}$	$1221 \pm 13$	$H(0.61)$	$92.8 \pm 1.4$
$\ln(10^{10} A_s)$	$3.038^{+0.010}_{-0.014}$	$D_{220}$	$5714 \pm 41$	$D_{\text{M}}(0.61)$	$2161^{+33}_{-92}$
$n_s$	$0.9663 \pm 0.0049$	$D_{810}$	$2532 \pm 13$	$H(2.33)$	$231.4^{+1.0}_{-2.6}$
$y_{\text{cal}}$	$1.0002 \pm 0.0025$	$D_{1420}$	$814.0 \pm 5.1$	$D_{\text{M}}(2.33)$	$5741^{+15}_{-22}$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{2000}$	$229.8 \pm 1.8$	$f\sigma_8(0.15)$	$0.481 \pm 0.015$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9663 \pm 0.0049$	$\sigma_8(0.15)$	$0.892^{+0.10}_{-0.048}$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P$	$0.245333^{+0.000094}_{-0.000079}$	$f\sigma_8(0.38)$	$0.562^{+0.058}_{-0.038}$
$A_{100}^{PS}$	$252 \pm 30$	$Y_P^{\text{BBN}}$	$0.246659^{+0.000094}_{-0.000079}$	$\sigma_8(0.38)$	$0.797^{+0.094}_{-0.043}$
$A_{143}^{PS}$	$44 \pm 9$	$10^5 D/H$	$2.613 \pm 0.040$	$f\sigma_8(0.51)$	$0.579^{+0.073}_{-0.043}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.575^{+0.056}_{-0.15}$	$\sigma_8(0.51)$	$0.746^{+0.088}_{-0.039}$
$A^{kSZ}$	$< 5.73$	$z_*$	$1090.03 \pm 0.35$	$f\sigma_8(0.61)$	$0.581^{+0.079}_{-0.044}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.77 \pm 0.36$	$\sigma_8(0.61)$	$0.708^{+0.083}_{-0.036}$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04117 \pm 0.00045$	$f\sigma_8(2.33)$	$0.356^{+0.040}_{-0.016}$
$H_0$	$> 80.6$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.904 \pm 0.034$	$\sigma_8(2.33)$	$0.359^{+0.037}_{-0.016}$
$\Omega_\Lambda$	$0.795^{+0.063}_{-0.017}$	$z_{\text{drag}}$	$1059.54 \pm 0.45$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$\Omega_m$	$0.205^{+0.017}_{-0.063}$	$r_{\text{drag}}$	$147.48 \pm 0.38$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_m h^2$	$0.1420 \pm 0.0015$	$k_{\text{D}}$	$0.14034 \pm 0.00045$	$f_{2000}^{217}$	$107.5 \pm 2.0$
$\Omega_m h^3$	$0.121^{+0.019}_{-0.0089}$	$100\theta_{\text{D}}$	$0.16100 \pm 0.00026$	$\chi_{\text{lensing}}^2$	$9.0 \pm 1.2$
$\sigma_8$	$0.953^{+0.099}_{-0.048}$	$z_{\text{eq}}$	$3378 \pm 35$	$\chi_{\text{simall}}^2$	$396.5 \pm 1.3$
$S_8$	$0.774^{+0.025}_{-0.042}$	$k_{\text{eq}}$	$0.01031 \pm 0.00011$	$\chi_{\text{lowl}}^2$	$22.61 \pm 0.92$
$\sigma_8 \Omega_m^{0.5}$	$0.424^{+0.014}_{-0.023}$	$100\theta_{\text{eq}}$	$0.8173 \pm 0.0067$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.635^{+0.018}_{-0.013}$	$100\theta_{\text{s,eq}}$	$0.4516 \pm 0.0034$	$\chi_{\text{CMB}}^2$	$4344 \pm 3000$
$\sigma_8/h^{0.5}$	$1.034^{+0.029}_{-0.019}$	$H(0.15)$	$82.2^{+6.7}_{-2.8}$		
$r_{\text{drag}} h$	$126^{+20}_{-8}$	$D_{\text{M}}(0.15)$	$544^{+21}_{-64}$		

$\bar{\chi}_{\text{eff}}^2 = 7497.68$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6292.01$ ;  $R - 1 = 0.02078$



18.5 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_w\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$r_{\text{drag}} h$	$126^{+20}_{-8}$	$H(0.15)$	$82.5^{+6.3}_{-2.5}$
$\Omega_c h^2$	$0.1197 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.491^{+0.041}_{-0.032}$	$D_{\text{M}}(0.15)$	$541^{+19}_{-61}$
$100\theta_{MC}$	$1.04093 \pm 0.00032$	$z_{\text{re}}$	$7.49 \pm 0.80$	$H(0.38)$	$84.47^{+0.89}_{-0.56}$
$\tau$	$0.0531 \pm 0.0078$	$10^9 A_s$	$2.091 \pm 0.034$	$D_{\text{M}}(0.38)$	$1374^{+30}_{-91}$
$w$	$-1.55^{+0.17}_{-0.37}$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.51)$	$88.5^{+1.2}_{-0.78}$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{40}$	$1224 \pm 13$	$D_{\text{M}}(0.51)$	$1826^{+30}_{-90}$
$n_s$	$0.9660 \pm 0.0044$	$D_{220}$	$5727 \pm 39$	$H(0.61)$	$92.7^{+1.3}_{-1.9}$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2157^{+28}_{-84}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.1 \pm 4.9$	$H(2.33)$	$231.85^{+0.89}_{-2.3}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.7 \pm 1.6$	$D_{\text{M}}(2.33)$	$5737^{+12}_{-18}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9660 \pm 0.0044$	$f\sigma_8(0.15)$	$0.486^{+0.018}_{-0.016}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.245390^{+0.000064}_{-0.000056}$	$\sigma_8(0.15)$	$0.901^{+0.10}_{-0.047}$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.246717^{+0.000064}_{-0.000056}$	$f\sigma_8(0.38)$	$0.569^{+0.063}_{-0.037}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.587 \pm 0.029$	$\sigma_8(0.38)$	$0.804^{+0.093}_{-0.042}$
$A^{kSZ}$	$< 5.10$	Age/Gyr	$13.558^{+0.045}_{-0.13}$	$f\sigma_8(0.51)$	$0.587^{+0.076}_{-0.042}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.90 \pm 0.27$	$\sigma_8(0.51)$	$0.752^{+0.087}_{-0.038}$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$r_*$	$144.52 \pm 0.32$	$f\sigma_8(0.61)$	$0.589^{+0.081}_{-0.042}$
$H_0$	$> 81.4$	$100\theta_*$	$1.04111 \pm 0.00031$	$\sigma_8(0.61)$	$0.715^{+0.082}_{-0.036}$
$\Omega_\Lambda$	$0.798^{+0.060}_{-0.015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.030$	$f\sigma_8(2.33)$	$0.358^{+0.039}_{-0.016}$
$\Omega_m$	$0.202^{+0.015}_{-0.060}$	$z_{\text{drag}}$	$1059.89 \pm 0.32$	$\sigma_8(2.33)$	$0.361^{+0.036}_{-0.016}$
$\Omega_m h^2$	$0.1427 \pm 0.0013$	$r_{\text{drag}}$	$147.19 \pm 0.32$	$f_{2000}^{143}$	$29.2 \pm 2.8$
$\Omega_m h^3$	$0.122^{+0.019}_{-0.0083}$	$k_{\text{D}}$	$0.14076 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$\sigma_8$	$0.962^{+0.10}_{-0.048}$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$S_8$	$0.777^{+0.024}_{-0.038}$	$z_{\text{eq}}$	$3394 \pm 31$	$\chi_{\text{small}}^2$	$396.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.425^{+0.013}_{-0.021}$	$k_{\text{eq}}$	$0.010359 \pm 0.000096$	$\chi_{\text{lowl}}^2$	$22.72 \pm 0.85$
$\sigma_8 \Omega_m^{0.25}$	$0.639^{+0.021}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8148 \pm 0.0059$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$1.039^{+0.033}_{-0.020}$	$100\theta_{\text{s,eq}}$	$0.4502 \pm 0.0030$	$\chi_{\text{CMB}}^2$	$7355 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11918.08$ ;  $\Delta\chi_{\text{eff}}^2 = 9156.71$ ;  $\bar{\chi}_{\text{eff}}^2 = 11940.42$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.76$ ;  $R - 1 = 0.01476$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.73 ( $\Delta$  -0.12) commander\_dx12\_v3\_2\_29: 22.18 ( $\Delta$  -0.27) CamSpec like\_10.7HM\_1400\_unified: 11498.24



18.6 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02239 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.481^{+0.029}_{-0.025}$	$H(0.38)$	$84.69^{+0.84}_{-0.52}$
$\Omega_c h^2$	$0.1192 \pm 0.0012$	$z_{\text{re}}$	$7.36^{+0.77}_{-0.69}$	$D_{\text{M}}(0.38)$	$1369^{+32}_{-88}$
$100\theta_{MC}$	$1.04096 \pm 0.00031$	$10^9 A_s$	$2.083 \pm 0.030$	$H(0.51)$	$88.6^{+1.1}_{-0.69}$
$\tau$	$0.0520 \pm 0.0074$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.51)$	$1820^{+31}_{-86}$
$w$	$-1.55^{+0.16}_{-0.34}$	$D_{40}$	$1221 \pm 12$	$H(0.61)$	$92.8^{+1.3}_{-1.8}$
$\ln(10^{10} A_s)$	$3.036 \pm 0.015$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(0.61)$	$2151^{+30}_{-81}$
$n_s$	$0.9668 \pm 0.0041$	$D_{810}$	$2534 \pm 13$	$H(2.33)$	$231.45^{+0.83}_{-2.2}$
$y_{\text{cal}}$	$1.0003 \pm 0.0025$	$D_{1420}$	$815.8 \pm 4.8$	$D_{\text{M}}(2.33)$	$5733^{+12}_{-17}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.6 \pm 1.6$	$f\sigma_8(0.15)$	$0.482^{+0.015}_{-0.013}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9668 \pm 0.0041$	$\sigma_8(0.15)$	$0.898^{+0.094}_{-0.045}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245400^{+0.000063}_{-0.000056}$	$f\sigma_8(0.38)$	$0.566^{+0.057}_{-0.035}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246727^{+0.000063}_{-0.000056}$	$\sigma_8(0.38)$	$0.803^{+0.087}_{-0.041}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.583 \pm 0.029$	$f\sigma_8(0.51)$	$0.584^{+0.070}_{-0.040}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.548^{+0.048}_{-0.13}$	$\sigma_8(0.51)$	$0.751^{+0.081}_{-0.037}$
$A^{kSZ}$	$< 5.24$	$z_*$	$1089.83 \pm 0.26$	$f\sigma_8(0.61)$	$0.586^{+0.075}_{-0.040}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.62 \pm 0.28$	$\sigma_8(0.61)$	$0.713^{+0.076}_{-0.035}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04114 \pm 0.00031$	$f\sigma_8(2.33)$	$0.358^{+0.036}_{-0.016}$
$H_0$	$> 81.8$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.891 \pm 0.026$	$\sigma_8(2.33)$	$0.361^{+0.034}_{-0.016}$
$\Omega_\Lambda$	$0.801^{+0.057}_{-0.016}$	$z_{\text{drag}}$	$1059.92 \pm 0.33$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$\Omega_m$	$0.199^{+0.016}_{-0.057}$	$r_{\text{drag}}$	$147.28 \pm 0.28$	$f_{2000}^{143 \times 217}$	$31.9 \pm 1.9$
$\Omega_m h^2$	$0.1422 \pm 0.0011$	$k_{\text{D}}$	$0.14068 \pm 0.00033$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$\Omega_m h^3$	$0.122^{+0.018}_{-0.0083}$	$100\theta_{\text{D}}$	$0.16077 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$8.88 \pm 0.98$
$\sigma_8$	$0.959^{+0.093}_{-0.046}$	$z_{\text{eq}}$	$3384 \pm 27$	$\chi_{\text{small}}^2$	$861 \pm 800$
$S_8$	$0.770^{+0.022}_{-0.038}$	$k_{\text{eq}}$	$0.010328 \pm 0.000084$	$\chi_{\text{lowl}}^2$	$22.51 \pm 0.75$
$\sigma_8 \Omega_m^{0.5}$	$0.422^{+0.012}_{-0.021}$	$100\theta_{\text{eq}}$	$0.8167 \pm 0.0052$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.635^{+0.017}_{-0.011}$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0027$	$\chi_{\text{CMB}}^2$	$7363 \pm 5000$
$\sigma_8/h^{0.5}$	$1.034^{+0.028}_{-0.017}$	$H(0.15)$	$82.8^{+6.1}_{-2.6}$		
$r_{\text{drag}} h$	$127^{+20}_{-9}$	$D_{\text{M}}(0.15)$	$539^{+26}_{-59}$		

$\bar{\chi}_{\text{eff}}^2 = 11948.65$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.93$ ;  $R - 1 = 0.02333$



18.7 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.468 \pm 0.032$	$H(0.38)$	$83.82 \pm 0.41$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$z_{\text{re}}$	$7.50 \pm 0.80$	$D_{\text{M}}(0.38)$	$1466 \pm 17$
$100\theta_{MC}$	$1.04090 \pm 0.00032$	$10^9 A_s$	$2.092 \pm 0.034$	$H(0.51)$	$89.53 \pm 0.37$
$\tau$	$0.0530 \pm 0.0078$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.51)$	$1916 \pm 18$
$w$	$-1.205 \pm 0.058$	$D_{40}$	$1228 \pm 13$	$H(0.61)$	$94.56 \pm 0.41$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2242 \pm 18$
$n_s$	$0.9653 \pm 0.0044$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$233.96 \pm 0.89$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{1420}$	$816.4 \pm 4.8$	$D_{\text{M}}(2.33)$	$5748 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.15)$	$0.470 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9653 \pm 0.0044$	$\sigma_8(0.15)$	$0.805 \pm 0.018$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$Y_P$	$0.245382^{+0.000061}_{-0.000053}$	$f\sigma_8(0.38)$	$0.509 \pm 0.014$
$A_{100}^{PS}$	$248 \pm 27$	$Y_P^{\text{BBN}}$	$0.246708^{+0.000061}_{-0.000053}$	$\sigma_8(0.38)$	$0.716 \pm 0.016$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.592 \pm 0.027$	$f\sigma_8(0.51)$	$0.514 \pm 0.015$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.689 \pm 0.031$	$\sigma_8(0.51)$	$0.670 \pm 0.015$
$A^{kSZ}$	$< 5.22$	$z_*$	$1089.95 \pm 0.26$	$f\sigma_8(0.61)$	$0.512 \pm 0.015$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.47 \pm 0.33$	$\sigma_8(0.61)$	$0.637 \pm 0.014$
$c_{217}$	$0.9996^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04109 \pm 0.00032$	$f\sigma_8(2.33)$	$0.3211 \pm 0.0068$
$H_0$	$73.6 \pm 1.6$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.877 \pm 0.031$	$\sigma_8(2.33)$	$0.3269 \pm 0.0061$
$\Omega_\Lambda$	$0.736^{+0.013}_{-0.011}$	$z_{\text{drag}}$	$1059.86 \pm 0.30$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$\Omega_m$	$0.264^{+0.011}_{-0.013}$	$r_{\text{drag}}$	$147.15 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_m h^2$	$0.1429 \pm 0.0014$	$k_{\text{D}}$	$0.14079 \pm 0.00037$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m h^3$	$0.1052 \pm 0.0025$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00018$	$\chi_{\text{small}}^2$	$842 \pm 800$
$\sigma_8$	$0.867 \pm 0.019$	$z_{\text{eq}}$	$3400 \pm 32$	$\chi_{\text{lowl}}^2$	$23.05 \pm 0.91$
$S_8$	$0.813 \pm 0.016$	$k_{\text{eq}}$	$0.010376 \pm 0.000099$	$\chi_{\text{H073p45}}^2$	$1.0 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4453 \pm 0.0087$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.621 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4496 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7356 \pm 5000$
$\sigma_8/h^{0.5}$	$1.010 \pm 0.015$	$H(0.15)$	$76.37 \pm 0.96$		
$r_{\text{drag}} h$	$108.3 \pm 2.4$	$D_{\text{M}}(0.15)$	$601 \pm 10$		

$\bar{\chi}_{\text{eff}}^2 = 11941.94$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.61$ ;  $R - 1 = 0.08175$



18.8 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$r_{\text{drag}} h$	$126^{+20}_{-8}$	$H(0.15)$	$82.5^{+6.4}_{-2.5}$
$\Omega_c h^2$	$0.1196 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.494^{+0.040}_{-0.031}$	$D_{\text{M}}(0.15)$	$541^{+19}_{-61}$
$100\theta_{MC}$	$1.04093 \pm 0.00031$	$z_{\text{re}}$	$7.66^{+0.52}_{-0.79}$	$H(0.38)$	$84.49^{+0.90}_{-0.55}$
$\tau$	$0.0547^{+0.0047}_{-0.0081}$	$10^9 A_s$	$2.097^{+0.024}_{-0.034}$	$D_{\text{M}}(0.38)$	$1375^{+30}_{-92}$
$w$	$-1.55^{+0.17}_{-0.37}$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.51)$	$88.5^{+1.2}_{-0.77}$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.016}$	$D_{40}$	$1224 \pm 13$	$D_{\text{M}}(0.51)$	$1826^{+30}_{-90}$
$n_s$	$0.9661 \pm 0.0044$	$D_{220}$	$5727 \pm 39$	$H(0.61)$	$92.7^{+1.3}_{-1.9}$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2536 \pm 14$	$D_{\text{M}}(0.61)$	$2157^{+28}_{-85}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.1 \pm 4.9$	$H(2.33)$	$231.84^{+0.88}_{-2.3}$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.8 \pm 1.6$	$D_{\text{M}}(2.33)$	$5736^{+11}_{-18}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9661 \pm 0.0044$	$f\sigma_8(0.15)$	$0.486^{+0.018}_{-0.016}$
$A_{100}^{PS}$	$247 \pm 30$	$Y_P$	$0.245392^{+0.000064}_{-0.000056}$	$\sigma_8(0.15)$	$0.901^{+0.10}_{-0.047}$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.246719^{+0.000064}_{-0.000056}$	$f\sigma_8(0.38)$	$0.570^{+0.063}_{-0.037}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$10^5 D/H$	$2.587 \pm 0.028$	$\sigma_8(0.38)$	$0.805^{+0.094}_{-0.042}$
$A^{kSZ}$	$< 5.07$	Age/Gyr	$13.558^{+0.045}_{-0.13}$	$f\sigma_8(0.51)$	$0.587^{+0.077}_{-0.042}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$z_*$	$1089.89 \pm 0.27$	$\sigma_8(0.51)$	$0.753^{+0.087}_{-0.038}$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$r_*$	$144.53 \pm 0.32$	$f\sigma_8(0.61)$	$0.589^{+0.082}_{-0.042}$
$H_0$	$> 81.3$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(0.61)$	$0.715^{+0.082}_{-0.036}$
$\Omega_\Lambda$	$0.797^{+0.060}_{-0.015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.030$	$f\sigma_8(2.33)$	$0.359^{+0.039}_{-0.016}$
$\Omega_m$	$0.203^{+0.015}_{-0.060}$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$\sigma_8(2.33)$	$0.362^{+0.036}_{-0.016}$
$\Omega_m h^2$	$0.1426 \pm 0.0013$	$r_{\text{drag}}$	$147.20 \pm 0.32$	$f_{2000}^{143}$	$29.1 \pm 2.8$
$\Omega_m h^3$	$0.122^{+0.019}_{-0.0084}$	$k_{\text{D}}$	$0.14075 \pm 0.00036$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\sigma_8$	$0.963^{+0.10}_{-0.048}$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$f_{2000}^{217}$	$106.6 \pm 1.8$
$S_8$	$0.778^{+0.024}_{-0.038}$	$z_{\text{eq}}$	$3393 \pm 31$	$\chi_{\text{simall}}^2$	$396.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.426^{+0.013}_{-0.021}$	$k_{\text{eq}}$	$0.010356 \pm 0.000095$	$\chi_{\text{lowl}}^2$	$22.72 \pm 0.85$
$\sigma_8 \Omega_m^{0.25}$	$0.639^{+0.021}_{-0.013}$	$100\theta_{\text{eq}}$	$0.8150 \pm 0.0059$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$1.040^{+0.033}_{-0.020}$	$100\theta_{\text{s,eq}}$	$0.4503 \pm 0.0030$	$\chi_{\text{CMB}}^2$	$7355 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11940.09$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.71$ ;  $R - 1 = 0.01385$



18.9 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02240 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.482^{+0.029}_{-0.024}$	$H(0.38)$	$84.71^{+0.86}_{-0.50}$
$\Omega_c h^2$	$0.1191 \pm 0.0012$	$z_{\text{re}}$	$7.54^{+0.46}_{-0.75}$	$D_{\text{M}}(0.38)$	$1370^{+32}_{-89}$
$100\theta_{MC}$	$1.04097 \pm 0.00031$	$10^9 A_s$	$2.090^{+0.021}_{-0.029}$	$H(0.51)$	$88.7^{+1.1}_{-0.68}$
$\tau$	$0.0537^{+0.0042}_{-0.0075}$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.51)$	$1821^{+32}_{-87}$
$w$	$-1.54^{+0.17}_{-0.35}$	$D_{40}$	$1221 \pm 12$	$H(0.61)$	$92.8^{+1.3}_{-1.8}$
$\ln(10^{10} A_s)$	$3.039^{+0.010}_{-0.014}$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(0.61)$	$2151^{+30}_{-82}$
$n_s$	$0.9671 \pm 0.0041$	$D_{810}$	$2534 \pm 13$	$H(2.33)$	$231.44^{+0.81}_{-2.2}$
$y_{\text{cal}}$	$1.0002 \pm 0.0024$	$D_{1420}$	$815.8 \pm 4.8$	$D_{\text{M}}(2.33)$	$5733^{+11}_{-17}$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.15)$	$0.481^{+0.015}_{-0.013}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9671 \pm 0.0041$	$\sigma_8(0.15)$	$0.898^{+0.094}_{-0.046}$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.245403^{+0.000062}_{-0.000056}$	$f\sigma_8(0.38)$	$0.565^{+0.057}_{-0.035}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P^{\text{BBN}}$	$0.246730^{+0.000062}_{-0.000056}$	$\sigma_8(0.38)$	$0.802^{+0.088}_{-0.042}$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.581 \pm 0.028$	$f\sigma_8(0.51)$	$0.583^{+0.070}_{-0.040}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.549^{+0.049}_{-0.13}$	$\sigma_8(0.51)$	$0.750^{+0.082}_{-0.038}$
$A^{kSZ}$	$< 5.20$	$z_*$	$1089.81 \pm 0.26$	$f\sigma_8(0.61)$	$0.585^{+0.076}_{-0.041}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.64 \pm 0.27$	$\sigma_8(0.61)$	$0.713^{+0.077}_{-0.036}$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04116 \pm 0.00030$	$f\sigma_8(2.33)$	$0.358^{+0.037}_{-0.016}$
$H_0$	$> 81.5$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.892 \pm 0.026$	$\sigma_8(2.33)$	$0.361^{+0.034}_{-0.016}$
$\Omega_\Lambda$	$0.800^{+0.058}_{-0.022}$	$z_{\text{drag}}$	$1059.93 \pm 0.33$	$f_{2000}^{143}$	$29.2 \pm 2.8$
$\Omega_m$	$0.200^{+0.022}_{-0.058}$	$r_{\text{drag}}$	$147.30 \pm 0.28$	$f_{2000}^{143 \times 217}$	$31.8 \pm 1.9$
$\Omega_m h^2$	$0.1422 \pm 0.0011$	$k_{\text{D}}$	$0.14067 \pm 0.00033$	$f_{2000}^{217}$	$106.6 \pm 1.9$
$\Omega_m h^3$	$0.122^{+0.018}_{-0.0085}$	$100\theta_{\text{D}}$	$0.16076 \pm 0.00019$	$\chi_{\text{lensing}}^2$	$8.9 \pm 1.0$
$\sigma_8$	$0.959^{+0.094}_{-0.047}$	$z_{\text{eq}}$	$3382 \pm 27$	$\chi_{\text{small}}^2$	$868 \pm 800$
$S_8$	$0.771^{+0.022}_{-0.038}$	$k_{\text{eq}}$	$0.010321 \pm 0.000082$	$\chi_{\text{lowl}}^2$	$22.49 \pm 0.76$
$\sigma_8 \Omega_m^{0.5}$	$0.422^{+0.012}_{-0.021}$	$100\theta_{\text{eq}}$	$0.8171 \pm 0.0051$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.635^{+0.017}_{-0.011}$	$100\theta_{\text{s,eq}}$	$0.4514 \pm 0.0026$	$\chi_{\text{CMB}}^2$	$7363 \pm 5000$
$\sigma_8/h^{0.5}$	$1.035^{+0.028}_{-0.017}$	$H(0.15)$	$82.7^{+6.2}_{-2.6}$		
$r_{\text{drag}} h$	$127^{+20}_{-9}$	$D_{\text{M}}(0.15)$	$540^{+25}_{-59}$		

$\bar{\chi}_{\text{eff}}^2 = 11948.34$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.91$ ;  $R - 1 = 0.02464$



18.10 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00014$	$\langle d^2 \rangle^{1/2}$	$2.471 \pm 0.031$	$H(0.38)$	$83.83 \pm 0.40$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$z_{\text{re}}$	$7.67^{+0.54}_{-0.83}$	$D_{\text{M}}(0.38)$	$1466 \pm 17$
$100\theta_{MC}$	$1.04091 \pm 0.00032$	$10^9 A_s$	$2.099^{+0.025}_{-0.034}$	$H(0.51)$	$89.54 \pm 0.36$
$\tau$	$0.0545^{+0.0053}_{-0.0078}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.51)$	$1916^{+17}_{-19}$
$w$	$-1.204 \pm 0.058$	$D_{40}$	$1228 \pm 13$	$H(0.61)$	$94.57 \pm 0.40$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{220}$	$5727 \pm 38$	$D_{\text{M}}(0.61)$	$2242^{+17}_{-19}$
$n_s$	$0.9654 \pm 0.0043$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$233.95 \pm 0.88$
$y_{\text{cal}}$	$1.0006 \pm 0.0024$	$D_{1420}$	$816.4 \pm 4.8$	$D_{\text{M}}(2.33)$	$5748 \pm 10$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.15)$	$0.470 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9654 \pm 0.0043$	$\sigma_8(0.15)$	$0.806 \pm 0.018$
$A_{143}^{tSZ}$	$4.7 \pm 2.1$	$Y_P$	$0.245383 \pm 0.000056$	$f\sigma_8(0.38)$	$0.510 \pm 0.014$
$A_{100}^{PS}$	$248 \pm 27$	$Y_P^{\text{BBN}}$	$0.246709^{+0.000059}_{-0.000053}$	$\sigma_8(0.38)$	$0.716 \pm 0.016$
$A_{143}^{PS}$	$42 \pm 9$	$10^5 D/H$	$2.591 \pm 0.026$	$f\sigma_8(0.51)$	$0.515 \pm 0.015$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.689 \pm 0.031$	$\sigma_8(0.51)$	$0.670 \pm 0.015$
$A^{kSZ}$	$< 5.18$	$z_*$	$1089.95 \pm 0.26$	$f\sigma_8(0.61)$	$0.512 \pm 0.015$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$r_*$	$144.48 \pm 0.33$	$\sigma_8(0.61)$	$0.637 \pm 0.014$
$c_{217}$	$0.9996^{+0.0019}_{-0.0023}$	$100\theta_*$	$1.04109 \pm 0.00032$	$f\sigma_8(2.33)$	$0.3215 \pm 0.0068$
$H_0$	$73.6 \pm 1.7$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.878 \pm 0.031$	$\sigma_8(2.33)$	$0.3273 \pm 0.0060$
$\Omega_\Lambda$	$0.736^{+0.013}_{-0.011}$	$z_{\text{drag}}$	$1059.86 \pm 0.30$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_m$	$0.264^{+0.011}_{-0.013}$	$r_{\text{drag}}$	$147.15 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$k_{\text{D}}$	$0.14078 \pm 0.00037$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m h^3$	$0.1052 \pm 0.0025$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00017$	$\chi_{\text{small}}^2$	$851 \pm 800$
$\sigma_8$	$0.868 \pm 0.019$	$z_{\text{eq}}$	$3399 \pm 32$	$\chi_{\text{lowl}}^2$	$23.07 \pm 0.90$
$S_8$	$0.814 \pm 0.015$	$k_{\text{eq}}$	$0.010374 \pm 0.000098$	$\chi_{\text{H073p45}}^2$	$1.0 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4458 \pm 0.0085$	$100\theta_{\text{eq}}$	$0.8138 \pm 0.0060$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.5$
$\sigma_8 \Omega_m^{0.25}$	$0.622 \pm 0.010$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7356 \pm 5000$
$\sigma_8/h^{0.5}$	$1.012 \pm 0.015$	$H(0.15)$	$76.37 \pm 0.96$		
$r_{\text{drag}} h$	$108.3 \pm 2.4$	$D_{\text{M}}(0.15)$	$601 \pm 10$		

$\bar{\chi}_{\text{eff}}^2 = 11941.58$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.58$ ;  $R - 1 = 0.09840$



18.11 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00015$	$z_{\text{re}}$	$7.59 \pm 0.80$	$H(0.51)$	$89.67^{+0.28}_{-0.25}$
$\Omega_c h^2$	$0.1196 \pm 0.0013$	$10^9 A_s$	$2.093 \pm 0.035$	$D_{\text{M}}(0.51)$	$1972 \pm 17$
$100\theta_{MC}$	$1.04094 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.20^{+0.36}_{-0.30}$
$\tau$	$0.0537 \pm 0.0079$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2297 \pm 17$
$w$	$-1.032^{+0.061}_{-0.052}$	$D_{220}$	$5727 \pm 40$	$H(2.33)$	$235.83 \pm 0.74$
$\ln(10^{10} A_s)$	$3.041 \pm 0.017$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.3 \pm 9.3$
$n_s$	$0.9661 \pm 0.0043$	$D_{1420}$	$816.6 \pm 5.0$	$f\sigma_8(0.15)$	$0.459 \pm 0.010$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.7$	$\sigma_8(0.15)$	$0.756 \pm 0.019$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9661 \pm 0.0043$	$f\sigma_8(0.38)$	$0.480^{+0.013}_{-0.014}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245386^{+0.000063}_{-0.000056}$	$\sigma_8(0.38)$	$0.671 \pm 0.017$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246712^{+0.000063}_{-0.000056}$	$f\sigma_8(0.51)$	$0.480^{+0.014}_{-0.015}$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.590 \pm 0.028$	$\sigma_8(0.51)$	$0.628 \pm 0.016$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.779 \pm 0.032$	$f\sigma_8(0.61)$	$0.475^{+0.014}_{-0.016}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.91 \pm 0.26$	$\sigma_8(0.61)$	$0.597 \pm 0.015$
$A^{kSZ}$	$< 5.26$	$r_*$	$144.56 \pm 0.31$	$f\sigma_8(2.33)$	$0.3010 \pm 0.0074$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04112 \pm 0.00031$	$\sigma_8(2.33)$	$0.3097 \pm 0.0063$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$68.5^{+1.3}_{-1.5}$	$z_{\text{drag}}$	$1059.86 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_{\Lambda}$	$0.695 \pm 0.012$	$r_{\text{drag}}$	$147.23 \pm 0.31$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.305 \pm 0.012$	$k_{\text{D}}$	$0.14071 \pm 0.00036$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1426 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.13 \pm 0.90$
$\Omega_m h^3$	$0.0976^{+0.0023}_{-0.0026}$	$z_{\text{eq}}$	$3391 \pm 30$	$\chi_{6\text{DF}}^2$	$0.13 \pm 0.19$
$\sigma_8$	$0.818 \pm 0.020$	$k_{\text{eq}}$	$0.010351 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.83 \pm 0.99$
$S_8$	$0.824 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8153 \pm 0.0055$	$\chi_{\text{DR12BAO}}^2$	$5.1 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4504 \pm 0.0028$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.607 \pm 0.011$	$H(0.15)$	$73.37 \pm 0.87$	$\chi_{\text{BAO}}^2$	$7.0 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.016$	$D_{\text{M}}(0.15)$	$635 \pm 10$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$100.8^{+1.9}_{-2.2}$	$H(0.38)$	$83.10 \pm 0.31$		
$\langle d^2 \rangle^{1/2}$	$2.440 \pm 0.033$	$D_{\text{M}}(0.38)$	$1520 \pm 16$		

Best-fit  $\chi_{\text{eff}}^2 = 11926.60$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.12$ ;  $\bar{\chi}_{\text{eff}}^2 = 11949.21$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.61$ ;  $R - 1 = 0.01464$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.61 ( $\Delta$  -0.14) DR12BAO: 4.04 ( $\Delta$  -0.36) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.90 ( $\Delta$  -0.16) commander\_dx12\_v3\_2\_29: 22.84 ( $\Delta$  -0.28) CamSpec like\_10.7HM\_1400\_unified: 11499.85



18.12 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00015$	$z_{\text{re}}$	$7.64 \pm 0.76$	$H(0.51)$	$89.67 \pm 0.25$
$\Omega_c h^2$	$0.1196 \pm 0.0011$	$10^9 A_s$	$2.096 \pm 0.031$	$D_{\text{M}}(0.51)$	$1971 \pm 17$
$100\theta_{\text{MC}}$	$1.04093 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.20^{+0.32}_{-0.27}$
$\tau$	$0.0542 \pm 0.0075$	$D_{40}$	$1228 \pm 12$	$D_{\text{M}}(0.61)$	$2296 \pm 17$
$w$	$-1.035^{+0.055}_{-0.049}$	$D_{220}$	$5729 \pm 40$	$H(2.33)$	$235.80 \pm 0.73$
$\ln(10^{10} A_s)$	$3.042 \pm 0.015$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5759.9 \pm 9.3$
$n_s$	$0.9659 \pm 0.0040$	$D_{1420}$	$816.7 \pm 5.0$	$f\sigma_8(0.15)$	$0.4592 \pm 0.0076$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.7$	$\sigma_8(0.15)$	$0.758 \pm 0.016$
$A_{217}^{\text{CIB}}$	$43 \pm 8$	$n_{s,0.002}$	$0.9659 \pm 0.0040$	$f\sigma_8(0.38)$	$0.481^{+0.010}_{-0.011}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245387^{+0.000063}_{-0.000056}$	$\sigma_8(0.38)$	$0.672 \pm 0.014$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246714^{+0.000063}_{-0.000056}$	$f\sigma_8(0.51)$	$0.480^{+0.011}_{-0.013}$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.589 \pm 0.028$	$\sigma_8(0.51)$	$0.629 \pm 0.013$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.777 \pm 0.031$	$f\sigma_8(0.61)$	$0.476^{+0.011}_{-0.013}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.90 \pm 0.24$	$\sigma_8(0.61)$	$0.598 \pm 0.012$
$A^{kSZ}$	$< 5.19$	$r_*$	$144.55 \pm 0.26$	$f\sigma_8(2.33)$	$0.3015 \pm 0.0063$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04112 \pm 0.00030$	$\sigma_8(2.33)$	$0.3101 \pm 0.0053$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.884 \pm 0.025$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$68.5^{+1.3}_{-1.5}$	$z_{\text{drag}}$	$1059.87 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_{\Lambda}$	$0.696 \pm 0.012$	$r_{\text{drag}}$	$147.22 \pm 0.27$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.304 \pm 0.012$	$k_{\text{D}}$	$0.14072 \pm 0.00033$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.73$
$\Omega_m h^2$	$0.1426 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{small}}^2$	$312 \pm 200$
$\Omega_m h^3$	$0.0977 \pm 0.0023$	$z_{\text{eq}}$	$3392 \pm 25$	$\chi_{\text{lowl}}^2$	$109 \pm 200$
$\sigma_8$	$0.819 \pm 0.016$	$k_{\text{eq}}$	$0.010353 \pm 0.000076$	$\chi_{6\text{DF}}^2$	$0.53 \pm 0.89$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8151 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.5 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0059$	$100\theta_{s,\text{eq}}$	$0.4504 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6080 \pm 0.0082$	$H(0.15)$	$73.42 \pm 0.84$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.012$	$D_{\text{M}}(0.15)$	$635 \pm 10$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$100.9^{+1.9}_{-2.1}$	$H(0.38)$	$83.12 \pm 0.31$	$\chi_{\text{BAO}}^2$	$7.0 \pm 1.7$
$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.024$	$D_{\text{M}}(0.38)$	$1519 \pm 16$		

$$\bar{\chi}_{\text{eff}}^2 = 11958.08; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.84; R - 1 = 0.01812$$



18.13 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00015$	$z_{\text{re}}$	$7.73^{+0.57}_{-0.81}$	$H(0.51)$	$89.68^{+0.28}_{-0.25}$
$\Omega_c h^2$	$0.1195 \pm 0.0013$	$10^9 A_s$	$2.098^{+0.025}_{-0.035}$	$D_{\text{M}}(0.51)$	$1972 \pm 17$
$100\theta_{MC}$	$1.04094 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.21^{+0.36}_{-0.30}$
$\tau$	$0.0550^{+0.0051}_{-0.0083}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2297 \pm 17$
$w$	$-1.032^{+0.061}_{-0.053}$	$D_{220}$	$5727 \pm 40$	$H(2.33)$	$235.83 \pm 0.74$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.017}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.2 \pm 9.3$
$n_s$	$0.9662 \pm 0.0042$	$D_{1420}$	$816.6 \pm 5.0$	$f\sigma_8(0.15)$	$0.4591 \pm 0.0099$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.7$	$\sigma_8(0.15)$	$0.757 \pm 0.019$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9662 \pm 0.0042$	$f\sigma_8(0.38)$	$0.480^{+0.013}_{-0.014}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245387^{+0.000062}_{-0.000056}$	$\sigma_8(0.38)$	$0.671 \pm 0.017$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246714^{+0.000063}_{-0.000057}$	$f\sigma_8(0.51)$	$0.480^{+0.014}_{-0.015}$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.589 \pm 0.028$	$\sigma_8(0.51)$	$0.628 \pm 0.016$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.779 \pm 0.032$	$f\sigma_8(0.61)$	$0.475^{+0.014}_{-0.016}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.90 \pm 0.26$	$\sigma_8(0.61)$	$0.598 \pm 0.015$
$A^{kSZ}$	$< 5.23$	$r_*$	$144.57 \pm 0.31$	$f\sigma_8(2.33)$	$0.3013 \pm 0.0073$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04113 \pm 0.00031$	$\sigma_8(2.33)$	$0.3100 \pm 0.0062$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.029$	$f_{2000}^{143}$	$29.5 \pm 2.7$
$H_0$	$68.4^{+1.3}_{-1.5}$	$z_{\text{drag}}$	$1059.87 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_{\Lambda}$	$0.695 \pm 0.012$	$r_{\text{drag}}$	$147.23 \pm 0.31$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.305 \pm 0.012$	$k_{\text{D}}$	$0.14070 \pm 0.00036$	$\chi_{\text{small}}^2$	$396.9 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.15 \pm 0.90$
$\Omega_m h^3$	$0.0976^{+0.0023}_{-0.0026}$	$z_{\text{eq}}$	$3391 \pm 30$	$\chi_{6\text{DF}}^2$	$0.13 \pm 0.19$
$\sigma_8$	$0.819 \pm 0.020$	$k_{\text{eq}}$	$0.010349 \pm 0.000090$	$\chi_{\text{MGS}}^2$	$1.83 \pm 0.99$
$S_8$	$0.824 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0055$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0028$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.608 \pm 0.011$	$H(0.15)$	$73.37 \pm 0.87$	$\chi_{\text{BAO}}^2$	$7.0 \pm 1.7$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.016$	$D_{\text{M}}(0.15)$	$635 \pm 10$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$100.8^{+1.9}_{-2.2}$	$H(0.38)$	$83.10 \pm 0.31$		
$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.032$	$D_{\text{M}}(0.38)$	$1520 \pm 16$		

$\bar{\chi}_{\text{eff}}^2 = 11948.94$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.58$ ;  $R - 1 = 0.01259$



## 18.14 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.74^{+0.57}_{-0.77}$	$H(0.51)$	$89.68 \pm 0.24$
$\Omega_c h^2$	$0.1195 \pm 0.0011$	$10^9 A_s$	$2.099^{+0.024}_{-0.032}$	$D_{\text{M}}(0.51)$	$1971 \pm 17$
$100\theta_{MC}$	$1.04094 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.21^{+0.32}_{-0.27}$
$\tau$	$0.0551^{+0.0052}_{-0.0080}$	$D_{40}$	$1228 \pm 12$	$D_{\text{M}}(0.61)$	$2296 \pm 17$
$w$	$-1.033^{+0.054}_{-0.048}$	$D_{220}$	$5729 \pm 40$	$H(2.33)$	$235.80 \pm 0.73$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.015}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5759.7 \pm 9.2$
$n_s$	$0.9661 \pm 0.0039$	$D_{1420}$	$816.7 \pm 5.0$	$f\sigma_8(0.15)$	$0.4592 \pm 0.0076$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.7$	$\sigma_8(0.15)$	$0.758 \pm 0.016$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9661 \pm 0.0039$	$f\sigma_8(0.38)$	$0.481^{+0.010}_{-0.012}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245389^{+0.000062}_{-0.000055}$	$\sigma_8(0.38)$	$0.672 \pm 0.014$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246715^{+0.000062}_{-0.000056}$	$f\sigma_8(0.51)$	$0.480^{+0.011}_{-0.013}$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.588 \pm 0.028$	$\sigma_8(0.51)$	$0.629 \pm 0.013$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.777 \pm 0.031$	$f\sigma_8(0.61)$	$0.476^{+0.011}_{-0.013}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.24$	$\sigma_8(0.61)$	$0.598 \pm 0.012$
$A^{kSZ}$	$< 5.17$	$r_*$	$144.56 \pm 0.26$	$f\sigma_8(2.33)$	$0.3016 \pm 0.0063$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04112 \pm 0.00030$	$\sigma_8(2.33)$	$0.3102 \pm 0.0053$
$c_{217}$	$0.9996 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.025$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$68.5 \pm 1.4$	$z_{\text{drag}}$	$1059.88 \pm 0.33$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_\Lambda$	$0.696 \pm 0.012$	$r_{\text{drag}}$	$147.23 \pm 0.27$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.304 \pm 0.012$	$k_{\text{D}}$	$0.14071 \pm 0.00033$	$\chi_{\text{lensing}}^2$	$9.19 \pm 0.70$
$\Omega_m h^2$	$0.1425 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{small}}^2$	$312 \pm 200$
$\Omega_m h^3$	$0.0977 \pm 0.0023$	$z_{\text{eq}}$	$3391 \pm 25$	$\chi_{\text{lowl}}^2$	$108 \pm 200$
$\sigma_8$	$0.819 \pm 0.016$	$k_{\text{eq}}$	$0.010349 \pm 0.000075$	$\chi_{6\text{DF}}^2$	$0.53 \pm 0.88$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8153 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.5 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0058$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6082 \pm 0.0082$	$H(0.15)$	$73.41 \pm 0.84$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.012$	$D_{\text{M}}(0.15)$	$635.0 \pm 9.9$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$100.9^{+1.9}_{-2.1}$	$H(0.38)$	$83.12 \pm 0.31$	$\chi_{\text{BAO}}^2$	$7.0 \pm 1.7$
$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.024$	$D_{\text{M}}(0.38)$	$1520 \pm 16$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.85; R - 1 = 0.01772$$



18.15 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02218 \pm 0.00020$	$z_{\text{re}}$	$7.57 \pm 0.81$	$H(0.51)$	$89.57 \pm 0.33$
$\Omega_c h^2$	$0.1195 \pm 0.0015$	$10^9 A_s$	$2.089 \pm 0.034$	$D_M(0.51)$	$1977 \pm 12$
$100\theta_{MC}$	$1.04095 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$H(0.61)$	$95.12 \pm 0.35$
$\tau$	$0.0531 \pm 0.0079$	$D_{40}$	$1227 \pm 13$	$D_M(0.61)$	$2302 \pm 12$
$w$	$-1.026 \pm 0.037$	$D_{220}$	$5714 \pm 41$	$H(2.33)$	$235.67 \pm 0.75$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5767 \pm 12$
$n_s$	$0.9655 \pm 0.0048$	$D_{1420}$	$814.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.458 \pm 0.011$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.754 \pm 0.014$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9655 \pm 0.0048$	$f\sigma_8(0.38)$	$0.479 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245316^{+0.000094}_{-0.000076}$	$\sigma_8(0.38)$	$0.668 \pm 0.012$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246642^{+0.000094}_{-0.000076}$	$f\sigma_8(0.51)$	$0.478 \pm 0.012$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.621 \pm 0.038$	$\sigma_8(0.51)$	$0.625 \pm 0.011$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.798 \pm 0.028$	$f\sigma_8(0.61)$	$0.473 \pm 0.012$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.11 \pm 0.33$	$\sigma_8(0.61)$	$0.595 \pm 0.010$
$A^{kSZ}$	$< 5.82$	$r_*$	$144.71 \pm 0.37$	$f\sigma_8(2.33)$	$0.3000 \pm 0.0051$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$100\theta_*$	$1.04115 \pm 0.00043$	$\sigma_8(2.33)$	$0.3087 \pm 0.0044$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.899 \pm 0.035$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$H_0$	$68.15 \pm 0.83$	$z_{\text{drag}}$	$1059.47 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6935 \pm 0.0078$	$r_{\text{drag}}$	$147.44 \pm 0.39$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3065 \pm 0.0078$	$k_D$	$0.14035 \pm 0.00047$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1423 \pm 0.0015$	$100\theta_D$	$0.16104 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.17 \pm 0.99$
$\Omega_m h^3$	$0.0970 \pm 0.0016$	$z_{\text{eq}}$	$3385 \pm 35$	$\chi_{\text{JLA}}^2$	$1035.43 \pm 0.99$
$\sigma_8$	$0.815 \pm 0.015$	$k_{\text{eq}}$	$0.01033 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.049 \pm 0.068$
$S_8$	$0.824 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8160 \pm 0.0066$	$\chi_{\text{MGS}}^2$	$1.64 \pm 0.61$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0090$	$100\theta_{s,\text{eq}}$	$0.4509 \pm 0.0034$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.607 \pm 0.011$	$H(0.15)$	$73.15 \pm 0.54$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.016$	$D_M(0.15)$	$637.6 \pm 6.1$	$\chi_{\text{BAO}}^2$	$6.5 \pm 1.3$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$82.97 \pm 0.34$	$\chi_{\text{CMB}}^2$	$4338 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.034$	$D_M(0.38)$	$1525 \pm 10$		

Best-fit  $\chi_{\text{eff}}^2 = 8513.28$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.04$ ;  $\bar{\chi}_{\text{eff}}^2 = 8532.92$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.76$ ;  $R - 1 = 0.00642$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.47 ( $\Delta$  -0.07) DR12BAO: 4.86 ( $\Delta$  0.40) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.06 ( $\Delta$  0.21) commander\_dx12\_v3\_2\_29: 23.45 ( $\Delta$  0.30) CamSpec like\_10.7HM: 7049.66 SN - JLA Pantheon18: 1034.75 ( $\Delta$  0.03)



18.16 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00020$	$z_{\text{re}}$	$7.64 \pm 0.76$	$H(0.51)$	$89.56 \pm 0.30$
$\Omega_c h^2$	$0.1196 \pm 0.0012$	$10^9 A_s$	$2.093^{+0.028}_{-0.032}$	$D_{\text{M}}(0.51)$	$1976 \pm 11$
$100\theta_{MC}$	$1.04093 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.10 \pm 0.31$
$\tau$	$0.0538 \pm 0.0076$	$D_{40}$	$1228 \pm 12$	$D_{\text{M}}(0.61)$	$2301 \pm 12$
$w$	$-1.028 \pm 0.034$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$235.69 \pm 0.68$
$\ln(10^{10} A_s)$	$3.041 \pm 0.015$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5767 \pm 12$
$n_s$	$0.9652 \pm 0.0044$	$D_{1420}$	$814.9 \pm 5.1$	$f\sigma_8(0.15)$	$0.4593 \pm 0.0078$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.756 \pm 0.011$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9652 \pm 0.0044$	$f\sigma_8(0.38)$	$0.4801 \pm 0.0090$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245317^{+0.000091}_{-0.000074}$	$\sigma_8(0.38)$	$0.6698 \pm 0.0097$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246643^{+0.000091}_{-0.000075}$	$f\sigma_8(0.51)$	$0.4793 \pm 0.0092$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.621 \pm 0.038$	$\sigma_8(0.51)$	$0.6267 \pm 0.0089$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.797 \pm 0.028$	$f\sigma_8(0.61)$	$0.4745 \pm 0.0092$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.12 \pm 0.31$	$\sigma_8(0.61)$	$0.5962 \pm 0.0084$
$A^{kSZ}$	$< 5.81$	$r_*$	$144.69 \pm 0.31$	$f\sigma_8(2.33)$	$0.3006 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04113 \pm 0.00042$	$\sigma_8(2.33)$	$0.3092 \pm 0.0036$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.897 \pm 0.030$	$f_{2000}^{143}$	$30.8 \pm 2.9$
$H_0$	$68.20 \pm 0.82$	$z_{\text{drag}}$	$1059.48 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6937 \pm 0.0077$	$r_{\text{drag}}$	$147.41 \pm 0.33$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3063 \pm 0.0077$	$k_{\text{D}}$	$0.14038 \pm 0.00043$	$\chi_{\text{lensing}}^2$	$9.30 \pm 0.78$
$\Omega_m h^2$	$0.1424 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$\chi_{\text{small}}^2$	$397.0 \pm 1.7$
$\Omega_m h^3$	$0.0971 \pm 0.0015$	$z_{\text{eq}}$	$3387 \pm 29$	$\chi_{\text{lowl}}^2$	$23.26 \pm 0.88$
$\sigma_8$	$0.817 \pm 0.012$	$k_{\text{eq}}$	$0.010338 \pm 0.000088$	$\chi_{\text{JLA}}^2$	$1035.39 \pm 0.94$
$S_8$	$0.826 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8155 \pm 0.0053$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.066$
$\sigma_8 \Omega_m^{0.5}$	$0.4522 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4507 \pm 0.0028$	$\chi_{\text{MGS}}^2$	$1.66 \pm 0.60$
$\sigma_8 \Omega_m^{0.25}$	$0.6079 \pm 0.0080$	$H(0.15)$	$73.18 \pm 0.53$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$D_{\text{M}}(0.15)$	$637.3 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$82.96 \pm 0.32$	$\chi_{\text{CMB}}^2$	$4347 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.024$	$D_{\text{M}}(0.38)$	$1524 \pm 10$	$\chi_{\text{BAO}}^2$	$6.5 \pm 1.1$
$\bar{\chi}_{\text{eff}}^2 = 8541.75$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.80$ ; $R - 1 = 0.00879$					



18.17    base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00020$	$z_{\text{re}}$	$7.72^{+0.54}_{-0.81}$	$H(0.51)$	$89.58 \pm 0.33$
$\Omega_c h^2$	$0.1194 \pm 0.0015$	$10^9 A_s$	$2.095^{+0.024}_{-0.034}$	$D_{\text{M}}(0.51)$	$1977 \pm 12$
$100\theta_{MC}$	$1.04095 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$H(0.61)$	$95.13 \pm 0.35$
$\tau$	$0.0545^{+0.0048}_{-0.0083}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2302 \pm 12$
$w$	$-1.025 \pm 0.037$	$D_{220}$	$5714 \pm 41$	$H(2.33)$	$235.66 \pm 0.75$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.016}$	$D_{810}$	$2534 \pm 14$	$D_{\text{M}}(2.33)$	$5767 \pm 12$
$n_s$	$0.9657 \pm 0.0048$	$D_{1420}$	$814.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.459 \pm 0.011$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.755 \pm 0.014$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9657 \pm 0.0048$	$f\sigma_8(0.38)$	$0.479 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245318^{+0.000093}_{-0.000075}$	$\sigma_8(0.38)$	$0.669 \pm 0.012$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246644^{+0.000094}_{-0.000075}$	$f\sigma_8(0.51)$	$0.478 \pm 0.012$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.620 \pm 0.038$	$\sigma_8(0.51)$	$0.626 \pm 0.011$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.798 \pm 0.028$	$f\sigma_8(0.61)$	$0.474 \pm 0.012$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.10 \pm 0.33$	$\sigma_8(0.61)$	$0.596 \pm 0.010$
$A^{kSZ}$	$< 5.80$	$r_*$	$144.72 \pm 0.37$	$f\sigma_8(2.33)$	$0.3004 \pm 0.0050$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$100\theta_*$	$1.04115 \pm 0.00043$	$\sigma_8(2.33)$	$0.3091 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.035$	$f_{2000}^{143}$	$30.8 \pm 3.0$
$H_0$	$68.15 \pm 0.83$	$z_{\text{drag}}$	$1059.47 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_\Lambda$	$0.6936 \pm 0.0078$	$r_{\text{drag}}$	$147.45 \pm 0.39$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3064 \pm 0.0078$	$k_{\text{D}}$	$0.14035 \pm 0.00047$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.8$
$\Omega_m h^2$	$0.1423 \pm 0.0015$	$100\theta_{\text{D}}$	$0.16104 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.0$
$\Omega_m h^3$	$0.0970 \pm 0.0016$	$z_{\text{eq}}$	$3384 \pm 35$	$\chi_{\text{JLA}}^2$	$1035.42 \pm 0.98$
$\sigma_8$	$0.816 \pm 0.015$	$k_{\text{eq}}$	$0.01033 \pm 0.00011$	$\chi_{6\text{DF}}^2$	$0.049 \pm 0.067$
$S_8$	$0.825 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8161 \pm 0.0066$	$\chi_{\text{MGS}}^2$	$1.64 \pm 0.61$
$\sigma_8 \Omega_m^{0.5}$	$0.4518 \pm 0.0089$	$100\theta_{s,\text{eq}}$	$0.4510 \pm 0.0034$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.607 \pm 0.011$	$H(0.15)$	$73.16 \pm 0.54$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.016$	$D_{\text{M}}(0.15)$	$637.6 \pm 6.1$	$\chi_{\text{BAO}}^2$	$6.5 \pm 1.3$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$82.97 \pm 0.34$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.033$	$D_{\text{M}}(0.38)$	$1524 \pm 10$		

$\bar{\chi}_{\text{eff}}^2 = 8532.67$ ;  $\Delta \bar{\chi}_{\text{eff}}^2 = 6291.82$ ;  $R - 1 = 0.00753$



## 18.18 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00020$	$z_{\text{re}}$	$7.75^{+0.57}_{-0.78}$	$H(0.51)$	$89.57 \pm 0.30$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s$	$2.097^{+0.023}_{-0.032}$	$D_{\text{M}}(0.51)$	$1976 \pm 11$
$100\theta_{MC}$	$1.04093 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$H(0.61)$	$95.11 \pm 0.31$
$\tau$	$0.0549^{+0.0051}_{-0.0080}$	$D_{40}$	$1228 \pm 12$	$D_{\text{M}}(0.61)$	$2301 \pm 12$
$w$	$-1.027 \pm 0.033$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$235.67 \pm 0.67$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.015}$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5767 \pm 12$
$n_s$	$0.9654 \pm 0.0043$	$D_{1420}$	$814.8 \pm 5.1$	$f\sigma_8(0.15)$	$0.4593 \pm 0.0078$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.8 \pm 1.8$	$\sigma_8(0.15)$	$0.756 \pm 0.011$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0043$	$f\sigma_8(0.38)$	$0.4801 \pm 0.0090$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245319^{+0.000090}_{-0.000074}$	$\sigma_8(0.38)$	$0.6700 \pm 0.0097$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246645^{+0.000091}_{-0.000074}$	$f\sigma_8(0.51)$	$0.4793 \pm 0.0092$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.620 \pm 0.038$	$\sigma_8(0.51)$	$0.6270 \pm 0.0089$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.797 \pm 0.028$	$f\sigma_8(0.61)$	$0.4745 \pm 0.0092$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.10 \pm 0.30$	$\sigma_8(0.61)$	$0.5965 \pm 0.0083$
$A^{kSZ}$	$< 5.79$	$r_*$	$144.70 \pm 0.31$	$f\sigma_8(2.33)$	$0.3008 \pm 0.0042$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04114 \pm 0.00042$	$\sigma_8(2.33)$	$0.3094 \pm 0.0036$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.898 \pm 0.030$	$f_{2000}^{143}$	$30.8 \pm 2.9$
$H_0$	$68.20 \pm 0.82$	$z_{\text{drag}}$	$1059.48 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$\Omega_{\Lambda}$	$0.6938 \pm 0.0076$	$r_{\text{drag}}$	$147.43 \pm 0.33$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$\Omega_m$	$0.3062 \pm 0.0076$	$k_{\text{D}}$	$0.14038 \pm 0.00043$	$\chi_{\text{lensing}}^2$	$9.27 \pm 0.75$
$\Omega_m h^2$	$0.1423 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16103 \pm 0.00026$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\Omega_m h^3$	$0.0971 \pm 0.0015$	$z_{\text{eq}}$	$3386 \pm 28$	$\chi_{\text{lowl}}^2$	$23.25 \pm 0.88$
$\sigma_8$	$0.817 \pm 0.012$	$k_{\text{eq}}$	$0.010334 \pm 0.000086$	$\chi_{\text{JLA}}^2$	$1035.38 \pm 0.92$
$S_8$	$0.826 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8158 \pm 0.0053$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.065$
$\sigma_8 \Omega_m^{0.5}$	$0.4523 \pm 0.0066$	$100\theta_{\text{s,eq}}$	$0.4508 \pm 0.0027$	$\chi_{\text{MGS}}^2$	$1.66 \pm 0.60$
$\sigma_8 \Omega_m^{0.25}$	$0.6080 \pm 0.0080$	$H(0.15)$	$73.18 \pm 0.53$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.2$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$D_{\text{M}}(0.15)$	$637.3 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$82.98 \pm 0.31$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.024$	$D_{\text{M}}(0.38)$	$1524 \pm 10$	$\chi_{\text{BAO}}^2$	$6.5 \pm 1.1$
$\bar{\chi}_{\text{eff}}^2 = 8541.57$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.89$ ; $R - 1 = 0.00916$					



18.19 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.63 \pm 0.79$	$H(0.51)$	$89.70 \pm 0.26$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s$	$2.094 \pm 0.034$	$D_{\text{M}}(0.51)$	$1974 \pm 11$
$100\theta_{MC}$	$1.04094 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.25 \pm 0.27$
$\tau$	$0.0541 \pm 0.0078$	$D_{40}$	$1227 \pm 12$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$w$	$-1.024 \pm 0.033$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$235.86 \pm 0.63$
$\ln(10^{10} A_s)$	$3.042 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.3 \pm 9.1$
$n_s$	$0.9664 \pm 0.0041$	$D_{1420}$	$816.7 \pm 4.9$	$f\sigma_8(0.15)$	$0.4579 \pm 0.0088$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.754 \pm 0.013$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9664 \pm 0.0041$	$f\sigma_8(0.38)$	$0.479 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245388^{+0.000062}_{-0.000053}$	$\sigma_8(0.38)$	$0.669 \pm 0.011$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246715^{+0.000062}_{-0.000054}$	$f\sigma_8(0.51)$	$0.478 \pm 0.010$
$A_{100}^{PS}$	$249^{+26}_{-29}$	$10^5 D/H$	$2.589 \pm 0.028$	$\sigma_8(0.51)$	$0.626 \pm 0.010$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.782 \pm 0.023$	$f\sigma_8(0.61)$	$0.473 \pm 0.010$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.25$	$\sigma_8(0.61)$	$0.5953 \pm 0.0097$
$A^{kSZ}$	$< 5.24$	$r_*$	$144.58 \pm 0.29$	$f\sigma_8(2.33)$	$0.3002 \pm 0.0048$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04113 \pm 0.00030$	$\sigma_8(2.33)$	$0.3089 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.887 \pm 0.027$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$68.25 \pm 0.83$	$z_{\text{drag}}$	$1059.87 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_{\Lambda}$	$0.6940 \pm 0.0076$	$r_{\text{drag}}$	$147.25 \pm 0.30$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.3060 \pm 0.0076$	$k_{\text{D}}$	$0.14069^{+0.00037}_{-0.00033}$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.10 \pm 0.87$
$\Omega_m h^3$	$0.0972 \pm 0.0015$	$z_{\text{eq}}$	$3389 \pm 28$	$\chi_{\text{JLA}}^2$	$1035.39 \pm 0.95$
$\sigma_8$	$0.816 \pm 0.014$	$k_{\text{eq}}$	$0.010344 \pm 0.000085$	$\chi_{6\text{DF}}^2$	$0.048 \pm 0.066$
$S_8$	$0.824 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8156 \pm 0.0052$	$\chi_{\text{MGS}}^2$	$1.65 \pm 0.60$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0075$	$100\theta_{\text{s,eq}}$	$0.4506 \pm 0.0027$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.6066 \pm 0.0094$	$H(0.15)$	$73.26 \pm 0.53$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.014$	$D_{\text{M}}(0.15)$	$636.7 \pm 6.0$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.0$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$83.09 \pm 0.28$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.438 \pm 0.030$	$D_{\text{M}}(0.38)$	$1522 \pm 10$		

Best-fit  $\chi_{\text{eff}}^2 = 12961.06$ ;  $\Delta\chi_{\text{eff}}^2 = 9154.81$ ;  $\bar{\chi}_{\text{eff}}^2 = 12983.86$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.66$ ;  $R - 1 = 0.00833$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.54 ( $\Delta$  -0.07) DR12BAO: 4.10 ( $\Delta$  -0.25) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  -0.18) commander\_dx12\_v3\_2\_29: 22.80 ( $\Delta$  -0.31) CamSpec like\_10.7HM\_1400\_unified: 11499.86 SN - JLA Pantheon18: 1034.72 ( $\Delta$  -0.02)



18.20 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.69 \pm 0.73$	$H(0.51)$	$89.69 \pm 0.24$
$\Omega_c h^2$	$0.1195 \pm 0.0011$	$10^9 A_s$	$2.097 \pm 0.030$	$D_{\text{M}}(0.51)$	$1973 \pm 11$
$100\theta_{MC}$	$1.04093 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.24 \pm 0.25$
$\tau$	$0.0546 \pm 0.0073$	$D_{40}$	$1228 \pm 11$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$w$	$-1.026 \pm 0.031$	$D_{220}$	$5730 \pm 39$	$H(2.33)$	$235.86 \pm 0.60$
$\ln(10^{10} A_s)$	$3.043 \pm 0.014$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.2 \pm 8.9$
$n_s$	$0.9661 \pm 0.0039$	$D_{1420}$	$816.8 \pm 4.9$	$f\sigma_8(0.15)$	$0.4585 \pm 0.0068$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.755 \pm 0.010$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9661 \pm 0.0039$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0081$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245389^{+0.000061}_{-0.000053}$	$\sigma_8(0.38)$	$0.6696 \pm 0.0093$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246715^{+0.000062}_{-0.000053}$	$f\sigma_8(0.51)$	$0.4786 \pm 0.0084$
$A_{100}^{PS}$	$249^{+26}_{-29}$	$10^5 D/H$	$2.588 \pm 0.027$	$\sigma_8(0.51)$	$0.6266 \pm 0.0086$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.781 \pm 0.023$	$f\sigma_8(0.61)$	$0.4739 \pm 0.0084$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.24$	$\sigma_8(0.61)$	$0.5962 \pm 0.0081$
$A^{kSZ}$	$< 5.24$	$r_*$	$144.57 \pm 0.25$	$f\sigma_8(2.33)$	$0.3006 \pm 0.0041$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04112 \pm 0.00030$	$\sigma_8(2.33)$	$0.3093 \pm 0.0036$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.886 \pm 0.024$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$H_0$	$68.29 \pm 0.81$	$z_{\text{drag}}$	$1059.87 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_{\Lambda}$	$0.6943 \pm 0.0075$	$r_{\text{drag}}$	$147.23 \pm 0.26$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3057 \pm 0.0075$	$k_{\text{D}}$	$0.14071 \pm 0.00032$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.69$
$\Omega_m h^2$	$0.1425 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$\Omega_m h^3$	$0.0973 \pm 0.0014$	$z_{\text{eq}}$	$3390 \pm 24$	$\chi_{\text{lowl}}^2$	$23.17 \pm 0.80$
$\sigma_8$	$0.817 \pm 0.011$	$k_{\text{eq}}$	$0.010348 \pm 0.000073$	$\chi_{\text{JLA}}^2$	$1035.36 \pm 0.91$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.046 \pm 0.064$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0059$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.67 \pm 0.60$
$\sigma_8 \Omega_m^{0.25}$	$0.6073 \pm 0.0072$	$H(0.15)$	$73.29 \pm 0.52$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.0$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.010$	$D_{\text{M}}(0.15)$	$636.4 \pm 5.9$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$83.09 \pm 0.27$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.441 \pm 0.022$	$D_{\text{M}}(0.38)$	$1522 \pm 10$	$\chi_{\text{BAO}}^2$	$6.38 \pm 0.91$

$$\bar{\chi}_{\text{eff}}^2 = 12992.76; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.80; R - 1 = 0.01319$$



18.21 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_p

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.75^{+0.57}_{-0.80}$	$H(0.51)$	$89.70 \pm 0.25$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s$	$2.099^{+0.025}_{-0.035}$	$D_{\text{M}}(0.51)$	$1974 \pm 11$
$100\theta_{MC}$	$1.04095 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.25 \pm 0.27$
$\tau$	$0.0552^{+0.0051}_{-0.0083}$	$D_{40}$	$1227 \pm 12$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$w$	$-1.024 \pm 0.033$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$235.86 \pm 0.63$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.1 \pm 9.0$
$n_s$	$0.9665 \pm 0.0041$	$D_{1420}$	$816.7 \pm 4.9$	$f\sigma_8(0.15)$	$0.4583 \pm 0.0086$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.755 \pm 0.013$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9665 \pm 0.0041$	$f\sigma_8(0.38)$	$0.479 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245389^{+0.000062}_{-0.000053}$	$\sigma_8(0.38)$	$0.669 \pm 0.011$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246716^{+0.000062}_{-0.000053}$	$f\sigma_8(0.51)$	$0.478 \pm 0.010$
$A_{100}^{PS}$	$249^{+26}_{-29}$	$10^5 D/H$	$2.588 \pm 0.027$	$\sigma_8(0.51)$	$0.626 \pm 0.010$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.781 \pm 0.023$	$f\sigma_8(0.61)$	$0.474 \pm 0.010$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.25$	$\sigma_8(0.61)$	$0.5959 \pm 0.0095$
$A^{kSZ}$	$< 5.20$	$r_*$	$144.58 \pm 0.29$	$f\sigma_8(2.33)$	$0.3005 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$100\theta_*$	$1.04113 \pm 0.00030$	$\sigma_8(2.33)$	$0.3093 \pm 0.0041$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.887 \pm 0.027$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$68.25 \pm 0.83$	$z_{\text{drag}}$	$1059.87 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_{\Lambda}$	$0.6941 \pm 0.0076$	$r_{\text{drag}}$	$147.25 \pm 0.30$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.3059 \pm 0.0076$	$k_{\text{D}}$	$0.14069^{+0.00037}_{-0.00033}$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0012$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.12 \pm 0.87$
$\Omega_m h^3$	$0.0972 \pm 0.0015$	$z_{\text{eq}}$	$3389 \pm 28$	$\chi_{\text{JLA}}^2$	$1035.39 \pm 0.94$
$\sigma_8$	$0.816 \pm 0.013$	$k_{\text{eq}}$	$0.010343 \pm 0.000085$	$\chi_{6\text{DF}}^2$	$0.047 \pm 0.065$
$S_8$	$0.824 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8157 \pm 0.0052$	$\chi_{\text{MGS}}^2$	$1.65 \pm 0.60$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4507 \pm 0.0027$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.1$
$\sigma_8 \Omega_m^{0.25}$	$0.6071 \pm 0.0092$	$H(0.15)$	$73.27 \pm 0.52$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.013$	$D_{\text{M}}(0.15)$	$636.7 \pm 6.0$	$\chi_{\text{BAO}}^2$	$6.4 \pm 1.0$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$83.10 \pm 0.28$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.440 \pm 0.029$	$D_{\text{M}}(0.38)$	$1522 \pm 10$		

$$\bar{\chi}_{\text{eff}}^2 = 12983.61; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.63; R - 1 = 0.00895$$



18.22 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.77^{+0.58}_{-0.74}$	$H(0.51)$	$89.70 \pm 0.23$
$\Omega_c h^2$	$0.1195 \pm 0.0010$	$10^9 A_s$	$2.100^{+0.024}_{-0.031}$	$D_{\text{M}}(0.51)$	$1973 \pm 11$
$100\theta_{\text{MC}}$	$1.04094 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.25 \pm 0.25$
$\tau$	$0.0554^{+0.0054}_{-0.0076}$	$D_{40}$	$1228 \pm 11$	$D_{\text{M}}(0.61)$	$2298 \pm 11$
$w$	$-1.025 \pm 0.031$	$D_{220}$	$5729 \pm 39$	$H(2.33)$	$235.85 \pm 0.60$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5760.0 \pm 8.9$
$n_s$	$0.9662 \pm 0.0039$	$D_{1420}$	$816.8 \pm 4.9$	$f\sigma_8(0.15)$	$0.4586 \pm 0.0067$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.755 \pm 0.010$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9662 \pm 0.0039$	$f\sigma_8(0.38)$	$0.4794 \pm 0.0081$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245390^{+0.000061}_{-0.000053}$	$\sigma_8(0.38)$	$0.6699 \pm 0.0092$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246716^{+0.000061}_{-0.000053}$	$f\sigma_8(0.51)$	$0.4787 \pm 0.0084$
$A_{100}^{PS}$	$249^{+26}_{-29}$	$10^5 D/H$	$2.588 \pm 0.027$	$\sigma_8(0.51)$	$0.6269 \pm 0.0085$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.781 \pm 0.023$	$f\sigma_8(0.61)$	$0.4740 \pm 0.0084$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.89 \pm 0.23$	$\sigma_8(0.61)$	$0.5964 \pm 0.0080$
$A^{kSZ}$	$< 5.23$	$r_*$	$144.57 \pm 0.25$	$f\sigma_8(2.33)$	$0.3008 \pm 0.0040$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04112 \pm 0.00030$	$\sigma_8(2.33)$	$0.3095 \pm 0.0035$
$c_{217}$	$0.9997 \pm 0.0019$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.886 \pm 0.024$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$68.29 \pm 0.81$	$z_{\text{drag}}$	$1059.88 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_{\Lambda}$	$0.6943 \pm 0.0075$	$r_{\text{drag}}$	$147.24 \pm 0.26$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\Omega_m$	$0.3057 \pm 0.0075$	$k_{\text{D}}$	$0.14070 \pm 0.00032$	$\chi_{\text{lensing}}^2$	$9.15 \pm 0.65$
$\Omega_m h^2$	$0.1425 \pm 0.0010$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.7$
$\Omega_m h^3$	$0.0973 \pm 0.0014$	$z_{\text{eq}}$	$3390 \pm 24$	$\chi_{\text{lowl}}^2$	$23.17 \pm 0.80$
$\sigma_8$	$0.817 \pm 0.011$	$k_{\text{eq}}$	$0.010345 \pm 0.000073$	$\chi_{\text{JLA}}^2$	$1035.35 \pm 0.90$
$S_8$	$0.825 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8156 \pm 0.0045$	$\chi_{6\text{DF}}^2$	$0.046 \pm 0.064$
$\sigma_8 \Omega_m^{0.5}$	$0.4517 \pm 0.0058$	$100\theta_{\text{s,eq}}$	$0.4506 \pm 0.0023$	$\chi_{\text{MGS}}^2$	$1.67 \pm 0.60$
$\sigma_8 \Omega_m^{0.25}$	$0.6075 \pm 0.0071$	$H(0.15)$	$73.29 \pm 0.52$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.0$
$\sigma_8/h^{0.5}$	$0.989 \pm 0.010$	$D_{\text{M}}(0.15)$	$636.4 \pm 6.0$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$83.10 \pm 0.27$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.022$	$D_{\text{M}}(0.38)$	$1522 \pm 10$	$\chi_{\text{BAO}}^2$	$6.36 \pm 0.90$

$$\bar{\chi}_{\text{eff}}^2 = 12992.59; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.80; R - 1 = 0.01370$$



**18.23**    **base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02221 \pm 0.00020$	$z_{\text{re}}$	$7.57 \pm 0.82$	$H(0.51)$	$89.59 \pm 0.35$
$\Omega_c h^2$	$0.1196 \pm 0.0015$	$10^9 A_s$	$2.091 \pm 0.035$	$D_{\text{M}}(0.51)$	$1963 \pm 11$
$100\theta_{MC}$	$1.04097 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.03 \pm 0.36$
$\tau$	$0.0533 \pm 0.0081$	$D_{40}$	$1227 \pm 14$	$D_{\text{M}}(0.61)$	$2288 \pm 11$
$w$	$-1.063 \pm 0.035$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$235.27 \pm 0.76$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5763 \pm 12$
$n_s$	$0.9655 \pm 0.0048$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.461 \pm 0.011$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.765 \pm 0.014$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9655 \pm 0.0048$	$f\sigma_8(0.38)$	$0.485 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245328^{+0.000090}_{-0.000075}$	$\sigma_8(0.38)$	$0.679 \pm 0.012$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246654^{+0.000090}_{-0.000075}$	$f\sigma_8(0.51)$	$0.486 \pm 0.012$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.616 \pm 0.038$	$\sigma_8(0.51)$	$0.635 \pm 0.011$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.773 \pm 0.027$	$f\sigma_8(0.61)$	$0.481 \pm 0.011$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.09 \pm 0.33$	$\sigma_8(0.61)$	$0.6041 \pm 0.0099$
$A^{kSZ}$	$< 5.67$	$r_*$	$144.65 \pm 0.37$	$f\sigma_8(2.33)$	$0.3047 \pm 0.0048$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04117 \pm 0.00043$	$\sigma_8(2.33)$	$0.3127 \pm 0.0042$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.035$	$f_{2000}^{143}$	$30.6 \pm 3.0$
$H_0$	$69.26 \pm 0.75$	$z_{\text{drag}}$	$1059.54 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$\Omega_\Lambda$	$0.7029 \pm 0.0070$	$r_{\text{drag}}$	$147.37 \pm 0.38$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$\Omega_m$	$0.2971 \pm 0.0070$	$k_{\text{D}}$	$0.14045 \pm 0.00046$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0015$	$100\theta_{\text{D}}$	$0.16100 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$23.15 \pm 0.99$
$\Omega_m h^3$	$0.0987 \pm 0.0015$	$z_{\text{eq}}$	$3389 \pm 35$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.3$
$\sigma_8$	$0.827 \pm 0.015$	$k_{\text{eq}}$	$0.01034 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$1036.6 \pm 1.9$
$S_8$	$0.823 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8153 \pm 0.0065$	$\chi_{6\text{DF}}^2$	$0.099 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0090$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0034$	$\chi_{\text{MGS}}^2$	$2.42 \pm 0.64$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.011$	$H(0.15)$	$73.83 \pm 0.49$	$\chi_{\text{DR12BAO}}^2$	$4.75 \pm 0.94$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$D_{\text{M}}(0.15)$	$629.7 \pm 5.4$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.5$
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$H(0.38)$	$83.17 \pm 0.35$	$\chi_{\text{BAO}}^2$	$7.3 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.034$	$D_{\text{M}}(0.38)$	$1511.7 \pm 9.4$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8521.38$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.10$ ;  $\bar{\chi}_{\text{eff}}^2 = 8541.10$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.99$ ;  $R - 1 = 0.00624$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.04 ( $\Delta$  -0.02) MGS: 2.19 ( $\Delta$  -0.16) DR12BAO: 4.41 ( $\Delta$  0.11) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.83 ( $\Delta$  0.94) commander\_dx12\_v3\_2\_29: 23.38 ( $\Delta$  0.29) CamSpec like\_10.7HM: 7049.34 Hubble - H073p45: 6.64 ( $\Delta$  0.34) SN - JLA Pantheon18: 1035.92 ( $\Delta$  -0.19)



18.24 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_lensing/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$10^9 A_s$	$2.092^{+0.029}_{-0.032}$	$H(0.61)$	$95.03 \pm 0.32$
$\Omega_c h^2$	$0.1196 \pm 0.0013$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_M(0.61)$	$2288 \pm 11$
$100\theta_{MC}$	$1.04096 \pm 0.00043$	$D_{40}$	$1227 \pm 12$	$H(2.33)$	$235.25 \pm 0.67$
$\tau$	$0.0536 \pm 0.0077$	$D_{220}$	$5718 \pm 40$	$D_M(2.33)$	$5762 \pm 12$
$w$	$-1.064 \pm 0.031$	$D_{810}$	$2535 \pm 13$	$f\sigma_8(0.15)$	$0.4611 \pm 0.0078$
$\ln(10^{10} A_s)$	$3.041 \pm 0.015$	$D_{1420}$	$815.1 \pm 5.1$	$\sigma_8(0.15)$	$0.765 \pm 0.011$
$n_s$	$0.9653 \pm 0.0044$	$D_{2000}$	$230.0 \pm 1.8$	$f\sigma_8(0.38)$	$0.4856 \pm 0.0089$
$y_{cal}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9653 \pm 0.0044$	$\sigma_8(0.38)$	$0.6789 \pm 0.0092$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245330^{+0.000087}_{-0.000075}$	$f\sigma_8(0.51)$	$0.4859 \pm 0.0090$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.246657^{+0.000087}_{-0.000075}$	$\sigma_8(0.51)$	$0.6353 \pm 0.0084$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.615 \pm 0.037$	$f\sigma_8(0.61)$	$0.4817 \pm 0.0089$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.772 \pm 0.027$	$\sigma_8(0.61)$	$0.6044 \pm 0.0079$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1090.08 \pm 0.30$	$f\sigma_8(2.33)$	$0.3048 \pm 0.0039$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.65 \pm 0.31$	$\sigma_8(2.33)$	$0.3128 \pm 0.0034$
$A^{kSZ}$	$< 5.70$	$100\theta_*$	$1.04116 \pm 0.00042$	$f_{2000}^{143}$	$30.6 \pm 2.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0010}$	$D_M(z_*)/\text{Gpc}$	$13.893 \pm 0.030$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{drag}$	$1059.55 \pm 0.44$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$H_0$	$69.28 \pm 0.75$	$r_{drag}$	$147.37 \pm 0.33$	$\chi^2_{lensing}$	$9.22 \pm 0.75$
$\Omega_\Lambda$	$0.7031 \pm 0.0068$	$k_D$	$0.14046 \pm 0.00043$	$\chi^2_{simall}$	$396.9 \pm 1.7$
$\Omega_m$	$0.2969 \pm 0.0068$	$100\theta_D$	$0.16099 \pm 0.00025$	$\chi^2_{lowl}$	$23.18 \pm 0.88$
$\Omega_m h^2$	$0.1425 \pm 0.0012$	$z_{eq}$	$3389 \pm 29$	$\chi^2_{H073p45}$	$6.5 \pm 2.3$
$\Omega_m h^3$	$0.0987 \pm 0.0014$	$k_{eq}$	$0.010343 \pm 0.000088$	$\chi^2_{JLA}$	$1036.6 \pm 1.8$
$\sigma_8$	$0.827 \pm 0.011$	$100\theta_{eq}$	$0.8153 \pm 0.0054$	$\chi^2_{6DF}$	$0.10 \pm 0.11$
$S_8$	$0.823 \pm 0.012$	$100\theta_{s,eq}$	$0.4506 \pm 0.0028$	$\chi^2_{MGS}$	$2.45 \pm 0.63$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0066$	$H(0.15)$	$73.85 \pm 0.49$	$\chi^2_{DR12BAO}$	$4.65 \pm 0.77$
$\sigma_8 \Omega_m^{0.25}$	$0.6104 \pm 0.0079$	$D_M(0.15)$	$629.5 \pm 5.3$	$\chi^2_{prior}$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.011$	$H(0.38)$	$83.18 \pm 0.32$	$\chi^2_{CMB}$	$4346 \pm 3000$
$r_{drag} h$	$102.1 \pm 1.1$	$D_M(0.38)$	$1511.3 \pm 9.3$	$\chi^2_{BAO}$	$7.2 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.447 \pm 0.024$	$H(0.51)$	$89.60 \pm 0.31$		
$z_{re}$	$7.61 \pm 0.77$	$D_M(0.51)$	$1963 \pm 10$		

$\bar{\chi}^2_{eff} = 8549.81$ ;  $\Delta\bar{\chi}^2_{eff} = 6292.07$ ;  $R - 1 = 0.01112$



18.25 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00020$	$z_{\text{re}}$	$7.72^{+0.55}_{-0.83}$	$H(0.51)$	$89.60 \pm 0.35$
$\Omega_c h^2$	$0.1196 \pm 0.0015$	$10^9 A_s$	$2.097^{+0.024}_{-0.035}$	$D_{\text{M}}(0.51)$	$1963 \pm 11$
$100\theta_{MC}$	$1.04098 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$H(0.61)$	$95.04 \pm 0.36$
$\tau$	$0.0547^{+0.0049}_{-0.0084}$	$D_{40}$	$1227 \pm 14$	$D_{\text{M}}(0.61)$	$2288 \pm 11$
$w$	$-1.062 \pm 0.035$	$D_{220}$	$5716 \pm 41$	$H(2.33)$	$235.26 \pm 0.76$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.017}$	$D_{810}$	$2535 \pm 14$	$D_{\text{M}}(2.33)$	$5762 \pm 12$
$n_s$	$0.9656 \pm 0.0047$	$D_{1420}$	$815.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.461 \pm 0.010$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.0 \pm 1.8$	$\sigma_8(0.15)$	$0.766 \pm 0.013$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9656 \pm 0.0047$	$f\sigma_8(0.38)$	$0.486 \pm 0.012$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245330^{+0.000089}_{-0.000075}$	$\sigma_8(0.38)$	$0.679 \pm 0.011$
$A_{143}^{tSZ}$	$4.5 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246656^{+0.000089}_{-0.000075}$	$f\sigma_8(0.51)$	$0.486 \pm 0.012$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.615 \pm 0.037$	$\sigma_8(0.51)$	$0.636 \pm 0.010$
$A_{143}^{PS}$	$44 \pm 9$	Age/Gyr	$13.772 \pm 0.027$	$f\sigma_8(0.61)$	$0.482 \pm 0.011$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.08 \pm 0.32$	$\sigma_8(0.61)$	$0.6048 \pm 0.0097$
$A^{kSZ}$	$< 5.64$	$r_*$	$144.66 \pm 0.37$	$f\sigma_8(2.33)$	$0.3050 \pm 0.0047$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04118 \pm 0.00043$	$\sigma_8(2.33)$	$0.3131 \pm 0.0041$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.035$	$f_{2000}^{143}$	$30.5 \pm 2.9$
$H_0$	$69.26 \pm 0.75$	$z_{\text{drag}}$	$1059.55 \pm 0.43$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$\Omega_\Lambda$	$0.7029 \pm 0.0070$	$r_{\text{drag}}$	$147.37 \pm 0.38$	$f_{2000}^{217}$	$107.5 \pm 2.0$
$\Omega_m$	$0.2971 \pm 0.0070$	$k_{\text{D}}$	$0.14045 \pm 0.00046$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.9$
$\Omega_m h^2$	$0.1424 \pm 0.0015$	$100\theta_{\text{D}}$	$0.16100 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$23.16 \pm 0.99$
$\Omega_m h^3$	$0.0986 \pm 0.0015$	$z_{\text{eq}}$	$3389 \pm 35$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.3$
$\sigma_8$	$0.828 \pm 0.014$	$k_{\text{eq}}$	$0.01034 \pm 0.00011$	$\chi_{\text{JLA}}^2$	$1036.5 \pm 1.9$
$S_8$	$0.823 \pm 0.016$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0065$	$\chi_{6\text{DF}}^2$	$0.099 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4510 \pm 0.0089$	$100\theta_{\text{s,eq}}$	$0.4506 \pm 0.0033$	$\chi_{\text{MGS}}^2$	$2.43 \pm 0.64$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.011$	$H(0.15)$	$73.83 \pm 0.49$	$\chi_{\text{DR12BAO}}^2$	$4.73 \pm 0.92$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.015$	$D_{\text{M}}(0.15)$	$629.7 \pm 5.4$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$H(0.38)$	$83.18 \pm 0.35$	$\chi_{\text{BAO}}^2$	$7.3 \pm 1.2$
$\langle d^2 \rangle^{1/2}$	$2.449 \pm 0.033$	$D_{\text{M}}(0.38)$	$1511.6 \pm 9.4$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 8540.87; \Delta \bar{\chi}_{\text{eff}}^2 = 6292.04; R - 1 = 0.00534$$



18.26 base\_w\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_lensing\_zre6p5/base\_w\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02222 \pm 0.00019$	$10^9 A_s$	$2.097^{+0.022}_{-0.032}$	$H(0.61)$	$95.05 \pm 0.31$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.011$	$D_M(0.61)$	$2288 \pm 11$
$100\theta_{MC}$	$1.04097 \pm 0.00043$	$D_{40}$	$1227 \pm 12$	$H(2.33)$	$235.23 \pm 0.67$
$\tau$	$0.0547^{+0.0049}_{-0.0082}$	$D_{220}$	$5718 \pm 40$	$D_M(2.33)$	$5762 \pm 12$
$w$	$-1.062 \pm 0.031$	$D_{810}$	$2535 \pm 13$	$f\sigma_8(0.15)$	$0.4611 \pm 0.0077$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.015}$	$D_{1420}$	$815.2 \pm 5.1$	$\sigma_8(0.15)$	$0.766 \pm 0.010$
$n_s$	$0.9656 \pm 0.0043$	$D_{2000}$	$230.0 \pm 1.8$	$f\sigma_8(0.38)$	$0.4855 \pm 0.0089$
$y_{cal}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9656 \pm 0.0043$	$\sigma_8(0.38)$	$0.6792 \pm 0.0091$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245333^{+0.000086}_{-0.000074}$	$f\sigma_8(0.51)$	$0.4859 \pm 0.0090$
$\xi^{tSZ-CIB}$	—	$Y_P^{BBN}$	$0.246659^{+0.000086}_{-0.000074}$	$\sigma_8(0.51)$	$0.6356 \pm 0.0084$
$A_{143}^{tSZ}$	$4.5 \pm 2.2$	$10^5 D/H$	$2.614 \pm 0.037$	$f\sigma_8(0.61)$	$0.4817 \pm 0.0089$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.772 \pm 0.027$	$\sigma_8(0.61)$	$0.6047 \pm 0.0079$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1090.06 \pm 0.30$	$f\sigma_8(2.33)$	$0.3050 \pm 0.0039$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.67 \pm 0.31$	$\sigma_8(2.33)$	$0.3130 \pm 0.0034$
$A^{kSZ}$	$< 5.66$	$100\theta_*$	$1.04117 \pm 0.00042$	$f_{2000}^{143}$	$30.5 \pm 2.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0010}$	$D_M(z_*)/\text{Gpc}$	$13.895 \pm 0.030$	$f_{2000}^{143 \times 217}$	$32.9 \pm 2.1$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{drag}$	$1059.56 \pm 0.43$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$H_0$	$69.28 \pm 0.75$	$r_{drag}$	$147.38 \pm 0.33$	$\chi^2_{lensing}$	$9.20 \pm 0.73$
$\Omega_\Lambda$	$0.7032 \pm 0.0068$	$k_D$	$0.14045 \pm 0.00043$	$\chi^2_{simall}$	$396.9 \pm 1.7$
$\Omega_m$	$0.2968 \pm 0.0068$	$100\theta_D$	$0.16099 \pm 0.00025$	$\chi^2_{lowl}$	$23.16 \pm 0.87$
$\Omega_m h^2$	$0.1424 \pm 0.0012$	$z_{eq}$	$3387 \pm 28$	$\chi^2_{H073p45}$	$6.5 \pm 2.3$
$\Omega_m h^3$	$0.0986 \pm 0.0014$	$k_{eq}$	$0.010338 \pm 0.000086$	$\chi^2_{JLA}$	$1036.5 \pm 1.8$
$\sigma_8$	$0.827 \pm 0.011$	$100\theta_{eq}$	$0.8156 \pm 0.0052$	$\chi^2_{6DF}$	$0.10 \pm 0.11$
$S_8$	$0.823 \pm 0.012$	$100\theta_{s,eq}$	$0.4507 \pm 0.0027$	$\chi^2_{MGS}$	$2.46 \pm 0.63$
$\sigma_8 \Omega_m^{0.5}$	$0.4506 \pm 0.0066$	$H(0.15)$	$73.86 \pm 0.49$	$\chi^2_{DR12BAO}$	$4.62 \pm 0.75$
$\sigma_8 \Omega_m^{0.25}$	$0.6106 \pm 0.0079$	$D_M(0.15)$	$629.5 \pm 5.4$	$\chi^2_{prior}$	$7.4 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.011$	$H(0.38)$	$83.20 \pm 0.31$	$\chi^2_{CMB}$	$4346 \pm 3000$
$r_{drag} h$	$102.1 \pm 1.1$	$D_M(0.38)$	$1511.2 \pm 9.3$	$\chi^2_{BAO}$	$7.2 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.024$	$H(0.51)$	$89.61 \pm 0.30$		
$z_{re}$	$7.72^{+0.54}_{-0.80}$	$D_M(0.51)$	$1963 \pm 10$		
$\bar{\chi}^2_{eff} = 8549.61$ ; $\Delta\bar{\chi}^2_{eff} = 6292.13$ ; $R - 1 = 0.01012$					



18.27 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_Pantheon18/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$z_{\text{re}}$	$7.60 \pm 0.80$	$H(0.51)$	$89.72 \pm 0.26$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s$	$2.094 \pm 0.035$	$D_{\text{M}}(0.51)$	$1961 \pm 10$
$100\theta_{MC}$	$1.04096 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.16 \pm 0.27$
$\tau$	$0.0539 \pm 0.0079$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2285 \pm 10$
$w$	$-1.059 \pm 0.031$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.40 \pm 0.62$
$\ln(10^{10} A_s)$	$3.041 \pm 0.017$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5756.2 \pm 9.0$
$n_s$	$0.9663 \pm 0.0041$	$D_{1420}$	$816.8 \pm 4.8$	$f\sigma_8(0.15)$	$0.4600 \pm 0.0086$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.7 \pm 1.6$	$\sigma_8(0.15)$	$0.764 \pm 0.012$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9663 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4843 \pm 0.0098$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245392^{+0.000062}_{-0.000054}$	$\sigma_8(0.38)$	$0.678 \pm 0.011$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246719^{+0.000063}_{-0.000054}$	$f\sigma_8(0.51)$	$0.4847 \pm 0.0099$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.587 \pm 0.028$	$\sigma_8(0.51)$	$0.6344 \pm 0.0097$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.759 \pm 0.022$	$f\sigma_8(0.61)$	$0.4804 \pm 0.0098$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.88 \pm 0.25$	$\sigma_8(0.61)$	$0.6036 \pm 0.0091$
$A^{kSZ}$	$< 5.24$	$r_*$	$144.56 \pm 0.28$	$f\sigma_8(2.33)$	$0.3045 \pm 0.0045$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04114 \pm 0.00030$	$\sigma_8(2.33)$	$0.3126 \pm 0.0040$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.027$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$69.32 \pm 0.76$	$z_{\text{drag}}$	$1059.89 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_{\Lambda}$	$0.7032 \pm 0.0068$	$r_{\text{drag}}$	$147.22 \pm 0.29$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.2968 \pm 0.0068$	$k_{\text{D}}$	$0.14073 \pm 0.00035$	$\chi_{\text{simall}}^2$	$397.0 \pm 1.8$
$\Omega_m h^2$	$0.1425 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.06 \pm 0.87$
$\Omega_m h^3$	$0.0988 \pm 0.0014$	$z_{\text{eq}}$	$3391 \pm 27$	$\chi_{\text{H073p45}}^2$	$6.4 \pm 2.3$
$\sigma_8$	$0.826 \pm 0.013$	$k_{\text{eq}}$	$0.010349 \pm 0.000083$	$\chi_{\text{JLA}}^2$	$1036.5 \pm 1.9$
$S_8$	$0.821 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8154 \pm 0.0051$	$\chi_{6\text{DF}}^2$	$0.099 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0074$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0026$	$\chi_{\text{MGS}}^2$	$2.43 \pm 0.63$
$\sigma_8 \Omega_m^{0.25}$	$0.6094 \pm 0.0091$	$H(0.15)$	$73.92 \pm 0.48$	$\chi_{\text{DR12BAO}}^2$	$4.58 \pm 0.72$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.013$	$D_{\text{M}}(0.15)$	$629.1 \pm 5.4$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$H(0.38)$	$83.29 \pm 0.28$	$\chi_{\text{BAO}}^2$	$7.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.029$	$D_{\text{M}}(0.38)$	$1509.8 \pm 9.1$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 12969.03$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.17$ ;  $\bar{\chi}_{\text{eff}}^2 = 12991.92$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.91$ ;  $R - 1 = 0.00648$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.05 ( $\Delta$  -0.00) MGS: 2.35 ( $\Delta$  0.00) DR12BAO: 4.05 ( $\Delta$  -0.15) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.86 ( $\Delta$  -0.20) commander\_dx12\_v3\_2\_29: 22.75 ( $\Delta$  -0.30) CamSpec like\_10.7HM\_1400\_unified: 11499.61 Hubble - H073p45: 6.54 ( $\Delta$  0.44) SN - JLA Pantheon18: 1035.62 ( $\Delta$  -0.28)



Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$10^9 A_s$	$2.095 \pm 0.030$	$H(0.61)$	$95.16 \pm 0.26$
$\Omega_c h^2$	$0.1195 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_M(0.61)$	$2285 \pm 10$
$100\theta_{MC}$	$1.04095 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$H(2.33)$	$235.39 \pm 0.58$
$\tau$	$0.0542 \pm 0.0074$	$D_{220}$	$5730 \pm 39$	$D_M(2.33)$	$5756.0 \pm 8.9$
$w$	$-1.060 \pm 0.030$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4600 \pm 0.0067$
$\ln(10^{10} A_s)$	$3.042 \pm 0.014$	$D_{1420}$	$816.8 \pm 4.8$	$\sigma_8(0.15)$	$0.764 \pm 0.010$
$n_s$	$0.9662 \pm 0.0039$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.38)$	$0.4844 \pm 0.0079$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$n_{s,0.002}$	$0.9662 \pm 0.0039$	$\sigma_8(0.38)$	$0.6782 \pm 0.0088$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245394^{+0.000062}_{-0.000053}$	$f\sigma_8(0.51)$	$0.4848 \pm 0.0081$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246720^{+0.000063}_{-0.000053}$	$\sigma_8(0.51)$	$0.6347 \pm 0.0081$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.586 \pm 0.028$	$f\sigma_8(0.61)$	$0.4806 \pm 0.0081$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.759 \pm 0.022$	$\sigma_8(0.61)$	$0.6038 \pm 0.0076$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.88 \pm 0.24$	$f\sigma_8(2.33)$	$0.3046 \pm 0.0038$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.56 \pm 0.25$	$\sigma_8(2.33)$	$0.3127 \pm 0.0034$
$A^{kSZ}$	$< 5.24$	$100\theta_*$	$1.04114 \pm 0.00029$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_M(z_*)/\text{Gpc}$	$13.885 \pm 0.024$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$H_0$	$69.34 \pm 0.76$	$r_{\text{drag}}$	$147.22 \pm 0.26$	$\chi^2_{\text{lensing}}$	$9.11 \pm 0.66$
$\Omega_\Lambda$	$0.7035 \pm 0.0068$	$k_D$	$0.14073^{+0.00034}_{-0.00031}$	$\chi^2_{\text{simall}}$	$396.9 \pm 1.6$
$\Omega_m$	$0.2965 \pm 0.0068$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi^2_{\text{lowl}}$	$23.09 \pm 0.80$
$\Omega_m h^2$	$0.1425 \pm 0.0010$	$z_{\text{eq}}$	$3390 \pm 24$	$\chi^2_{\text{H073p45}}$	$6.3 \pm 2.3$
$\Omega_m h^3$	$0.0988 \pm 0.0013$	$k_{\text{eq}}$	$0.010348 \pm 0.000073$	$\chi^2_{\text{JLA}}$	$1036.5 \pm 1.8$
$\sigma_8$	$0.826 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8155 \pm 0.0045$	$\chi^2_{6\text{DF}}$	$0.10 \pm 0.12$
$S_8$	$0.821 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4505 \pm 0.0023$	$\chi^2_{\text{MGS}}$	$2.45 \pm 0.63$
$\sigma_8 \Omega_m^{0.5}$	$0.4497 \pm 0.0058$	$H(0.15)$	$73.94 \pm 0.48$	$\chi^2_{\text{DR12BAO}}$	$4.55 \pm 0.66$
$\sigma_8 \Omega_m^{0.25}$	$0.6094 \pm 0.0070$	$D_M(0.15)$	$628.9 \pm 5.4$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$H(0.38)$	$83.30 \pm 0.27$	$\chi^2_{\text{CMB}}$	$7366 \pm 5000$
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$D_M(0.38)$	$1509.5 \pm 9.1$	$\chi^2_{\text{BAO}}$	$7.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.022$	$H(0.51)$	$89.72 \pm 0.25$		
$z_{\text{re}}$	$7.63 \pm 0.74$	$D_M(0.51)$	$1960.5 \pm 9.9$		

$\bar{\chi}^2_{\text{eff}} = 13000.66; \Delta\bar{\chi}^2_{\text{eff}} = 9150.96; R - 1 = 0.00726$



## 18.29 base\_w\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_zre6p5/base\_w\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$z_{\text{re}}$	$7.74^{+0.56}_{-0.80}$	$H(0.51)$	$89.72 \pm 0.26$
$\Omega_c h^2$	$0.1195 \pm 0.0012$	$10^9 A_s$	$2.099^{+0.025}_{-0.035}$	$D_{\text{M}}(0.51)$	$1961 \pm 10$
$100\theta_{MC}$	$1.04096 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$H(0.61)$	$95.17 \pm 0.27$
$\tau$	$0.0552^{+0.0051}_{-0.0082}$	$D_{40}$	$1227 \pm 13$	$D_{\text{M}}(0.61)$	$2285 \pm 10$
$w$	$-1.059 \pm 0.031$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.39 \pm 0.62$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.017}$	$D_{810}$	$2537 \pm 14$	$D_{\text{M}}(2.33)$	$5756.0 \pm 9.0$
$n_s$	$0.9664 \pm 0.0041$	$D_{1420}$	$816.7 \pm 4.9$	$f\sigma_8(0.15)$	$0.4603 \pm 0.0085$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.8 \pm 1.6$	$\sigma_8(0.15)$	$0.765 \pm 0.012$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9664 \pm 0.0041$	$f\sigma_8(0.38)$	$0.4847 \pm 0.0097$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245393^{+0.000062}_{-0.000054}$	$\sigma_8(0.38)$	$0.679 \pm 0.010$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246720^{+0.000062}_{-0.000054}$	$f\sigma_8(0.51)$	$0.4850 \pm 0.0098$
$A_{100}^{PS}$	$248 \pm 30$	$10^5 D/H$	$2.586 \pm 0.028$	$\sigma_8(0.51)$	$0.6350 \pm 0.0094$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.759 \pm 0.022$	$f\sigma_8(0.61)$	$0.4808 \pm 0.0097$
$A_{217}^{PS}$	$109^{+20}_{-10}$	$z_*$	$1089.88 \pm 0.25$	$\sigma_8(0.61)$	$0.6042 \pm 0.0088$
$A^{kSZ}$	$< 5.22$	$r_*$	$144.56 \pm 0.28$	$f\sigma_8(2.33)$	$0.3048 \pm 0.0044$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04114 \pm 0.00030$	$\sigma_8(2.33)$	$0.3129 \pm 0.0038$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.027$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$H_0$	$69.31 \pm 0.76$	$z_{\text{drag}}$	$1059.90 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$\Omega_{\Lambda}$	$0.7033 \pm 0.0068$	$r_{\text{drag}}$	$147.23 \pm 0.29$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$\Omega_m$	$0.2967 \pm 0.0068$	$k_{\text{D}}$	$0.14072 \pm 0.00035$	$\chi_{\text{small}}^2$	$397.0 \pm 1.9$
$\Omega_m h^2$	$0.1425 \pm 0.0011$	$100\theta_{\text{D}}$	$0.16078 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.08 \pm 0.88$
$\Omega_m h^3$	$0.0988 \pm 0.0014$	$z_{\text{eq}}$	$3390 \pm 27$	$\chi_{\text{H073p45}}^2$	$6.4 \pm 2.3$
$\sigma_8$	$0.826 \pm 0.013$	$k_{\text{eq}}$	$0.010347 \pm 0.000083$	$\chi_{\text{JLA}}^2$	$1036.4 \pm 1.8$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8155 \pm 0.0051$	$\chi_{6\text{DF}}^2$	$0.099 \pm 0.11$
$\sigma_8 \Omega_m^{0.5}$	$0.4501 \pm 0.0073$	$100\theta_{\text{s,eq}}$	$0.4505 \pm 0.0026$	$\chi_{\text{MGS}}^2$	$2.43 \pm 0.63$
$\sigma_8 \Omega_m^{0.25}$	$0.6099 \pm 0.0089$	$H(0.15)$	$73.92 \pm 0.48$	$\chi_{\text{DR12BAO}}^2$	$4.57 \pm 0.72$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.013$	$D_{\text{M}}(0.15)$	$629.1 \pm 5.4$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$H(0.38)$	$83.30 \pm 0.28$	$\chi_{\text{BAO}}^2$	$7.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.028$	$D_{\text{M}}(0.38)$	$1509.8 \pm 9.2$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

$$\bar{\chi}_{\text{eff}}^2 = 12991.69; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.91; R - 1 = 0.00727$$



Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00015$	$10^9 A_s$	$2.099^{+0.023}_{-0.031}$	$H(0.61)$	$95.17 \pm 0.25$
$\Omega_c h^2$	$0.1195 \pm 0.0010$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_M(0.61)$	$2285 \pm 10$
$100\theta_{MC}$	$1.04096 \pm 0.00030$	$D_{40}$	$1227 \pm 12$	$H(2.33)$	$235.37 \pm 0.58$
$\tau$	$0.0552^{+0.0051}_{-0.0077}$	$D_{220}$	$5730 \pm 39$	$D_M(2.33)$	$5755.8 \pm 8.9$
$w$	$-1.059 \pm 0.029$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4601 \pm 0.0067$
$\ln(10^{10} A_s)$	$3.044^{+0.011}_{-0.015}$	$D_{1420}$	$816.7 \pm 4.8$	$\sigma_8(0.15)$	$0.7647 \pm 0.0099$
$n_s$	$0.9663 \pm 0.0039$	$D_{2000}$	$230.8 \pm 1.6$	$f\sigma_8(0.38)$	$0.4844 \pm 0.0079$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9663 \pm 0.0039$	$\sigma_8(0.38)$	$0.6785 \pm 0.0087$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245395^{+0.000062}_{-0.000053}$	$f\sigma_8(0.51)$	$0.4849 \pm 0.0081$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246722^{+0.000062}_{-0.000053}$	$\sigma_8(0.51)$	$0.6350 \pm 0.0080$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.585^{+0.026}_{-0.029}$	$f\sigma_8(0.61)$	$0.4807 \pm 0.0081$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.758 \pm 0.022$	$\sigma_8(0.61)$	$0.6041 \pm 0.0076$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.87 \pm 0.24$	$f\sigma_8(2.33)$	$0.3047 \pm 0.0038$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.57 \pm 0.25$	$\sigma_8(2.33)$	$0.3129 \pm 0.0033$
$A^{kSZ}$	$< 5.22$	$100\theta_*$	$1.04114 \pm 0.00029$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0013}$	$D_M(z_*)/\text{Gpc}$	$13.886 \pm 0.024$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.91 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.8$
$H_0$	$69.33 \pm 0.76$	$r_{\text{drag}}$	$147.23 \pm 0.26$	$\chi^2_{\text{lensing}}$	$9.08 \pm 0.64$
$\Omega_\Lambda$	$0.7035 \pm 0.0068$	$k_D$	$0.14072^{+0.00034}_{-0.00031}$	$\chi^2_{\text{simall}}$	$396.9 \pm 1.7$
$\Omega_m$	$0.2965 \pm 0.0068$	$100\theta_D$	$0.16078 \pm 0.00019$	$\chi^2_{\text{lowl}}$	$23.08 \pm 0.80$
$\Omega_m h^2$	$0.14247 \pm 0.00099$	$z_{\text{eq}}$	$3389 \pm 24$	$\chi^2_{\text{H073p45}}$	$6.4 \pm 2.3$
$\Omega_m h^3$	$0.0988 \pm 0.0013$	$k_{\text{eq}}$	$0.010344 \pm 0.000072$	$\chi^2_{\text{JLA}}$	$1036.4 \pm 1.8$
$\sigma_8$	$0.826 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8157 \pm 0.0044$	$\chi^2_{6\text{DF}}$	$0.10 \pm 0.12$
$S_8$	$0.821 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4506 \pm 0.0023$	$\chi^2_{\text{MGS}}$	$2.45 \pm 0.63$
$\sigma_8 \Omega_m^{0.5}$	$0.4499 \pm 0.0058$	$H(0.15)$	$73.94 \pm 0.48$	$\chi^2_{\text{DR12BAO}}$	$4.53 \pm 0.65$
$\sigma_8 \Omega_m^{0.25}$	$0.6097 \pm 0.0070$	$D_M(0.15)$	$628.9 \pm 5.4$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.010$	$H(0.38)$	$83.31 \pm 0.27$	$\chi^2_{\text{CMB}}$	$7365 \pm 5000$
$r_{\text{drag}} h$	$102.1 \pm 1.1$	$D_M(0.38)$	$1509.4 \pm 9.1$	$\chi^2_{\text{BAO}}$	$7.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.446 \pm 0.022$	$H(0.51)$	$89.73 \pm 0.24$		
$z_{\text{re}}$	$7.74^{+0.56}_{-0.74}$	$D_M(0.51)$	$1960.4 \pm 9.9$		

$\bar{\chi}^2_{\text{eff}} = 13000.46; \Delta\bar{\chi}^2_{\text{eff}} = 9150.99; R - 1 = 0.00765$



## 19 w+wa

### 19.1 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00021$	$\langle d^2 \rangle^{1/2}$	$2.463^{+0.044}_{-0.040}$	$D_M(0.38)$	$1516 \pm 14$
$\Omega_c h^2$	$0.1205 \pm 0.0018$	$z_{\text{re}}$	$7.46 \pm 0.83$	$H(0.51)$	$89.89 \pm 0.51$
$100\theta_{MC}$	$1.04082 \pm 0.00046$	$10^9 A_s$	$2.089 \pm 0.034$	$D_M(0.51)$	$1966 \pm 16$
$\tau$	$0.0520 \pm 0.0080$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.013$	$H(0.61)$	$95.28 \pm 0.44$
$w$	$-0.955 \pm 0.085$	$D_{40}$	$1230 \pm 14$	$D_M(0.61)$	$2290 \pm 17$
$w_a$	$-0.35^{+0.41}_{-0.31}$	$D_{220}$	$5709 \pm 41$	$H(2.33)$	$235.12 \pm 0.98$
$\ln(10^{10} A_s)$	$3.039 \pm 0.016$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5765 \pm 13$
$n_s$	$0.9634 \pm 0.0052$	$D_{1420}$	$814.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.462 \pm 0.011$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.6 \pm 1.8$	$\sigma_8(0.15)$	$0.762 \pm 0.016$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9634 \pm 0.0052$	$f\sigma_8(0.38)$	$0.483 \pm 0.013$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245292^{+0.000098}_{-0.000081}$	$\sigma_8(0.38)$	$0.676 \pm 0.014$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246618^{+0.000098}_{-0.000081}$	$f\sigma_8(0.51)$	$0.484 \pm 0.013$
$A_{100}^{PS}$	$253 \pm 30$	$10^5 D/H$	$2.632 \pm 0.039$	$\sigma_8(0.51)$	$0.633 \pm 0.013$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.778 \pm 0.035$	$f\sigma_8(0.61)$	$0.480 \pm 0.014$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.27 \pm 0.36$	$\sigma_8(0.61)$	$0.602 \pm 0.012$
$A^{kSZ}$	$< 5.75$	$r_*$	$144.49 \pm 0.43$	$f\sigma_8(2.33)$	$0.3039^{+0.0066}_{-0.0057}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$100\theta_*$	$1.04103 \pm 0.00045$	$\sigma_8(2.33)$	$0.3107 \pm 0.0047$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.880 \pm 0.040$	$f_{2000}^{143}$	$30.9 \pm 3.0$
$H_0$	$68.17 \pm 0.84$	$z_{\text{drag}}$	$1059.41 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6916 \pm 0.0082$	$r_{\text{drag}}$	$147.24 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3084 \pm 0.0082$	$k_D$	$0.14053 \pm 0.00050$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.6$
$\Omega_m h^2$	$0.1433 \pm 0.0018$	$100\theta_D$	$0.16107 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_m h^3$	$0.0977 \pm 0.0017$	$z_{\text{eq}}$	$3408 \pm 42$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.5$
$\sigma_8$	$0.824 \pm 0.017$	$k_{\text{eq}}$	$0.01040 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.077$
$S_8$	$0.836 \pm 0.020$	$100\theta_{\text{eq}}$	$0.8116 \pm 0.0078$	$\chi_{\text{MGS}}^2$	$1.89 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.458 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4487 \pm 0.0040$	$\chi_{\text{DR12BAO}}^2$	$5.0 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.614 \pm 0.013$	$H(0.15)$	$73.64 \pm 0.74$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.5$
$\sigma_8/h^{0.5}$	$0.998 \pm 0.019$	$D_M(0.15)$	$635.0 \pm 6.6$	$\chi_{\text{BAO}}^2$	$6.9 \pm 1.5$
$r_{\text{drag}} h$	$100.4 \pm 1.2$	$H(0.38)$	$83.45 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$

Best-fit  $\chi_{\text{eff}}^2 = 8512.97$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.44$ ;  $\bar{\chi}_{\text{eff}}^2 = 8533.43$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.96$ ;  $R - 1 = 0.00675$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  -0.00) MGS: 1.75 ( $\Delta$  -0.07) DR12BAO: 3.97 ( $\Delta$  -0.06) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 397.31 ( $\Delta$  1.44) commander\_dx12\_v3\_2\_29: 23.37 ( $\Delta$  0.09) CamSpec like\_10.7HM: 7049.34 SN - JLA Pantheon18: 1034.74 ( $\Delta$  -0.03)



19.2 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_le

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02215 \pm 0.00020$	$z_{\text{re}}$	$7.44 \pm 0.81$	$D_{\text{M}}(0.51)$	$1966 \pm 16$
$\Omega_c h^2$	$0.1201 \pm 0.0014$	$10^9 A_s$	$2.087 \pm 0.031$	$H(0.61)$	$95.34 \pm 0.44$
$100\theta_{MC}$	$1.04084 \pm 0.00044$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$D_{\text{M}}(0.61)$	$2290 \pm 17$
$\tau$	$0.0519 \pm 0.0078$	$D_{40}$	$1229 \pm 12$	$H(2.33)$	$235.03 \pm 0.99$
$w$	$-0.960 \pm 0.081$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(2.33)$	$5764 \pm 13$
$w_a$	$-0.30^{+0.34}_{-0.27}$	$D_{810}$	$2534 \pm 13$	$f\sigma_8(0.15)$	$0.4595 \pm 0.0078$
$\ln(10^{10} A_s)$	$3.038 \pm 0.015$	$D_{1420}$	$814.2 \pm 5.0$	$\sigma_8(0.15)$	$0.759 \pm 0.012$
$n_s$	$0.9640 \pm 0.0045$	$D_{2000}$	$229.6 \pm 1.8$	$f\sigma_8(0.38)$	$0.4808 \pm 0.0091$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9640 \pm 0.0045$	$\sigma_8(0.38)$	$0.673 \pm 0.010$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245301^{+0.000093}_{-0.000077}$	$f\sigma_8(0.51)$	$0.4811 \pm 0.0095$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246628^{+0.000093}_{-0.000077}$	$\sigma_8(0.51)$	$0.6302 \pm 0.0095$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.628 \pm 0.038$	$f\sigma_8(0.61)$	$0.4771 \pm 0.0096$
$A_{100}^{PS}$	$253 \pm 30$	Age/Gyr	$13.779 \pm 0.034$	$\sigma_8(0.61)$	$0.5996 \pm 0.0089$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.21 \pm 0.32$	$f\sigma_8(2.33)$	$0.3029 \pm 0.0046$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.58 \pm 0.33$	$\sigma_8(2.33)$	$0.3100 \pm 0.0036$
$A^{kSZ}$	$< 5.81$	$100\theta_*$	$1.04105 \pm 0.00044$	$f_{2000}^{143}$	$31.0 \pm 3.0$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.888 \pm 0.032$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.43 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$H_0$	$68.18 \pm 0.84$	$r_{\text{drag}}$	$147.32 \pm 0.35$	$\chi_{\text{lensing}}^2$	$9.40 \pm 0.95$
$\Omega_{\Lambda}$	$0.6925 \pm 0.0079$	$k_{\text{D}}$	$0.14046 \pm 0.00044$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$\Omega_m$	$0.3075 \pm 0.0079$	$100\theta_{\text{D}}$	$0.16105 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.38 \pm 0.90$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$z_{\text{eq}}$	$3399 \pm 31$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.5$
$\Omega_m h^3$	$0.0974 \pm 0.0015$	$k_{\text{eq}}$	$0.010374 \pm 0.000095$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.078$
$\sigma_8$	$0.821 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8133 \pm 0.0058$	$\chi_{\text{MGS}}^2$	$1.91 \pm 0.70$
$S_8$	$0.831 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4495 \pm 0.0030$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4552 \pm 0.0073$	$H(0.15)$	$73.62 \pm 0.72$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.5$
$\sigma_8 \Omega_m^{0.25}$	$0.6113 \pm 0.0086$	$D_{\text{M}}(0.15)$	$635.1 \pm 6.5$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$\sigma_8/h^{0.5}$	$0.994 \pm 0.012$	$H(0.38)$	$83.46 \pm 0.62$	$\chi_{\text{BAO}}^2$	$6.8 \pm 1.5$
$r_{\text{drag}} h$	$100.4 \pm 1.2$	$D_{\text{M}}(0.38)$	$1516 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.455 \pm 0.027$	$H(0.51)$	$89.92 \pm 0.51$		
$\bar{\chi}_{\text{eff}}^2 = 8542.20$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.90$ ; $R - 1 = 0.00753$					



19.3 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_zr

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02214 \pm 0.00021$	$\langle d^2 \rangle^{1/2}$	$2.465 \pm 0.042$	$D_M(0.38)$	$1516 \pm 14$
$\Omega_c h^2$	$0.1204 \pm 0.0018$	$z_{\text{re}}$	$7.65^{+0.52}_{-0.82}$	$H(0.51)$	$89.89 \pm 0.51$
$100\theta_{MC}$	$1.04083 \pm 0.00045$	$10^9 A_s$	$2.096^{+0.025}_{-0.034}$	$D_M(0.51)$	$1966 \pm 16$
$\tau$	$0.0537^{+0.0045}_{-0.0084}$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.013$	$H(0.61)$	$95.30 \pm 0.44$
$w$	$-0.955 \pm 0.084$	$D_{40}$	$1230 \pm 14$	$D_M(0.61)$	$2290 \pm 17$
$w_a$	$-0.34^{+0.41}_{-0.31}$	$D_{220}$	$5708 \pm 41$	$H(2.33)$	$235.12 \pm 0.98$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.016}$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5765 \pm 13$
$n_s$	$0.9637 \pm 0.0051$	$D_{1420}$	$814.2 \pm 5.1$	$f\sigma_8(0.15)$	$0.462 \pm 0.011$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$229.6 \pm 1.8$	$\sigma_8(0.15)$	$0.763 \pm 0.016$
$A_{217}^{CIB}$	$44 \pm 8$	$n_{s,0.002}$	$0.9637 \pm 0.0051$	$f\sigma_8(0.38)$	$0.484 \pm 0.013$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245295^{+0.000097}_{-0.000080}$	$\sigma_8(0.38)$	$0.677 \pm 0.014$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$Y_P^{\text{BBN}}$	$0.246621^{+0.000097}_{-0.000081}$	$f\sigma_8(0.51)$	$0.484 \pm 0.013$
$A_{100}^{PS}$	$252 \pm 30$	$10^5 D/H$	$2.630 \pm 0.039$	$\sigma_8(0.51)$	$0.633 \pm 0.013$
$A_{143}^{PS}$	$45 \pm 9$	Age/Gyr	$13.778 \pm 0.035$	$f\sigma_8(0.61)$	$0.480 \pm 0.013$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.25 \pm 0.36$	$\sigma_8(0.61)$	$0.602 \pm 0.012$
$A^{kSZ}$	$< 5.71$	$r_*$	$144.51 \pm 0.43$	$f\sigma_8(2.33)$	$0.3041^{+0.0066}_{-0.0057}$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$100\theta_*$	$1.04104 \pm 0.00045$	$\sigma_8(2.33)$	$0.3110 \pm 0.0046$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.881 \pm 0.040$	$f_{2000}^{143}$	$30.8 \pm 2.9$
$H_0$	$68.16 \pm 0.84$	$z_{\text{drag}}$	$1059.42 \pm 0.44$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$\Omega_\Lambda$	$0.6917 \pm 0.0082$	$r_{\text{drag}}$	$147.25 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$\Omega_m$	$0.3083 \pm 0.0082$	$k_D$	$0.14052 \pm 0.00050$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\Omega_m h^2$	$0.1432 \pm 0.0017$	$100\theta_D$	$0.16106 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_m h^3$	$0.0976 \pm 0.0017$	$z_{\text{eq}}$	$3406 \pm 42$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.5$
$\sigma_8$	$0.825 \pm 0.017$	$k_{\text{eq}}$	$0.01040 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.077$
$S_8$	$0.836 \pm 0.020$	$100\theta_{\text{eq}}$	$0.8120 \pm 0.0077$	$\chi_{\text{MGS}}^2$	$1.89 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.458 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4489 \pm 0.0040$	$\chi_{\text{DR12BAO}}^2$	$4.9 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.615 \pm 0.013$	$H(0.15)$	$73.63 \pm 0.74$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.999 \pm 0.019$	$D_M(0.15)$	$635.1 \pm 6.6$	$\chi_{\text{BAO}}^2$	$6.9 \pm 1.5$
$r_{\text{drag}} h$	$100.4 \pm 1.2$	$H(0.38)$	$83.45 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 8533.12$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.95$ ;  $R - 1 = 0.00716$



## 19.4 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing\_zre6p5/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02216 \pm 0.00020$	$z_{\text{re}}$	$7.63^{+0.51}_{-0.81}$	$D_{\text{M}}(0.51)$	$1967 \pm 16$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$10^9 A_s$	$2.093^{+0.023}_{-0.031}$	$H(0.61)$	$95.35 \pm 0.44$
$100\theta_{MC}$	$1.04086 \pm 0.00044$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.61)$	$2290 \pm 17$
$\tau$	$0.0536^{+0.0045}_{-0.0082}$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$235.0 \pm 1.0$
$w$	$-0.962 \pm 0.081$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(2.33)$	$5764 \pm 13$
$w_a$	$-0.28^{+0.34}_{-0.27}$	$D_{810}$	$2534 \pm 13$	$f\sigma_8(0.15)$	$0.4594 \pm 0.0078$
$\ln(10^{10} A_s)$	$3.041^{+0.011}_{-0.015}$	$D_{1420}$	$814.2 \pm 5.0$	$\sigma_8(0.15)$	$0.759 \pm 0.012$
$n_s$	$0.9645 \pm 0.0043$	$D_{2000}$	$229.6 \pm 1.7$	$f\sigma_8(0.38)$	$0.4806 \pm 0.0091$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9645 \pm 0.0043$	$\sigma_8(0.38)$	$0.674 \pm 0.010$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245306^{+0.000092}_{-0.000076}$	$f\sigma_8(0.51)$	$0.4809 \pm 0.0095$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246632^{+0.000092}_{-0.000076}$	$\sigma_8(0.51)$	$0.6304 \pm 0.0095$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.626 \pm 0.038$	$f\sigma_8(0.61)$	$0.4769 \pm 0.0096$
$A_{100}^{PS}$	$253 \pm 30$	Age/Gyr	$13.779 \pm 0.034$	$\sigma_8(0.61)$	$0.5998 \pm 0.0089$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.18 \pm 0.31$	$f\sigma_8(2.33)$	$0.3029 \pm 0.0047$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.61 \pm 0.32$	$\sigma_8(2.33)$	$0.3102 \pm 0.0036$
$A^{kSZ}$	$< 5.76$	$100\theta_*$	$1.04107 \pm 0.00043$	$f_{2000}^{143}$	$30.9 \pm 2.9$
$c_{100}$	$0.9985^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.890 \pm 0.031$	$f_{2000}^{143 \times 217}$	$33.2 \pm 2.1$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.44 \pm 0.44$	$f_{2000}^{217}$	$107.8 \pm 2.0$
$H_0$	$68.16 \pm 0.84$	$r_{\text{drag}}$	$147.34 \pm 0.35$	$\chi_{\text{lensing}}^2$	$9.39 \pm 0.96$
$\Omega_{\Lambda}$	$0.6926 \pm 0.0079$	$k_{\text{D}}$	$0.14044 \pm 0.00044$	$\chi_{\text{simall}}^2$	$396.7 \pm 1.5$
$\Omega_m$	$0.3074 \pm 0.0079$	$100\theta_{\text{D}}$	$0.16105 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.35 \pm 0.89$
$\Omega_m h^2$	$0.1428 \pm 0.0013$	$z_{\text{eq}}$	$3396 \pm 30$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.5$
$\Omega_m h^3$	$0.0973 \pm 0.0015$	$k_{\text{eq}}$	$0.010365 \pm 0.000092$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.078$
$\sigma_8$	$0.821 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0056$	$\chi_{\text{MGS}}^2$	$1.91 \pm 0.70$
$S_8$	$0.831 \pm 0.013$	$100\theta_{s,\text{eq}}$	$0.4498 \pm 0.0029$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4552 \pm 0.0073$	$H(0.15)$	$73.60 \pm 0.72$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6113 \pm 0.0086$	$D_{\text{M}}(0.15)$	$635.3 \pm 6.5$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$\sigma_8/h^{0.5}$	$0.995 \pm 0.012$	$H(0.38)$	$83.45 \pm 0.63$	$\chi_{\text{BAO}}^2$	$6.7 \pm 1.5$
$r_{\text{drag}} h$	$100.4 \pm 1.2$	$D_{\text{M}}(0.38)$	$1516 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.455 \pm 0.027$	$H(0.51)$	$89.93 \pm 0.51$		
$\bar{\chi}_{\text{eff}}^2 = 8541.86$ ; $\Delta \bar{\chi}_{\text{eff}}^2 = 6291.85$ ; $R - 1 = 0.00901$					



19.5 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.451 \pm 0.034$	$D_M(0.38)$	$1514 \pm 14$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$z_{\text{re}}$	$7.53 \pm 0.81$	$H(0.51)$	$90.06 \pm 0.51$
$100\theta_{MC}$	$1.04089 \pm 0.00030$	$10^9 A_s$	$2.092 \pm 0.034$	$D_M(0.51)$	$1964 \pm 16$
$\tau$	$0.0531 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$H(0.61)$	$95.49 \pm 0.42$
$w$	$-0.959 \pm 0.082$	$D_{40}$	$1228 \pm 13$	$D_M(0.61)$	$2287 \pm 17$
$w_a$	$-0.28^{+0.35}_{-0.28}$	$D_{220}$	$5725 \pm 40$	$H(2.33)$	$235.20 \pm 0.95$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5756 \pm 11$
$n_s$	$0.9653 \pm 0.0043$	$D_{1420}$	$816.3 \pm 4.9$	$f\sigma_8(0.15)$	$0.4582 \pm 0.0085$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.5 \pm 1.6$	$\sigma_8(0.15)$	$0.758 \pm 0.013$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9653 \pm 0.0043$	$f\sigma_8(0.38)$	$0.479 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245377^{+0.000065}_{-0.000056}$	$\sigma_8(0.38)$	$0.673 \pm 0.012$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246703^{+0.000065}_{-0.000056}$	$f\sigma_8(0.51)$	$0.480 \pm 0.011$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.594 \pm 0.028$	$\sigma_8(0.51)$	$0.630 \pm 0.011$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763^{+0.030}_{-0.034}$	$f\sigma_8(0.61)$	$0.476 \pm 0.011$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.97 \pm 0.26$	$\sigma_8(0.61)$	$0.599 \pm 0.011$
$A^{kSZ}$	$< 5.32$	$r_*$	$144.49 \pm 0.31$	$f\sigma_8(2.33)$	$0.3026 \pm 0.0055$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04107 \pm 0.00030$	$\sigma_8(2.33)$	$0.3100 \pm 0.0043$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.879 \pm 0.029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$68.26 \pm 0.83$	$z_{\text{drag}}$	$1059.83 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$\Omega_\Lambda$	$0.6932 \pm 0.0078$	$r_{\text{drag}}$	$147.16 \pm 0.32$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$\Omega_m$	$0.3068 \pm 0.0078$	$k_D$	$0.14076^{+0.00038}_{-0.00034}$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$100\theta_D$	$0.16082 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.27 \pm 0.92$
$\Omega_m h^3$	$0.0975 \pm 0.0015$	$z_{\text{eq}}$	$3399 \pm 30$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.6$
$\sigma_8$	$0.820 \pm 0.014$	$k_{\text{eq}}$	$0.010374 \pm 0.000092$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.077$
$S_8$	$0.829 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8138 \pm 0.0056$	$\chi_{\text{MGS}}^2$	$1.93 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.4540 \pm 0.0083$	$100\theta_{s,\text{eq}}$	$0.4497 \pm 0.0029$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.010$	$H(0.15)$	$73.71 \pm 0.73$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.015$	$D_M(0.15)$	$634.4 \pm 6.6$	$\chi_{\text{BAO}}^2$	$6.7 \pm 1.5$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$H(0.38)$	$83.58 \pm 0.63$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 12960.67$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.21$ ;  $\bar{\chi}_{\text{eff}}^2 = 12984.58$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.08$ ;  $R - 1 = 0.00938$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.00 ( $\Delta$  0.00) MGS: 1.82 ( $\Delta$  0.00) DR12BAO: 3.77 ( $\Delta$  -0.15) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.76 ( $\Delta$  -0.28) commander\_dx12\_v3\_2\_29: 22.92 ( $\Delta$  -0.22) CamSpec like\_10.7HM\_1400\_unified: 11499.35 SN - JLA Pantheon18: 1034.83 ( $\Delta$  0.00)



19.6 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$z_{\text{re}}$	$7.53 \pm 0.76$	$D_{\text{M}}(0.51)$	$1963 \pm 16$
$\Omega_c h^2$	$0.1198 \pm 0.0011$	$10^9 A_s$	$2.092 \pm 0.031$	$H(0.61)$	$95.52 \pm 0.42$
$100\theta_{MC}$	$1.04089 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$D_{\text{M}}(0.61)$	$2287 \pm 17$
$\tau$	$0.0531 \pm 0.0075$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$235.16 \pm 0.95$
$w$	$-0.960 \pm 0.080$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(2.33)$	$5756 \pm 11$
$w_a$	$-0.27^{+0.32}_{-0.27}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4574 \pm 0.0067$
$\ln(10^{10} A_s)$	$3.040 \pm 0.015$	$D_{1420}$	$816.2 \pm 4.9$	$\sigma_8(0.15)$	$0.757 \pm 0.011$
$n_s$	$0.9654 \pm 0.0040$	$D_{2000}$	$230.5 \pm 1.6$	$f\sigma_8(0.38)$	$0.4785 \pm 0.0081$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9654 \pm 0.0040$	$\sigma_8(0.38)$	$0.6719 \pm 0.0096$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245380^{+0.000064}_{-0.000054}$	$f\sigma_8(0.51)$	$0.4788 \pm 0.0084$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246707^{+0.000064}_{-0.000054}$	$\sigma_8(0.51)$	$0.6289 \pm 0.0090$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$10^5 D/H$	$2.592^{+0.026}_{-0.030}$	$f\sigma_8(0.61)$	$0.4749 \pm 0.0086$
$A_{100}^{PS}$	$249 \pm 27$	Age/Gyr	$13.763 \pm 0.031$	$\sigma_8(0.61)$	$0.5984 \pm 0.0085$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.94 \pm 0.24$	$f\sigma_8(2.33)$	$0.3024 \pm 0.0044$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.51 \pm 0.26$	$\sigma_8(2.33)$	$0.3098 \pm 0.0036$
$A^{kSZ}$	$< 5.35$	$100\theta_*$	$1.04108 \pm 0.00030$	$f_{2000}^{143}$	$29.7 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.881 \pm 0.025$	$f_{2000}^{143 \times 217}$	$32.2 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.84 \pm 0.33$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$H_0$	$68.27 \pm 0.83$	$r_{\text{drag}}$	$147.19 \pm 0.27$	$\chi_{\text{lensing}}^2$	$9.19 \pm 0.75$
$\Omega_{\Lambda}$	$0.6935 \pm 0.0077$	$k_{\text{D}}$	$0.14074^{+0.00035}_{-0.00031}$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$\Omega_m$	$0.3065 \pm 0.0077$	$100\theta_{\text{D}}$	$0.16081 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.24 \pm 0.82$
$\Omega_m h^2$	$0.1428 \pm 0.0010$	$z_{\text{eq}}$	$3396 \pm 25$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.6$
$\Omega_m h^3$	$0.0975 \pm 0.0014$	$k_{\text{eq}}$	$0.010366 \pm 0.000077$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.078$
$\sigma_8$	$0.819 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8143 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.94 \pm 0.70$
$S_8$	$0.827 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4499 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4532 \pm 0.0061$	$H(0.15)$	$73.72 \pm 0.71$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6092 \pm 0.0074$	$D_{\text{M}}(0.15)$	$634.3 \pm 6.4$	$\chi_{\text{CMB}}^2$	$7365 \pm 5000$
$\sigma_8/h^{0.5}$	$0.991 \pm 0.011$	$H(0.38)$	$83.60 \pm 0.62$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.38)$	$1514 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.449 \pm 0.024$	$H(0.51)$	$90.08 \pm 0.50$		

$\bar{\chi}_{\text{eff}}^2 = 12993.26$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.09$ ;  $R - 1 = 0.00901$



19.7 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02233 \pm 0.00015$	$\langle d^2 \rangle^{1/2}$	$2.454 \pm 0.033$	$D_M(0.38)$	$1514 \pm 14$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$z_{\text{re}}$	$7.69^{+0.55}_{-0.81}$	$H(0.51)$	$90.06 \pm 0.51$
$100\theta_{MC}$	$1.04089 \pm 0.00030$	$10^9 A_s$	$2.098^{+0.025}_{-0.034}$	$D_M(0.51)$	$1964 \pm 16$
$\tau$	$0.0546^{+0.0049}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$H(0.61)$	$95.49 \pm 0.42$
$w$	$-0.960 \pm 0.082$	$D_{40}$	$1228 \pm 13$	$D_M(0.61)$	$2287 \pm 17$
$w_a$	$-0.27^{+0.34}_{-0.28}$	$D_{220}$	$5725 \pm 39$	$H(2.33)$	$235.21 \pm 0.95$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5756 \pm 11$
$n_s$	$0.9654 \pm 0.0043$	$D_{1420}$	$816.2 \pm 4.9$	$f\sigma_8(0.15)$	$0.4586 \pm 0.0084$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{2000}$	$230.6 \pm 1.6$	$\sigma_8(0.15)$	$0.759 \pm 0.013$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9654 \pm 0.0043$	$f\sigma_8(0.38)$	$0.4798 \pm 0.0099$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245378^{+0.000065}_{-0.000056}$	$\sigma_8(0.38)$	$0.673 \pm 0.012$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246705^{+0.000065}_{-0.000056}$	$f\sigma_8(0.51)$	$0.480 \pm 0.010$
$A_{100}^{PS}$	$249 \pm 30$	$10^5 D/H$	$2.593 \pm 0.028$	$\sigma_8(0.51)$	$0.630 \pm 0.011$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.763^{+0.030}_{-0.034}$	$f\sigma_8(0.61)$	$0.476 \pm 0.011$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.96 \pm 0.26$	$\sigma_8(0.61)$	$0.600 \pm 0.010$
$A^{kSZ}$	$< 5.29$	$r_*$	$144.50 \pm 0.31$	$f\sigma_8(2.33)$	$0.3029 \pm 0.0054$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$100\theta_*$	$1.04108 \pm 0.00030$	$\sigma_8(2.33)$	$0.3103 \pm 0.0042$
$c_{217}$	$0.9996 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.880 \pm 0.029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$H_0$	$68.25 \pm 0.83$	$z_{\text{drag}}$	$1059.84 \pm 0.32$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$\Omega_\Lambda$	$0.6932 \pm 0.0078$	$r_{\text{drag}}$	$147.17 \pm 0.32$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$\Omega_m$	$0.3068 \pm 0.0078$	$k_D$	$0.14075^{+0.00038}_{-0.00034}$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\Omega_m h^2$	$0.1428 \pm 0.0013$	$100\theta_D$	$0.16081 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.28 \pm 0.92$
$\Omega_m h^3$	$0.0975 \pm 0.0015$	$z_{\text{eq}}$	$3398 \pm 30$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.5$
$\sigma_8$	$0.821 \pm 0.014$	$k_{\text{eq}}$	$0.010371 \pm 0.000092$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.077$
$S_8$	$0.830 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8140 \pm 0.0056$	$\chi_{\text{MGS}}^2$	$1.92 \pm 0.70$
$\sigma_8 \Omega_m^{0.5}$	$0.4544 \pm 0.0082$	$100\theta_{s,\text{eq}}$	$0.4498 \pm 0.0029$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.2$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.010$	$H(0.15)$	$73.70 \pm 0.73$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.5$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.014$	$D_M(0.15)$	$634.4 \pm 6.6$	$\chi_{\text{BAO}}^2$	$6.7 \pm 1.5$
$r_{\text{drag}} h$	$100.4 \pm 1.2$	$H(0.38)$	$83.58 \pm 0.63$	$\chi_{\text{CMB}}^2$	$7356 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 12984.26$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.99$ ;  $R - 1 = 0.00880$



19.8 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Pantheon18\_post\_lensing\_zre6p5/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$z_{\text{re}}$	$7.67^{+0.55}_{-0.78}$	$D_{\text{M}}(0.51)$	$1964 \pm 15$
$\Omega_c h^2$	$0.1197 \pm 0.0011$	$10^9 A_s$	$2.096^{+0.023}_{-0.031}$	$H(0.61)$	$95.52 \pm 0.42$
$100\theta_{MC}$	$1.04090 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.61)$	$2287 \pm 17$
$\tau$	$0.0544^{+0.0049}_{-0.0080}$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$235.16 \pm 0.95$
$w$	$-0.962 \pm 0.080$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(2.33)$	$5756 \pm 11$
$w_a$	$-0.26^{+0.31}_{-0.26}$	$D_{810}$	$2536 \pm 13$	$f\sigma_8(0.15)$	$0.4575 \pm 0.0067$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.015}$	$D_{1420}$	$816.2 \pm 4.9$	$\sigma_8(0.15)$	$0.758 \pm 0.011$
$n_s$	$0.9656 \pm 0.0039$	$D_{2000}$	$230.5 \pm 1.6$	$f\sigma_8(0.38)$	$0.4786 \pm 0.0081$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9656 \pm 0.0039$	$\sigma_8(0.38)$	$0.6722 \pm 0.0096$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245382^{+0.000064}_{-0.000053}$	$f\sigma_8(0.51)$	$0.4789 \pm 0.0084$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246709^{+0.000064}_{-0.000054}$	$\sigma_8(0.51)$	$0.6292 \pm 0.0089$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$10^5 D/H$	$2.591^{+0.026}_{-0.030}$	$f\sigma_8(0.61)$	$0.4750 \pm 0.0086$
$A_{100}^{PS}$	$249 \pm 28$	Age/Gyr	$13.763 \pm 0.031$	$\sigma_8(0.61)$	$0.5987 \pm 0.0084$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.93 \pm 0.24$	$f\sigma_8(2.33)$	$0.3025 \pm 0.0044$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.53 \pm 0.26$	$\sigma_8(2.33)$	$0.3100 \pm 0.0035$
$A^{kSZ}$	$< 5.32$	$100\theta_*$	$1.04109 \pm 0.00029$	$f_{2000}^{143}$	$29.6 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.025$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.85 \pm 0.32$	$f_{2000}^{217}$	$106.9 \pm 1.8$
$H_0$	$68.26 \pm 0.83$	$r_{\text{drag}}$	$147.20 \pm 0.27$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.75$
$\Omega_{\Lambda}$	$0.6936 \pm 0.0077$	$k_{\text{D}}$	$0.14073^{+0.00035}_{-0.00031}$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$\Omega_m$	$0.3064 \pm 0.0077$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.23 \pm 0.81$
$\Omega_m h^2$	$0.1427 \pm 0.0010$	$z_{\text{eq}}$	$3395 \pm 25$	$\chi_{\text{JLA}}^2$	$1035.9 \pm 1.6$
$\Omega_m h^3$	$0.0974 \pm 0.0014$	$k_{\text{eq}}$	$0.010361 \pm 0.000075$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.078$
$\sigma_8$	$0.819 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8146 \pm 0.0046$	$\chi_{\text{MGS}}^2$	$1.94 \pm 0.70$
$S_8$	$0.828 \pm 0.011$	$100\theta_{s,\text{eq}}$	$0.4501 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4534 \pm 0.0061$	$H(0.15)$	$73.70 \pm 0.71$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6094 \pm 0.0073$	$D_{\text{M}}(0.15)$	$634.4 \pm 6.4$	$\chi_{\text{CMB}}^2$	$7365 \pm 5000$
$\sigma_8/h^{0.5}$	$0.991 \pm 0.011$	$H(0.38)$	$83.59 \pm 0.62$	$\chi_{\text{BAO}}^2$	$6.6 \pm 1.5$
$r_{\text{drag}} h$	$100.5 \pm 1.2$	$D_{\text{M}}(0.38)$	$1514 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.450 \pm 0.024$	$H(0.51)$	$90.08 \pm 0.50$		
$\bar{\chi}_{\text{eff}}^2 = 12993.01$ ; $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.08$ ; $R - 1 = 0.00841$					



**19.9 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02216 \pm 0.00020$	$z_{\text{re}}$	$7.47 \pm 0.82$	$D_{\text{M}}(0.51)$	$1953 \pm 16$
$\Omega_c h^2$	$0.1206 \pm 0.0018$	$10^9 A_s$	$2.091 \pm 0.034$	$H(0.61)$	$95.17 \pm 0.44$
$100\theta_{MC}$	$1.04085 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.013$	$D_{\text{M}}(0.61)$	$2277 \pm 17$
$\tau$	$0.0521 \pm 0.0080$	$D_{40}$	$1231 \pm 14$	$H(2.33)$	$234.77 \pm 0.96$
$w$	$-0.991^{+0.079}_{-0.089}$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(2.33)$	$5761 \pm 13$
$w_a$	$-0.36^{+0.42}_{-0.32}$	$D_{810}$	$2535 \pm 14$	$f\sigma_8(0.15)$	$0.464 \pm 0.011$
$\ln(10^{10} A_s)$	$3.040 \pm 0.016$	$D_{1420}$	$814.5 \pm 5.1$	$\sigma_8(0.15)$	$0.773 \pm 0.016$
$n_s$	$0.9633 \pm 0.0052$	$D_{2000}$	$229.8 \pm 1.8$	$f\sigma_8(0.38)$	$0.490 \pm 0.013$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9633 \pm 0.0052$	$\sigma_8(0.38)$	$0.686 \pm 0.014$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245306^{+0.000094}_{-0.000079}$	$f\sigma_8(0.51)$	$0.491 \pm 0.013$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246632^{+0.000095}_{-0.000079}$	$\sigma_8(0.51)$	$0.642 \pm 0.013$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.626 \pm 0.039$	$f\sigma_8(0.61)$	$0.488 \pm 0.014$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.754 \pm 0.034$	$\sigma_8(0.61)$	$0.610 \pm 0.012$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.24 \pm 0.36$	$f\sigma_8(2.33)$	$0.3082^{+0.0063}_{-0.0057}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.44 \pm 0.42$	$\sigma_8(2.33)$	$0.3145 \pm 0.0046$
$A^{kSZ}$	$< 5.71$	$100\theta_*$	$1.04106 \pm 0.00044$	$f_{2000}^{143}$	$30.7 \pm 2.9$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.874 \pm 0.040$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.49 \pm 0.44$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$H_0$	$69.26 \pm 0.77$	$r_{\text{drag}}$	$147.17 \pm 0.43$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\Omega_{\Lambda}$	$0.7010 \pm 0.0073$	$k_{\text{D}}$	$0.14062 \pm 0.00049$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_m$	$0.2990 \pm 0.0073$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00026$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.4$
$\Omega_m h^2$	$0.1434 \pm 0.0017$	$z_{\text{eq}}$	$3411 \pm 41$	$\chi_{\text{JLA}}^2$	$1036.3 \pm 1.7$
$\Omega_m h^3$	$0.0993 \pm 0.0017$	$k_{\text{eq}}$	$0.01041 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$\sigma_8$	$0.835 \pm 0.017$	$100\theta_{\text{eq}}$	$0.8111 \pm 0.0076$	$\chi_{\text{MGS}}^2$	$2.71 \pm 0.74$
$S_8$	$0.834 \pm 0.020$	$100\theta_{s,\text{eq}}$	$0.4484 \pm 0.0039$	$\chi_{\text{DR12BAO}}^2$	$5.5 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.011$	$H(0.15)$	$74.32 \pm 0.73$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.618 \pm 0.013$	$D_{\text{M}}(0.15)$	$627.2 \pm 6.1$	$\chi_{\text{BAO}}^2$	$8.3 \pm 2.1$
$\sigma_8/h^{0.5}$	$1.004 \pm 0.019$	$H(0.38)$	$83.65 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$
$r_{\text{drag}} h$	$101.9 \pm 1.1$	$D_{\text{M}}(0.38)$	$1503 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.470 \pm 0.041$	$H(0.51)$	$89.89 \pm 0.50$		

Best-fit  $\chi_{\text{eff}}^2 = 8520.89$ ;  $\Delta\chi_{\text{eff}}^2 = 6293.31$ ;  $\bar{\chi}_{\text{eff}}^2 = 8541.50$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.90$ ;  $R - 1 = 0.00869$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.07 ( $\Delta$  -0.03) MGS: 2.43 ( $\Delta$  -0.24) DR12BAO: 4.45 ( $\Delta$  -0.16) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 396.52 ( $\Delta$  0.67) commander\_dx12\_v3\_2\_29: 23.60 ( $\Delta$  0.22) CamSpec like\_10.7HM: 7049.04 Hubble - H073p45: 6.22 ( $\Delta$  0.03) SN - JLA Pantheon18: 1035.91 ( $\Delta$  0.51)



19.10 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_lensing/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02219 \pm 0.00020$	$z_{\text{re}}$	$7.42 \pm 0.80$	$D_{\text{M}}(0.51)$	$1953 \pm 15$
$\Omega_c h^2$	$0.1201 \pm 0.0013$	$10^9 A_s$	$2.086 \pm 0.031$	$H(0.61)$	$95.24 \pm 0.43$
$100\theta_{MC}$	$1.04089 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$D_{\text{M}}(0.61)$	$2278 \pm 16$
$\tau$	$0.0518 \pm 0.0078$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$234.67 \pm 0.97$
$w$	$-0.998 \pm 0.081$	$D_{220}$	$5713 \pm 41$	$D_{\text{M}}(2.33)$	$5760 \pm 13$
$w_a$	$-0.29^{+0.35}_{-0.29}$	$D_{810}$	$2534 \pm 13$	$f\sigma_8(0.15)$	$0.4610 \pm 0.0078$
$\ln(10^{10} A_s)$	$3.038 \pm 0.015$	$D_{1420}$	$814.5 \pm 5.1$	$\sigma_8(0.15)$	$0.768 \pm 0.011$
$n_s$	$0.9642 \pm 0.0045$	$D_{2000}$	$229.7 \pm 1.8$	$f\sigma_8(0.38)$	$0.4860 \pm 0.0091$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9642 \pm 0.0045$	$\sigma_8(0.38)$	$0.682 \pm 0.010$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245318^{+0.000089}_{-0.000076}$	$f\sigma_8(0.51)$	$0.4874 \pm 0.0094$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246644^{+0.000090}_{-0.000076}$	$\sigma_8(0.51)$	$0.6383 \pm 0.0092$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.620 \pm 0.038$	$f\sigma_8(0.61)$	$0.4840 \pm 0.0095$
$A_{100}^{PS}$	$253 \pm 30$	Age/Gyr	$13.756 \pm 0.033$	$\sigma_8(0.61)$	$0.6073 \pm 0.0087$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.16 \pm 0.31$	$f\sigma_8(2.33)$	$0.3067 \pm 0.0045$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.55 \pm 0.33$	$\sigma_8(2.33)$	$0.3134 \pm 0.0035$
$A^{kSZ}$	$< 5.79$	$100\theta_*$	$1.04109 \pm 0.00043$	$f_{2000}^{143}$	$30.8 \pm 2.9$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.031$	$f_{2000}^{143 \times 217}$	$33.1 \pm 2.1$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.52 \pm 0.44$	$f_{2000}^{217}$	$107.7 \pm 2.0$
$H_0$	$69.25 \pm 0.76$	$r_{\text{drag}}$	$147.28 \pm 0.35$	$\chi_{\text{lensing}}^2$	$9.36 \pm 0.97$
$\Omega_{\Lambda}$	$0.7019 \pm 0.0071$	$k_{\text{D}}$	$0.14053 \pm 0.00044$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$\Omega_m$	$0.2981 \pm 0.0071$	$100\theta_{\text{D}}$	$0.16101 \pm 0.00025$	$\chi_{\text{lowl}}^2$	$23.31 \pm 0.89$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$z_{\text{eq}}$	$3399 \pm 31$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.4$
$\Omega_m h^3$	$0.0990 \pm 0.0014$	$k_{\text{eq}}$	$0.010375 \pm 0.000094$	$\chi_{\text{JLA}}^2$	$1036.2 \pm 1.7$
$\sigma_8$	$0.830 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8133 \pm 0.0057$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$S_8$	$0.827 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4495 \pm 0.0030$	$\chi_{\text{MGS}}^2$	$2.72 \pm 0.74$
$\sigma_8 \Omega_m^{0.5}$	$0.4532 \pm 0.0072$	$H(0.15)$	$74.27 \pm 0.70$	$\chi_{\text{DR12BAO}}^2$	$5.3 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6134 \pm 0.0086$	$D_{\text{M}}(0.15)$	$627.5 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.998 \pm 0.012$	$H(0.38)$	$83.65 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1504 \pm 13$	$\chi_{\text{BAO}}^2$	$8.2 \pm 2.1$
$\langle d^2 \rangle^{1/2}$	$2.458 \pm 0.027$	$H(0.51)$	$89.93 \pm 0.51$		

$\bar{\chi}_{\text{eff}}^2 = 8550.26$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.88$ ;  $R - 1 = 0.01140$



## 19.11 base\_w\_wa\_CamSpecHM\_TT\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_zre6p5/base\_w\_wa\_plikHM\_TT\_lowl\_lowE\_BAO\_Riess18\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02217 \pm 0.00020$	$z_{\text{re}}$	$7.65^{+0.51}_{-0.82}$	$D_{\text{M}}(0.51)$	$1953 \pm 16$
$\Omega_c h^2$	$0.1205 \pm 0.0018$	$10^9 A_s$	$2.097^{+0.024}_{-0.033}$	$H(0.61)$	$95.18 \pm 0.44$
$100\theta_{MC}$	$1.04086 \pm 0.00045$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.013$	$D_{\text{M}}(0.61)$	$2277 \pm 17$
$\tau$	$0.0538^{+0.0045}_{-0.0083}$	$D_{40}$	$1231 \pm 14$	$H(2.33)$	$234.77 \pm 0.96$
$w$	$-0.992^{+0.079}_{-0.088}$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(2.33)$	$5761 \pm 13$
$w_a$	$-0.35^{+0.42}_{-0.32}$	$D_{810}$	$2535 \pm 14$	$f\sigma_8(0.15)$	$0.465 \pm 0.011$
$\ln(10^{10} A_s)$	$3.043^{+0.011}_{-0.016}$	$D_{1420}$	$814.5 \pm 5.1$	$\sigma_8(0.15)$	$0.774 \pm 0.016$
$n_s$	$0.9635 \pm 0.0051$	$D_{2000}$	$229.8 \pm 1.8$	$f\sigma_8(0.38)$	$0.490 \pm 0.013$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9635 \pm 0.0051$	$\sigma_8(0.38)$	$0.687 \pm 0.014$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245308^{+0.000095}_{-0.000078}$	$f\sigma_8(0.51)$	$0.492 \pm 0.013$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246634^{+0.000095}_{-0.000079}$	$\sigma_8(0.51)$	$0.642 \pm 0.013$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.625 \pm 0.039$	$f\sigma_8(0.61)$	$0.488 \pm 0.014$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.754 \pm 0.034$	$\sigma_8(0.61)$	$0.611 \pm 0.012$
$A_{143}^{PS}$	$45 \pm 9$	$z_*$	$1090.23 \pm 0.36$	$f\sigma_8(2.33)$	$0.3086^{+0.0063}_{-0.0056}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.45 \pm 0.42$	$\sigma_8(2.33)$	$0.3149 \pm 0.0045$
$A^{kSZ}$	$< 5.69$	$100\theta_*$	$1.04106 \pm 0.00044$	$f_{2000}^{143}$	$30.6 \pm 2.9$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.875 \pm 0.040$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.50 \pm 0.44$	$f_{2000}^{217}$	$107.6 \pm 2.0$
$H_0$	$69.26 \pm 0.77$	$r_{\text{drag}}$	$147.18 \pm 0.43$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.7$
$\Omega_{\Lambda}$	$0.7011 \pm 0.0073$	$k_{\text{D}}$	$0.14061 \pm 0.00049$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\Omega_m$	$0.2989 \pm 0.0073$	$100\theta_{\text{D}}$	$0.16102 \pm 0.00026$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.4$
$\Omega_m h^2$	$0.1433 \pm 0.0017$	$z_{\text{eq}}$	$3410 \pm 41$	$\chi_{\text{JLA}}^2$	$1036.3 \pm 1.7$
$\Omega_m h^3$	$0.0993 \pm 0.0017$	$k_{\text{eq}}$	$0.01041 \pm 0.00013$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$\sigma_8$	$0.836 \pm 0.017$	$100\theta_{\text{eq}}$	$0.8114 \pm 0.0076$	$\chi_{\text{MGS}}^2$	$2.71 \pm 0.74$
$S_8$	$0.834 \pm 0.020$	$100\theta_{s,\text{eq}}$	$0.4485 \pm 0.0039$	$\chi_{\text{DR12BAO}}^2$	$5.4 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.457 \pm 0.011$	$H(0.15)$	$74.32 \pm 0.73$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.618 \pm 0.013$	$D_{\text{M}}(0.15)$	$627.2 \pm 6.1$	$\chi_{\text{BAO}}^2$	$8.3 \pm 2.1$
$\sigma_8/h^{0.5}$	$1.005 \pm 0.019$	$H(0.38)$	$83.65 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4337 \pm 3000$
$r_{\text{drag}} h$	$101.9 \pm 1.1$	$D_{\text{M}}(0.38)$	$1503 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.472 \pm 0.041$	$H(0.51)$	$89.89 \pm 0.50$		

$$\bar{\chi}_{\text{eff}}^2 = 8541.22; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.88; R - 1 = 0.00801$$



Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02220 \pm 0.00020$	$z_{\text{re}}$	$7.61^{+0.49}_{-0.80}$	$D_{\text{M}}(0.51)$	$1954 \pm 15$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$10^9 A_s$	$2.093^{+0.021}_{-0.030}$	$H(0.61)$	$95.25 \pm 0.43$
$100\theta_{MC}$	$1.04091 \pm 0.00043$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.61)$	$2278 \pm 16$
$\tau$	$0.0535^{+0.0043}_{-0.0081}$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$234.66 \pm 0.98$
$w$	$-1.000 \pm 0.080$	$D_{220}$	$5713 \pm 41$	$D_{\text{M}}(2.33)$	$5759 \pm 13$
$w_a$	$-0.27^{+0.35}_{-0.28}$	$D_{810}$	$2534 \pm 13$	$f\sigma_8(0.15)$	$0.4610 \pm 0.0079$
$\ln(10^{10} A_s)$	$3.041^{+0.010}_{-0.014}$	$D_{1420}$	$814.5 \pm 5.1$	$\sigma_8(0.15)$	$0.769 \pm 0.011$
$n_s$	$0.9646 \pm 0.0044$	$D_{2000}$	$229.8 \pm 1.8$	$f\sigma_8(0.38)$	$0.4859 \pm 0.0091$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9646 \pm 0.0044$	$\sigma_8(0.38)$	$0.682 \pm 0.010$
$A_{217}^{CIB}$	$44 \pm 8$	$Y_P$	$0.245321^{+0.000089}_{-0.000075}$	$f\sigma_8(0.51)$	$0.4873 \pm 0.0094$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246648^{+0.000090}_{-0.000076}$	$\sigma_8(0.51)$	$0.6385 \pm 0.0092$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$10^5 D/H$	$2.619 \pm 0.038$	$f\sigma_8(0.61)$	$0.4838 \pm 0.0095$
$A_{100}^{PS}$	$252 \pm 30$	Age/Gyr	$13.756 \pm 0.033$	$\sigma_8(0.61)$	$0.6075 \pm 0.0087$
$A_{143}^{PS}$	$44 \pm 9$	$z_*$	$1090.13 \pm 0.31$	$f\sigma_8(2.33)$	$0.3069 \pm 0.0045$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.58 \pm 0.32$	$\sigma_8(2.33)$	$0.3137 \pm 0.0035$
$A^{kSZ}$	$< 5.79$	$100\theta_*$	$1.04111 \pm 0.00043$	$f_{2000}^{143}$	$30.7 \pm 2.9$
$c_{100}$	$0.9985^{+0.0018}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.887 \pm 0.031$	$f_{2000}^{143 \times 217}$	$33.0 \pm 2.1$
$c_{217}$	$0.9997 \pm 0.0019$	$z_{\text{drag}}$	$1059.53 \pm 0.44$	$f_{2000}^{217}$	$107.6 \pm 1.9$
$H_0$	$69.24 \pm 0.76$	$r_{\text{drag}}$	$147.30 \pm 0.34$	$\chi_{\text{lensing}}^2$	$9.35 \pm 0.98$
$\Omega_{\Lambda}$	$0.7021 \pm 0.0070$	$k_{\text{D}}$	$0.14051 \pm 0.00044$	$\chi_{\text{simall}}^2$	$396.7 \pm 1.5$
$\Omega_m$	$0.2979 \pm 0.0070$	$100\theta_{\text{D}}$	$0.16100 \pm 0.00026$	$\chi_{\text{lowl}}^2$	$23.28 \pm 0.89$
$\Omega_m h^2$	$0.1428 \pm 0.0013$	$z_{\text{eq}}$	$3396 \pm 30$	$\chi_{\text{H073p45}}^2$	$6.6 \pm 2.3$
$\Omega_m h^3$	$0.0989 \pm 0.0014$	$k_{\text{eq}}$	$0.010366 \pm 0.000092$	$\chi_{\text{JLA}}^2$	$1036.2 \pm 1.7$
$\sigma_8$	$0.830 \pm 0.012$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0056$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$S_8$	$0.827 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4498 \pm 0.0029$	$\chi_{\text{MGS}}^2$	$2.72 \pm 0.74$
$\sigma_8 \Omega_m^{0.5}$	$0.4532 \pm 0.0072$	$H(0.15)$	$74.25 \pm 0.70$	$\chi_{\text{DR12BAO}}^2$	$5.3 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6135 \pm 0.0086$	$D_{\text{M}}(0.15)$	$627.6 \pm 6.0$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.998 \pm 0.012$	$H(0.38)$	$83.64 \pm 0.63$	$\chi_{\text{CMB}}^2$	$4346 \pm 3000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1504 \pm 13$	$\chi_{\text{BAO}}^2$	$8.1 \pm 2.1$
$\langle d^2 \rangle^{1/2}$	$2.459 \pm 0.027$	$H(0.51)$	$89.93 \pm 0.52$		

$\bar{\chi}_{\text{eff}}^2 = 8549.95$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.82$ ;  $R - 1 = 0.01139$



19.13 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_Pantheon18/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_P

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$z_{\text{re}}$	$7.54 \pm 0.79$	$D_{\text{M}}(0.51)$	$1951 \pm 15$
$\Omega_c h^2$	$0.1200 \pm 0.0013$	$10^9 A_s$	$2.093 \pm 0.034$	$H(0.61)$	$95.37 \pm 0.40$
$100\theta_{MC}$	$1.04090 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.61)$	$2275 \pm 16$
$\tau$	$0.0532 \pm 0.0078$	$D_{40}$	$1228 \pm 13$	$H(2.33)$	$234.83 \pm 0.93$
$w$	$-0.996 \pm 0.080$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$w_a$	$-0.28^{+0.36}_{-0.28}$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.4604 \pm 0.0085$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{1420}$	$816.4 \pm 4.9$	$\sigma_8(0.15)$	$0.768 \pm 0.013$
$n_s$	$0.9653 \pm 0.0043$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.38)$	$0.4853 \pm 0.0099$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9653 \pm 0.0043$	$\sigma_8(0.38)$	$0.682 \pm 0.012$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245381^{+0.000063}_{-0.000056}$	$f\sigma_8(0.51)$	$0.487 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246708^{+0.000063}_{-0.000057}$	$\sigma_8(0.51)$	$0.638 \pm 0.011$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.592 \pm 0.028$	$f\sigma_8(0.61)$	$0.483 \pm 0.011$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.742^{+0.029}_{-0.032}$	$\sigma_8(0.61)$	$0.607 \pm 0.010$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.96 \pm 0.26$	$f\sigma_8(2.33)$	$0.3068 \pm 0.0053$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.46 \pm 0.30$	$\sigma_8(2.33)$	$0.3136 \pm 0.0042$
$A^{kSZ}$	$< 5.17$	$100\theta_*$	$1.04109 \pm 0.00030$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.876 \pm 0.029$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.86 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$H_0$	$69.30 \pm 0.76$	$r_{\text{drag}}$	$147.13 \pm 0.31$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$\Omega_{\Lambda}$	$0.7023 \pm 0.0070$	$k_{\text{D}}$	$0.14080 \pm 0.00036$	$\chi_{\text{lowl}}^2$	$23.22 \pm 0.91$
$\Omega_m$	$0.2977 \pm 0.0070$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{H073p45}}^2$	$6.5 \pm 2.3$
$\Omega_m h^2$	$0.1430 \pm 0.0012$	$z_{\text{eq}}$	$3401 \pm 30$	$\chi_{\text{JLA}}^2$	$1036.2 \pm 1.6$
$\Omega_m h^3$	$0.0991 \pm 0.0014$	$k_{\text{eq}}$	$0.010380 \pm 0.000091$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$\sigma_8$	$0.830 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8135 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$2.71 \pm 0.74$
$S_8$	$0.827 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4495 \pm 0.0029$	$\chi_{\text{DR12BAO}}^2$	$5.2 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4528 \pm 0.0082$	$H(0.15)$	$74.35 \pm 0.71$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.613 \pm 0.010$	$D_{\text{M}}(0.15)$	$627.0 \pm 6.0$	$\chi_{\text{BAO}}^2$	$8.1 \pm 2.1$
$\sigma_8/h^{0.5}$	$0.997 \pm 0.015$	$H(0.38)$	$83.75 \pm 0.62$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1502 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.457 \pm 0.033$	$H(0.51)$	$90.05 \pm 0.49$		

Best-fit  $\chi_{\text{eff}}^2 = 12968.70$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.52$ ;  $\bar{\chi}_{\text{eff}}^2 = 12992.43$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.17$ ;  $R - 1 = 0.01047$   
 $\chi_{\text{eff}}^2$ : BAO - 6DF: 0.10 ( $\Delta$  0.00) MGS: 2.67 ( $\Delta$  0.00) DR12BAO: 4.36 ( $\Delta$  -0.14) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.84 ( $\Delta$  -0.15) commander\_dx12\_v3\_2\_29: 22.83 ( $\Delta$  -0.38) CamSpec like\_10.7HM\_1400\_unified: 11499.24 Hubble - H073p45: 6.18 ( $\Delta$  0.28) SN - JLA Pantheon18: 1035.34 ( $\Delta$  -0.05)



## 19.14 base\_w\_wa\_CamSpecHM\_TTTEEE\_lowl\_lowE\_BAO\_Riess18\_Pantheon18\_post\_lensing/base\_w\_wa\_plikHM\_TTTEEE\_lowl\_lowE\_BA

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02235 \pm 0.00015$	$z_{\text{re}}$	$7.50 \pm 0.75$	$D_{\text{M}}(0.51)$	$1951 \pm 15$
$\Omega_c h^2$	$0.1198 \pm 0.0011$	$10^9 A_s$	$2.091 \pm 0.030$	$H(0.61)$	$95.40 \pm 0.40$
$100\theta_{MC}$	$1.04092 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$D_{\text{M}}(0.61)$	$2275 \pm 16$
$\tau$	$0.0529 \pm 0.0074$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$234.78 \pm 0.93$
$w$	$-0.998 \pm 0.078$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(2.33)$	$5752 \pm 10$
$w_a$	$-0.26^{+0.33}_{-0.27}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4591 \pm 0.0068$
$\ln(10^{10} A_s)$	$3.040 \pm 0.014$	$D_{1420}$	$816.4 \pm 4.8$	$\sigma_8(0.15)$	$0.767 \pm 0.010$
$n_s$	$0.9655 \pm 0.0040$	$D_{2000}$	$230.6 \pm 1.6$	$f\sigma_8(0.38)$	$0.4839 \pm 0.0080$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9655 \pm 0.0040$	$\sigma_8(0.38)$	$0.6805 \pm 0.0093$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245386^{+0.000063}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4853 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246713^{+0.000063}_{-0.000056}$	$\sigma_8(0.51)$	$0.6370 \pm 0.0087$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.589 \pm 0.028$	$f\sigma_8(0.61)$	$0.4819 \pm 0.0084$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.742 \pm 0.030$	$\sigma_8(0.61)$	$0.6061 \pm 0.0082$
$A_{143}^{PS}$	$43 \pm 9$	$z_*$	$1089.93 \pm 0.24$	$f\sigma_8(2.33)$	$0.3062 \pm 0.0043$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.50 \pm 0.26$	$\sigma_8(2.33)$	$0.3132 \pm 0.0035$
$A^{kSZ}$	$< 5.24$	$100\theta_*$	$1.04110 \pm 0.00030$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.880 \pm 0.025$	$f_{2000}^{143 \times 217}$	$32.1 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.88 \pm 0.32$	$f_{2000}^{217}$	$106.9 \pm 1.9$
$H_0$	$69.31 \pm 0.76$	$r_{\text{drag}}$	$147.17 \pm 0.27$	$\chi_{\text{lensing}}^2$	$9.16 \pm 0.77$
$\Omega_{\Lambda}$	$0.7027 \pm 0.0069$	$k_{\text{D}}$	$0.14077 \pm 0.00032$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.5$
$\Omega_m$	$0.2973 \pm 0.0069$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi_{\text{lowl}}^2$	$23.16 \pm 0.81$
$\Omega_m h^2$	$0.1428 \pm 0.0010$	$z_{\text{eq}}$	$3397 \pm 25$	$\chi_{\text{H073p45}}^2$	$6.4 \pm 2.3$
$\Omega_m h^3$	$0.0990 \pm 0.0013$	$k_{\text{eq}}$	$0.010367 \pm 0.000076$	$\chi_{\text{JLA}}^2$	$1036.1 \pm 1.6$
$\sigma_8$	$0.828 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8143 \pm 0.0047$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4499 \pm 0.0024$	$\chi_{\text{MGS}}^2$	$2.73 \pm 0.74$
$\sigma_8 \Omega_m^{0.5}$	$0.4515 \pm 0.0061$	$H(0.15)$	$74.34 \pm 0.69$	$\chi_{\text{DR12BAO}}^2$	$5.2 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6115 \pm 0.0074$	$D_{\text{M}}(0.15)$	$627.0 \pm 5.9$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.3$
$\sigma_8/h^{0.5}$	$0.995 \pm 0.011$	$H(0.38)$	$83.76 \pm 0.61$	$\chi_{\text{CMB}}^2$	$7365 \pm 5000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1502 \pm 13$	$\chi_{\text{BAO}}^2$	$8.1 \pm 2.1$
$\langle d^2 \rangle^{1/2}$	$2.453 \pm 0.024$	$H(0.51)$	$90.07 \pm 0.49$		

 $\bar{\chi}_{\text{eff}}^2 = 13001.06; \Delta\bar{\chi}_{\text{eff}}^2 = 9151.04; R - 1 = 0.01205$



Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02234 \pm 0.00015$	$z_{\text{re}}$	$7.69^{+0.54}_{-0.79}$	$D_{\text{M}}(0.51)$	$1951 \pm 15$
$\Omega_c h^2$	$0.1199 \pm 0.0013$	$10^9 A_s$	$2.099^{+0.024}_{-0.034}$	$H(0.61)$	$95.37 \pm 0.40$
$100\theta_{MC}$	$1.04091 \pm 0.00031$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.012$	$D_{\text{M}}(0.61)$	$2275 \pm 16$
$\tau$	$0.0546^{+0.0048}_{-0.0082}$	$D_{40}$	$1228 \pm 13$	$H(2.33)$	$234.83 \pm 0.93$
$w$	$-0.997 \pm 0.080$	$D_{220}$	$5726 \pm 39$	$D_{\text{M}}(2.33)$	$5753 \pm 10$
$w_a$	$-0.27^{+0.36}_{-0.28}$	$D_{810}$	$2537 \pm 14$	$f\sigma_8(0.15)$	$0.4608 \pm 0.0084$
$\ln(10^{10} A_s)$	$3.044^{+0.012}_{-0.016}$	$D_{1420}$	$816.4 \pm 4.9$	$\sigma_8(0.15)$	$0.769 \pm 0.013$
$n_s$	$0.9654 \pm 0.0043$	$D_{2000}$	$230.7 \pm 1.6$	$f\sigma_8(0.38)$	$0.4858 \pm 0.0098$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$n_{s,0.002}$	$0.9654 \pm 0.0043$	$\sigma_8(0.38)$	$0.683 \pm 0.011$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245383^{+0.000063}_{-0.000056}$	$f\sigma_8(0.51)$	$0.487 \pm 0.010$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246710^{+0.000063}_{-0.000056}$	$\sigma_8(0.51)$	$0.639 \pm 0.011$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.591 \pm 0.028$	$f\sigma_8(0.61)$	$0.484 \pm 0.010$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.742 \pm 0.030$	$\sigma_8(0.61)$	$0.608 \pm 0.010$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.95 \pm 0.26$	$f\sigma_8(2.33)$	$0.3071^{+0.0055}_{-0.0049}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.47 \pm 0.30$	$\sigma_8(2.33)$	$0.3140 \pm 0.0040$
$A^{kSZ}$	$< 5.14$	$100\theta_*$	$1.04110 \pm 0.00030$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.877 \pm 0.029$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.87 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$H_0$	$69.31 \pm 0.76$	$r_{\text{drag}}$	$147.14 \pm 0.31$	$\chi_{\text{small}}^2$	$396.8 \pm 1.7$
$\Omega_{\Lambda}$	$0.7024 \pm 0.0069$	$k_{\text{D}}$	$0.14080 \pm 0.00036$	$\chi_{\text{lowl}}^2$	$23.23 \pm 0.91$
$\Omega_m$	$0.2976 \pm 0.0069$	$100\theta_{\text{D}}$	$0.16080 \pm 0.00019$	$\chi_{\text{H073p45}}^2$	$6.4 \pm 2.3$
$\Omega_m h^2$	$0.1429 \pm 0.0012$	$z_{\text{eq}}$	$3400 \pm 30$	$\chi_{\text{JLA}}^2$	$1036.2 \pm 1.6$
$\Omega_m h^3$	$0.0991 \pm 0.0014$	$k_{\text{eq}}$	$0.010377 \pm 0.000091$	$\chi_{6\text{DF}}^2$	$0.14 \pm 0.15$
$\sigma_8$	$0.831 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0055$	$\chi_{\text{MGS}}^2$	$2.72 \pm 0.74$
$S_8$	$0.827 \pm 0.015$	$100\theta_{\text{s,eq}}$	$0.4496 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$5.2 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4532 \pm 0.0081$	$H(0.15)$	$74.34 \pm 0.71$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.614 \pm 0.010$	$D_{\text{M}}(0.15)$	$627.0 \pm 6.0$	$\chi_{\text{BAO}}^2$	$8.1 \pm 2.1$
$\sigma_8/h^{0.5}$	$0.998 \pm 0.014$	$H(0.38)$	$83.75 \pm 0.62$	$\chi_{\text{CMB}}^2$	$7356 \pm 5000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1502 \pm 13$		
$\langle d^2 \rangle^{1/2}$	$2.460 \pm 0.033$	$H(0.51)$	$90.05 \pm 0.49$		

$\bar{\chi}_{\text{eff}}^2 = 12992.15$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9151.09$ ;  $R - 1 = 0.01047$



Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.64^{+0.53}_{-0.75}$	$D_{\text{M}}(0.51)$	$1951 \pm 15$
$\Omega_c h^2$	$0.1197 \pm 0.0011$	$10^9 A_s$	$2.096^{+0.022}_{-0.031}$	$H(0.61)$	$95.40 \pm 0.40$
$100\theta_{MC}$	$1.04093 \pm 0.00030$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$D_{\text{M}}(0.61)$	$2275 \pm 16$
$\tau$	$0.0542^{+0.0048}_{-0.0077}$	$D_{40}$	$1227 \pm 12$	$H(2.33)$	$234.78 \pm 0.93$
$w$	$-0.9999 \pm 0.078$	$D_{220}$	$5727 \pm 39$	$D_{\text{M}}(2.33)$	$5752 \pm 10$
$w_a$	$-0.25^{+0.32}_{-0.26}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4593 \pm 0.0068$
$\ln(10^{10} A_s)$	$3.042^{+0.011}_{-0.014}$	$D_{1420}$	$816.4 \pm 4.8$	$\sigma_8(0.15)$	$0.767 \pm 0.010$
$n_s$	$0.9657 \pm 0.0040$	$D_{2000}$	$230.6 \pm 1.6$	$f\sigma_8(0.38)$	$0.4841 \pm 0.0080$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$n_{s,0.002}$	$0.9657 \pm 0.0040$	$\sigma_8(0.38)$	$0.6809 \pm 0.0093$
$A_{217}^{CIB}$	$43 \pm 8$	$Y_P$	$0.245388^{+0.000062}_{-0.000055}$	$f\sigma_8(0.51)$	$0.4855 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$Y_P^{\text{BBN}}$	$0.246715^{+0.000063}_{-0.000055}$	$\sigma_8(0.51)$	$0.6374 \pm 0.0087$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$10^5 D/H$	$2.588 \pm 0.028$	$f\sigma_8(0.61)$	$0.4820 \pm 0.0084$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.742 \pm 0.030$	$\sigma_8(0.61)$	$0.6065 \pm 0.0082$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.91 \pm 0.24$	$f\sigma_8(2.33)$	$0.3064 \pm 0.0043$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.52 \pm 0.25$	$\sigma_8(2.33)$	$0.3134 \pm 0.0034$
$A^{kSZ}$	$< 5.21$	$100\theta_*$	$1.04111 \pm 0.00030$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$c_{100}$	$0.9986^{+0.0017}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.881 \pm 0.024$	$f_{2000}^{143 \times 217}$	$32.0 \pm 1.9$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.89 \pm 0.32$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$H_0$	$69.31 \pm 0.76$	$r_{\text{drag}}$	$147.18 \pm 0.27$	$\chi^2_{\text{lensing}}$	$9.15 \pm 0.77$
$\Omega_{\Lambda}$	$0.7028 \pm 0.0069$	$k_{\text{D}}$	$0.14076 \pm 0.00032$	$\chi^2_{\text{simall}}$	$396.7 \pm 1.5$
$\Omega_m$	$0.2972 \pm 0.0069$	$100\theta_{\text{D}}$	$0.16079 \pm 0.00019$	$\chi^2_{\text{lowl}}$	$23.15 \pm 0.81$
$\Omega_m h^2$	$0.1427 \pm 0.0010$	$z_{\text{eq}}$	$3395 \pm 24$	$\chi^2_{\text{H073p45}}$	$6.4 \pm 2.3$
$\Omega_m h^3$	$0.0989 \pm 0.0013$	$k_{\text{eq}}$	$0.010362 \pm 0.000075$	$\chi^2_{\text{JLA}}$	$1036.2 \pm 1.6$
$\sigma_8$	$0.829 \pm 0.011$	$100\theta_{\text{eq}}$	$0.8146 \pm 0.0046$	$\chi^2_{6\text{DF}}$	$0.14 \pm 0.15$
$S_8$	$0.825 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4501 \pm 0.0024$	$\chi^2_{\text{MGS}}$	$2.73 \pm 0.74$
$\sigma_8 \Omega_m^{0.5}$	$0.4516 \pm 0.0061$	$H(0.15)$	$74.33 \pm 0.69$	$\chi^2_{\text{DR12BAO}}$	$5.2 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6117 \pm 0.0074$	$D_{\text{M}}(0.15)$	$627.0 \pm 5.9$	$\chi^2_{\text{prior}}$	$9.6 \pm 4.3$
$\sigma_8/h^{0.5}$	$0.995 \pm 0.011$	$H(0.38)$	$83.76 \pm 0.61$	$\chi^2_{\text{CMB}}$	$7365 \pm 5000$
$r_{\text{drag}} h$	$102.0 \pm 1.1$	$D_{\text{M}}(0.38)$	$1502 \pm 13$	$\chi^2_{\text{BAO}}$	$8.1 \pm 2.1$
$\langle d^2 \rangle^{1/2}$	$2.454 \pm 0.024$	$H(0.51)$	$90.07 \pm 0.49$		

$\bar{\chi}^2_{\text{eff}} = 13000.80$ ;  $\Delta\bar{\chi}^2_{\text{eff}} = 9151.01$ ;  $R - 1 = 0.01150$



## 20 yhe

### 20.1 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE/base\_yhe\_plikHM\_TT\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02211 \pm 0.00030$	$r_{\text{drag}} h$	$98.5 \pm 1.8$	$D_{\text{M}}(0.15)$	$647.5 \pm 9.8$
$\Omega_c h^2$	$0.1206 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.452 \pm 0.043$	$H(0.38)$	$82.53 \pm 0.74$
$100\theta_{MC}$	$1.04077 \pm 0.00089$	$z_{\text{re}}$	$7.48 \pm 0.84$	$D_{\text{M}}(0.38)$	$1542 \pm 20$
$\tau$	$0.0520 \pm 0.0081$	$10^9 A_s$	$2.089 \pm 0.037$	$H(0.51)$	$89.33 \pm 0.61$
$Y_{He}$	$0.244 \pm 0.021$	$10^9 A_s e^{-2\tau}$	$1.883 \pm 0.015$	$D_{\text{M}}(0.51)$	$1996 \pm 23$
$\ln(10^{10} A_s)$	$3.039 \pm 0.018$	$D_{40}$	$1232 \pm 22$	$H(0.61)$	$95.02 \pm 0.52$
$n_s$	$0.963 \pm 0.011$	$D_{220}$	$5708 \pm 42$	$D_{\text{M}}(0.61)$	$2322 \pm 25$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$236.7 \pm 1.3$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.3 \pm 5.4$	$D_{\text{M}}(2.33)$	$5778 \pm 26$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 2.5$	$f\sigma_8(0.15)$	$0.463 \pm 0.013$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.963 \pm 0.011$	$\sigma_8(0.15)$	$0.7487 \pm 0.0085$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.244 \pm 0.021$	$f\sigma_8(0.38)$	$0.4793 \pm 0.0097$
$A_{143}^{PS}$	$45 \pm 10$	$Y_P^{\text{BBN}}$	$0.245 \pm 0.021$	$\sigma_8(0.38)$	$0.6627 \pm 0.0074$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.830 \pm 0.058$	$f\sigma_8(0.51)$	$0.4768 \pm 0.0083$
$A^{kSZ}$	$< 5.84$	$z_*$	$1090.27 \pm 0.67$	$\sigma_8(0.51)$	$0.6198 \pm 0.0069$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.48 \pm 0.49$	$f\sigma_8(0.61)$	$0.4711 \pm 0.0074$
$c_{217}$	$0.9997^{+0.0021}_{-0.0023}$	$100\theta_*$	$1.04101 \pm 0.00050$	$\sigma_8(0.61)$	$0.5895 \pm 0.0066$
$H_0$	$66.9 \pm 1.1$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.879 \pm 0.045$	$f\sigma_8(2.33)$	$0.2969 \pm 0.0035$
$\Omega_\Lambda$	$0.679 \pm 0.015$	$z_{\text{drag}}$	$1059.4 \pm 1.2$	$\sigma_8(2.33)$	$0.3057 \pm 0.0038$
$\Omega_m$	$0.321 \pm 0.015$	$r_{\text{drag}}$	$147.23 \pm 0.50$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_m h^2$	$0.1433 \pm 0.0021$	$k_{\text{D}}$	$0.14056 \pm 0.00077$	$f_{2000}^{143 \times 217}$	$33.2 \pm 3.0$
$\Omega_m h^3$	$0.09588 \pm 0.00077$	$100\theta_{\text{D}}$	$0.16104 \pm 0.00079$	$f_{2000}^{217}$	$107.8 \pm 2.7$
$\sigma_8$	$0.8112 \pm 0.0097$	$z_{\text{eq}}$	$3410 \pm 49$	$\chi_{\text{small}}^2$	$396.9 \pm 1.7$
$S_8$	$0.838 \pm 0.025$	$k_{\text{eq}}$	$0.01041 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$24.0 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.459 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8112 \pm 0.0094$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.610 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4485 \pm 0.0048$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8/h^{0.5}$	$0.992 \pm 0.016$	$H(0.15)$	$72.27 \pm 0.97$		

Best-fit  $\chi_{\text{eff}}^2 = 7471.80$ ;  $\Delta\chi_{\text{eff}}^2 = 6292.24$ ;  $\bar{\chi}_{\text{eff}}^2 = 7492.39$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.97$ ;  $R - 1 = 0.00648$

$\chi_{\text{eff}}^2$ : CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 395.89 ( $\Delta$  0.05) commander\_dx12\_v3.2.29: 23.34 ( $\Delta$  -0.35) CamSpec like\_10.7HM: 7050.19



## 20.2 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02227 \pm 0.00025$	$\langle d^2 \rangle^{1/2}$	$2.423 \pm 0.029$	$D_M(0.38)$	$1527 \pm 11$
$\Omega_c h^2$	$0.1190 \pm 0.0012$	$z_{\text{re}}$	$7.65 \pm 0.81$	$H(0.51)$	$89.76 \pm 0.38$
$100\theta_{MC}$	$1.04122 \pm 0.00074$	$10^9 A_s$	$2.093 \pm 0.037$	$D_M(0.51)$	$1979 \pm 13$
$\tau$	$0.0539 \pm 0.0079$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.015$	$H(0.61)$	$95.36 \pm 0.35$
$Y_{He}$	$0.251 \pm 0.019$	$D_{40}$	$1220 \pm 17$	$D_M(0.61)$	$2303 \pm 14$
$\ln(10^{10} A_s)$	$3.041 \pm 0.018$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.80 \pm 0.83$
$n_s$	$0.9692 \pm 0.0083$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5762 \pm 18$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.5 \pm 5.3$	$f\sigma_8(0.15)$	$0.4544 \pm 0.0078$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.3 \pm 2.4$	$\sigma_8(0.15)$	$0.7473 \pm 0.0083$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9692 \pm 0.0083$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0068$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.5}$	$Y_P$	$0.251 \pm 0.019$	$\sigma_8(0.38)$	$0.6627 \pm 0.0073$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.019$	$f\sigma_8(0.51)$	$0.4720 \pm 0.0063$
$A_{143}^{PS}$	$46 \pm 10$	Age/Gyr	$13.794 \pm 0.043$	$\sigma_8(0.51)$	$0.6203 \pm 0.0069$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.22 \pm 0.67$	$f\sigma_8(0.61)$	$0.4672 \pm 0.0059$
$A^{kSZ}$	$< 6.10$	$r_*$	$144.76 \pm 0.38$	$\sigma_8(0.61)$	$0.5902 \pm 0.0065$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04125 \pm 0.00043$	$f\sigma_8(2.33)$	$0.2977 \pm 0.0033$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.902 \pm 0.037$	$\sigma_8(2.33)$	$0.3070 \pm 0.0035$
$H_0$	$67.74 \pm 0.62$	$z_{\text{drag}}$	$1059.8 \pm 1.1$	$f_{2000}^{143}$	$32 \pm 4$
$\Omega_\Lambda$	$0.6907 \pm 0.0076$	$r_{\text{drag}}$	$147.46 \pm 0.42$	$f_{2000}^{143 \times 217}$	$33.7 \pm 3.0$
$\Omega_m$	$0.3093 \pm 0.0076$	$k_D$	$0.14014 \pm 0.00060$	$f_{2000}^{217}$	$108.3 \pm 2.7$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_D$	$0.16126 \pm 0.00075$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_m h^3$	$0.09610 \pm 0.00073$	$z_{\text{eq}}$	$3375 \pm 29$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.3$
$\sigma_8$	$0.8085 \pm 0.0092$	$k_{\text{eq}}$	$0.010301 \pm 0.000089$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.074$
$S_8$	$0.821 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8182 \pm 0.0053$	$\chi_{\text{MGS}}^2$	$1.42 \pm 0.55$
$\sigma_8 \Omega_m^{0.5}$	$0.4496 \pm 0.0083$	$100\theta_{s,\text{eq}}$	$0.4520 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6029 \pm 0.0084$	$H(0.15)$	$72.99 \pm 0.55$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.012$	$D_M(0.15)$	$640.2 \pm 5.3$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$r_{\text{drag}} h$	$99.89 \pm 0.98$	$H(0.38)$	$83.06 \pm 0.44$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 7498.32; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.79; R - 1 = 0.01513$$



### 20.3 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02212 \pm 0.00028$	$r_{\text{drag}} h$	$98.7 \pm 1.4$	$D_{\text{M}}(0.15)$	$646.6 \pm 7.8$
$\Omega_c h^2$	$0.1203 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.448 \pm 0.029$	$H(0.38)$	$82.58 \pm 0.61$
$100\theta_{MC}$	$1.04074 \pm 0.00085$	$z_{\text{re}}$	$7.49 \pm 0.83$	$D_{\text{M}}(0.38)$	$1540 \pm 16$
$\tau$	$0.0522 \pm 0.0080$	$10^9 A_s$	$2.088 \pm 0.035$	$H(0.51)$	$89.36 \pm 0.52$
$Y_{He}$	$0.242 \pm 0.021$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.014$	$D_{\text{M}}(0.51)$	$1994 \pm 19$
$\ln(10^{10} A_s)$	$3.039 \pm 0.017$	$D_{40}$	$1233 \pm 19$	$H(0.61)$	$95.03 \pm 0.45$
$n_s$	$0.9626 \pm 0.0099$	$D_{220}$	$5711 \pm 41$	$D_{\text{M}}(0.61)$	$2320 \pm 20$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$236.48 \pm 0.96$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.6 \pm 5.3$	$D_{\text{M}}(2.33)$	$5777 \pm 23$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.8 \pm 2.5$	$f\sigma_8(0.15)$	$0.4612 \pm 0.0082$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$n_{s,0.002}$	$0.9626 \pm 0.0099$	$\sigma_8(0.15)$	$0.7477 \pm 0.0073$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.242 \pm 0.021$	$f\sigma_8(0.38)$	$0.4779 \pm 0.0063$
$A_{143}^{PS}$	$44 \pm 10$	$Y_P^{\text{BBN}}$	$0.244 \pm 0.021$	$\sigma_8(0.38)$	$0.6620 \pm 0.0068$
$A_{217}^{PS}$	$108_{-10}^{+20}$	Age/Gyr	$13.829 \pm 0.053$	$f\sigma_8(0.51)$	$0.4756 \pm 0.0055$
$A^{kSZ}$	$< 5.76$	$z_*$	$1090.16 \pm 0.66$	$\sigma_8(0.51)$	$0.6192 \pm 0.0065$
$c_{100}$	$0.9985_{-0.0013}^{+0.0017}$	$r_*$	$144.56 \pm 0.39$	$f\sigma_8(0.61)$	$0.4701 \pm 0.0050$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04102 \pm 0.00047$	$\sigma_8(0.61)$	$0.5890 \pm 0.0063$
$H_0$	$67.00 \pm 0.89$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.886 \pm 0.037$	$f\sigma_8(2.33)$	$0.2967 \pm 0.0034$
$\Omega_\Lambda$	$0.681 \pm 0.011$	$z_{\text{drag}}$	$1059.3 \pm 1.2$	$\sigma_8(2.33)$	$0.3056 \pm 0.0038$
$\Omega_m$	$0.319 \pm 0.011$	$r_{\text{drag}}$	$147.31 \pm 0.42$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_m h^2$	$0.1430 \pm 0.0015$	$k_{\text{D}}$	$0.14055 \pm 0.00068$	$f_{2000}^{143 \times 217}$	$33.0 \pm 3.0$
$\Omega_m h^3$	$0.09583 \pm 0.00077$	$100\theta_{\text{D}}$	$0.16097 \pm 0.00078$	$f_{2000}^{217}$	$107.6 \pm 2.8$
$\sigma_8$	$0.8099 \pm 0.0077$	$z_{\text{eq}}$	$3403 \pm 36$	$\chi_{\text{lensing}}^2$	$9.49 \pm 0.91$
$S_8$	$0.835 \pm 0.017$	$k_{\text{eq}}$	$0.01039 \pm 0.00011$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4573 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8124 \pm 0.0070$	$\chi_{\text{lowl}}^2$	$23.9 \pm 1.8$
$\sigma_8 \Omega_m^{0.25}$	$0.6086 \pm 0.0078$	$100\theta_{\text{s,eq}}$	$0.4491 \pm 0.0036$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$H(0.15)$	$72.35 \pm 0.78$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7501.32$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.93$ ;  $R - 1 = 0.00730$



## 20.4 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00025$	$z_{\text{re}}$	$7.80 \pm 0.74$	$D_{\text{M}}(0.51)$	$1981 \pm 13$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s$	$2.100 \pm 0.033$	$H(0.61)$	$95.32 \pm 0.34$
$100\theta_{MC}$	$1.04115 \pm 0.00074$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.014$	$D_{\text{M}}(0.61)$	$2305 \pm 14$
$\tau$	$0.0553 \pm 0.0074$	$D_{40}$	$1224 \pm 17$	$H(2.33)$	$235.90 \pm 0.74$
$Y_{He}$	$0.250 \pm 0.019$	$D_{220}$	$5719 \pm 40$	$D_{\text{M}}(2.33)$	$5764 \pm 18$
$\ln(10^{10} A_s)$	$3.045 \pm 0.016$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4560 \pm 0.0063$
$n_s$	$0.9680 \pm 0.0082$	$D_{1420}$	$815.0 \pm 5.2$	$\sigma_8(0.15)$	$0.7486 \pm 0.0072$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$229.6 \pm 2.4$	$f\sigma_8(0.38)$	$0.4746 \pm 0.0054$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9680 \pm 0.0082$	$\sigma_8(0.38)$	$0.6637 \pm 0.0065$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.250 \pm 0.019$	$f\sigma_8(0.51)$	$0.4733 \pm 0.0050$
$A_{143}^{tSZ}$	$4.3^{+2.2}_{-2.5}$	$Y_P^{\text{BBN}}$	$0.251 \pm 0.019$	$\sigma_8(0.51)$	$0.6212 \pm 0.0062$
$A_{100}^{PS}$	$255 \pm 30$	Age/Gyr	$13.798 \pm 0.043$	$f\sigma_8(0.61)$	$0.4684 \pm 0.0047$
$A_{143}^{PS}$	$46 \pm 10$	$z_*$	$1090.18 \pm 0.65$	$\sigma_8(0.61)$	$0.5911 \pm 0.0059$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.73 \pm 0.35$	$f\sigma_8(2.33)$	$0.2981 \pm 0.0031$
$A^{kSZ}$	$< 5.92$	$100\theta_*$	$1.04123 \pm 0.00042$	$\sigma_8(2.33)$	$0.3074 \pm 0.0033$
$c_{100}$	$0.9986^{+0.0016}_{-0.0012}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.035$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.8 \pm 1.1$	$f_{2000}^{143 \times 217}$	$33.5 \pm 3.0$
$H_0$	$67.64 \pm 0.59$	$r_{\text{drag}}$	$147.44 \pm 0.40$	$f_{2000}^{217}$	$108.1 \pm 2.7$
$\Omega_\Lambda$	$0.6895 \pm 0.0070$	$k_{\text{D}}$	$0.14023 \pm 0.00058$	$\chi_{\text{lensing}}^2$	$9.39 \pm 0.80$
$\Omega_m$	$0.3105 \pm 0.0070$	$100\theta_{\text{D}}$	$0.16118 \pm 0.00074$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.8$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$z_{\text{eq}}$	$3379 \pm 26$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.3$
$\Omega_m h^3$	$0.09607 \pm 0.00073$	$k_{\text{eq}}$	$0.010312 \pm 0.000079$	$\chi_{6\text{DF}}^2$	$0.057 \pm 0.073$
$\sigma_8$	$0.8100 \pm 0.0077$	$100\theta_{\text{eq}}$	$0.8174 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.33 \pm 0.49$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4516 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4513 \pm 0.0066$	$H(0.15)$	$72.91 \pm 0.52$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6046 \pm 0.0067$	$D_{\text{M}}(0.15)$	$641.0 \pm 5.1$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.9849 \pm 0.0096$	$H(0.38)$	$83.00 \pm 0.42$	$\chi_{\text{BAO}}^2$	$6.2 \pm 1.3$
$r_{\text{drag}} h$	$99.73 \pm 0.89$	$D_{\text{M}}(0.38)$	$1529 \pm 10$		
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.023$	$H(0.51)$	$89.71 \pm 0.38$		

$$\bar{\chi}_{\text{eff}}^2 = 7507.45; \Delta \bar{\chi}_{\text{eff}}^2 = 6291.93; R - 1 = 0.01905$$



20.5 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_zre6p5/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02213 \pm 0.00030$	$r_{\text{drag}} h$	$98.6 \pm 1.8$	$D_{\text{M}}(0.15)$	$646.9 \pm 9.7$
$\Omega_c h^2$	$0.1205 \pm 0.0022$	$\langle d^2 \rangle^{1/2}$	$2.454 \pm 0.043$	$H(0.38)$	$82.58 \pm 0.73$
$100\theta_{MC}$	$1.04082 \pm 0.00088$	$z_{\text{re}}$	$7.67^{+0.52}_{-0.85}$	$D_{\text{M}}(0.38)$	$1541 \pm 20$
$\tau$	$0.0538^{+0.0046}_{-0.0084}$	$10^9 A_s$	$2.096^{+0.026}_{-0.036}$	$H(0.51)$	$89.37 \pm 0.60$
$Y_{He}$	$0.245 \pm 0.021$	$10^9 A_s e^{-2\tau}$	$1.882 \pm 0.015$	$D_{\text{M}}(0.51)$	$1995 \pm 23$
$\ln(10^{10} A_s)$	$3.043^{+0.013}_{-0.017}$	$D_{40}$	$1232 \pm 22$	$H(0.61)$	$95.05 \pm 0.51$
$n_s$	$0.963 \pm 0.011$	$D_{220}$	$5708 \pm 42$	$D_{\text{M}}(0.61)$	$2320 \pm 25$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2535 \pm 14$	$H(2.33)$	$236.6 \pm 1.3$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.3 \pm 5.3$	$D_{\text{M}}(2.33)$	$5776 \pm 25$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.6 \pm 2.5$	$f\sigma_8(0.15)$	$0.463 \pm 0.013$
$A_{143}^{tSZ}$	$4.4 \pm 2.1$	$n_{s,0.002}$	$0.963 \pm 0.011$	$\sigma_8(0.15)$	$0.7499 \pm 0.0079$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.245 \pm 0.021$	$f\sigma_8(0.38)$	$0.4797 \pm 0.0097$
$A_{143}^{PS}$	$45 \pm 10$	$Y_P^{\text{BBN}}$	$0.246 \pm 0.021$	$\sigma_8(0.38)$	$0.6638^{+0.0061}_{-0.0072}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.827 \pm 0.058$	$f\sigma_8(0.51)$	$0.4773 \pm 0.0082$
$A^{kSZ}$	$< 5.83$	$z_*$	$1090.27 \pm 0.67$	$\sigma_8(0.51)$	$0.6209^{+0.0057}_{-0.0068}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0014}$	$r_*$	$144.50 \pm 0.49$	$f\sigma_8(0.61)$	$0.4717 \pm 0.0073$
$c_{217}$	$0.9997^{+0.0020}_{-0.0023}$	$100\theta_*$	$1.04103 \pm 0.00050$	$\sigma_8(0.61)$	$0.5906^{+0.0054}_{-0.0065}$
$H_0$	$67.0 \pm 1.1$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.880 \pm 0.045$	$f\sigma_8(2.33)$	$0.2975^{+0.0028}_{-0.0034}$
$\Omega_\Lambda$	$0.680 \pm 0.015$	$z_{\text{drag}}$	$1059.4 \pm 1.2$	$\sigma_8(2.33)$	$0.3063^{+0.0031}_{-0.0037}$
$\Omega_m$	$0.320 \pm 0.015$	$r_{\text{drag}}$	$147.24 \pm 0.50$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_m h^2$	$0.1432 \pm 0.0020$	$k_{\text{D}}$	$0.14053 \pm 0.00076$	$f_{2000}^{143 \times 217}$	$33.2 \pm 3.0$
$\Omega_m h^3$	$0.09591 \pm 0.00077$	$100\theta_{\text{D}}$	$0.16107 \pm 0.00078$	$f_{2000}^{217}$	$107.8 \pm 2.7$
$\sigma_8$	$0.8124 \pm 0.0092$	$z_{\text{eq}}$	$3408 \pm 49$	$\chi_{\text{small}}^2$	$396.8 \pm 1.7$
$S_8$	$0.839 \pm 0.025$	$k_{\text{eq}}$	$0.01040 \pm 0.00015$	$\chi_{\text{lowl}}^2$	$23.9 \pm 2.1$
$\sigma_8 \Omega_m^{0.5}$	$0.459 \pm 0.014$	$100\theta_{\text{eq}}$	$0.8117 \pm 0.0094$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.611 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4487 \pm 0.0048$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$
$\sigma_8/h^{0.5}$	$0.993 \pm 0.016$	$H(0.15)$	$72.33 \pm 0.96$		

$\bar{\chi}_{\text{eff}}^2 = 7492.12$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.97$ ;  $R - 1 = 0.00634$



20.6 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02227 \pm 0.00025$	$\langle d^2 \rangle^{1/2}$	$2.426 \pm 0.028$	$D_M(0.38)$	$1527 \pm 11$
$\Omega_c h^2$	$0.1189 \pm 0.0012$	$z_{\text{re}}$	$7.78^{+0.59}_{-0.82}$	$H(0.51)$	$89.77 \pm 0.38$
$100\theta_{MC}$	$1.04123 \pm 0.00074$	$10^9 A_s$	$2.098^{+0.028}_{-0.037}$	$D_M(0.51)$	$1979 \pm 13$
$\tau$	$0.0551^{+0.0054}_{-0.0080}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.015$	$H(0.61)$	$95.37 \pm 0.35$
$Y_{He}$	$0.252 \pm 0.019$	$D_{40}$	$1220 \pm 17$	$D_M(0.61)$	$2303 \pm 14$
$\ln(10^{10} A_s)$	$3.044^{+0.014}_{-0.017}$	$D_{220}$	$5715 \pm 41$	$H(2.33)$	$235.80 \pm 0.83$
$n_s$	$0.9694 \pm 0.0082$	$D_{810}$	$2535 \pm 14$	$D_M(2.33)$	$5761 \pm 18$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$814.5 \pm 5.3$	$f\sigma_8(0.15)$	$0.4548 \pm 0.0077$
$A_{217}^{CIB}$	$45 \pm 8$	$D_{2000}$	$229.3 \pm 2.4$	$\sigma_8(0.15)$	$0.7482^{+0.0073}_{-0.0082}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9694 \pm 0.0082$	$f\sigma_8(0.38)$	$0.4736 \pm 0.0066$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.5}$	$Y_P$	$0.252 \pm 0.019$	$\sigma_8(0.38)$	$0.6635^{+0.0063}_{-0.0072}$
$A_{100}^{PS}$	$255 \pm 30$	$Y_P^{\text{BBN}}$	$0.253 \pm 0.019$	$f\sigma_8(0.51)$	$0.4725 \pm 0.0061$
$A_{143}^{PS}$	$46 \pm 10$	Age/Gyr	$13.794 \pm 0.043$	$\sigma_8(0.51)$	$0.6210^{+0.0059}_{-0.0067}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1090.22 \pm 0.66$	$f\sigma_8(0.61)$	$0.4677 \pm 0.0057$
$A^{kSZ}$	$< 6.08$	$r_*$	$144.76 \pm 0.38$	$\sigma_8(0.61)$	$0.5910^{+0.0056}_{-0.0064}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$100\theta_*$	$1.04126 \pm 0.00043$	$f\sigma_8(2.33)$	$0.2981^{+0.0029}_{-0.0033}$
$c_{217}$	$0.9997 \pm 0.0019$	$D_M(z_*)/\text{Gpc}$	$13.902 \pm 0.037$	$\sigma_8(2.33)$	$0.3074^{+0.0030}_{-0.0034}$
$H_0$	$67.75 \pm 0.62$	$z_{\text{drag}}$	$1059.9 \pm 1.1$	$f_{2000}^{143}$	$32 \pm 4$
$\Omega_\Lambda$	$0.6909 \pm 0.0076$	$r_{\text{drag}}$	$147.46 \pm 0.43$	$f_{2000}^{143 \times 217}$	$33.7 \pm 3.0$
$\Omega_m$	$0.3091 \pm 0.0076$	$k_D$	$0.14013 \pm 0.00059$	$f_{2000}^{217}$	$108.2 \pm 2.7$
$\Omega_m h^2$	$0.1419 \pm 0.0012$	$100\theta_D$	$0.16126 \pm 0.00074$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$\Omega_m h^3$	$0.09611 \pm 0.00073$	$z_{\text{eq}}$	$3375 \pm 29$	$\chi_{\text{lowl}}^2$	$22.7 \pm 1.3$
$\sigma_8$	$0.8094^{+0.0080}_{-0.0091}$	$k_{\text{eq}}$	$0.010300 \pm 0.000089$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.073$
$S_8$	$0.822 \pm 0.015$	$100\theta_{\text{eq}}$	$0.8183 \pm 0.0053$	$\chi_{\text{MGS}}^2$	$1.44 \pm 0.56$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0082$	$100\theta_{s,\text{eq}}$	$0.4521 \pm 0.0028$	$\chi_{\text{DR12BAO}}^2$	$4.6 \pm 1.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6035 \pm 0.0082$	$H(0.15)$	$73.01 \pm 0.55$	$\chi_{\text{prior}}^2$	$7.5 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.012$	$D_M(0.15)$	$640.1 \pm 5.3$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.3$
$r_{\text{drag}} h$	$99.91 \pm 0.98$	$H(0.38)$	$83.08 \pm 0.44$	$\chi_{\text{CMB}}^2$	$4339 \pm 3000$

$\bar{\chi}_{\text{eff}}^2 = 7498.14$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 6291.76$ ;  $R - 1 = 0.01531$



20.7 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02214 \pm 0.00028$	$r_{\text{drag}} h$	$98.8 \pm 1.3$	$D_{\text{M}}(0.15)$	$645.9 \pm 7.5$
$\Omega_c h^2$	$0.1201 \pm 0.0016$	$\langle d^2 \rangle^{1/2}$	$2.449 \pm 0.029$	$H(0.38)$	$82.64 \pm 0.59$
$100\theta_{MC}$	$1.04079 \pm 0.00084$	$z_{\text{re}}$	$7.67^{+0.52}_{-0.84}$	$D_{\text{M}}(0.38)$	$1539 \pm 15$
$\tau$	$0.0539^{+0.0048}_{-0.0083}$	$10^9 A_s$	$2.094^{+0.025}_{-0.035}$	$H(0.51)$	$89.41 \pm 0.50$
$Y_{He}$	$0.243 \pm 0.020$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.014$	$D_{\text{M}}(0.51)$	$1992 \pm 18$
$\ln(10^{10} A_s)$	$3.042^{+0.012}_{-0.016}$	$D_{40}$	$1231 \pm 19$	$H(0.61)$	$95.07 \pm 0.44$
$n_s$	$0.9634 \pm 0.0097$	$D_{220}$	$5712 \pm 41$	$D_{\text{M}}(0.61)$	$2318 \pm 20$
$y_{\text{cal}}$	$1.0004 \pm 0.0025$	$D_{810}$	$2534 \pm 14$	$H(2.33)$	$236.40 \pm 0.94$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$814.5 \pm 5.3$	$D_{\text{M}}(2.33)$	$5775 \pm 23$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$229.7 \pm 2.5$	$f\sigma_8(0.15)$	$0.4611 \pm 0.0082$
$A_{143}^{tSZ}$	$4.4 \pm 2.2$	$n_{s,0.002}$	$0.9634 \pm 0.0097$	$\sigma_8(0.15)$	$0.7487 \pm 0.0068$
$A_{100}^{PS}$	$253 \pm 30$	$Y_P$	$0.243 \pm 0.020$	$f\sigma_8(0.38)$	$0.4780 \pm 0.0064$
$A_{143}^{PS}$	$44 \pm 10$	$Y_P^{\text{BBN}}$	$0.245 \pm 0.021$	$\sigma_8(0.38)$	$0.6630^{+0.0057}_{-0.0066}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.825 \pm 0.052$	$f\sigma_8(0.51)$	$0.4759 \pm 0.0055$
$A^{kSZ}$	$< 5.76$	$z_*$	$1090.16 \pm 0.66$	$\sigma_8(0.51)$	$0.6202^{+0.0055}_{-0.0063}$
$c_{100}$	$0.9985^{+0.0017}_{-0.0013}$	$r_*$	$144.58 \pm 0.38$	$f\sigma_8(0.61)$	$0.4704 \pm 0.0049$
$c_{217}$	$0.9997 \pm 0.0019$	$100\theta_*$	$1.04104 \pm 0.00047$	$\sigma_8(0.61)$	$0.5899^{+0.0053}_{-0.0062}$
$H_0$	$67.09 \pm 0.86$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.888 \pm 0.037$	$f\sigma_8(2.33)$	$0.2972^{+0.0028}_{-0.0033}$
$\Omega_\Lambda$	$0.682 \pm 0.011$	$z_{\text{drag}}$	$1059.4 \pm 1.2$	$\sigma_8(2.33)$	$0.3062^{+0.0032}_{-0.0037}$
$\Omega_m$	$0.318 \pm 0.011$	$r_{\text{drag}}$	$147.32 \pm 0.42$	$f_{2000}^{143}$	$31 \pm 4$
$\Omega_m h^2$	$0.1429 \pm 0.0015$	$k_{\text{D}}$	$0.14051 \pm 0.00067$	$f_{2000}^{143 \times 217}$	$33.0 \pm 3.0$
$\Omega_m h^3$	$0.09586 \pm 0.00077$	$100\theta_{\text{D}}$	$0.16099 \pm 0.00078$	$f_{2000}^{217}$	$107.6 \pm 2.7$
$\sigma_8$	$0.8108 \pm 0.0073$	$z_{\text{eq}}$	$3400 \pm 35$	$\chi_{\text{lensing}}^2$	$9.47 \pm 0.91$
$S_8$	$0.834 \pm 0.016$	$k_{\text{eq}}$	$0.01038 \pm 0.00011$	$\chi_{\text{simall}}^2$	$396.8 \pm 1.6$
$\sigma_8 \Omega_m^{0.5}$	$0.4570 \pm 0.0090$	$100\theta_{\text{eq}}$	$0.8131 \pm 0.0067$	$\chi_{\text{lowl}}^2$	$23.8 \pm 1.7$
$\sigma_8 \Omega_m^{0.25}$	$0.6087 \pm 0.0078$	$100\theta_{\text{s,eq}}$	$0.4494 \pm 0.0034$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8/h^{0.5}$	$0.990 \pm 0.011$	$H(0.15)$	$72.43 \pm 0.75$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$

$$\bar{\chi}_{\text{eff}}^2 = 7501.05; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.92; R - 1 = 0.00841$$



## 20.8 base\_yhe\_CamSpecHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_yhe\_plikHM\_TT\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02226 \pm 0.00025$	$z_{\text{re}}$	$7.87^{+0.62}_{-0.75}$	$D_{\text{M}}(0.51)$	$1980 \pm 12$
$\Omega_c h^2$	$0.1191 \pm 0.0011$	$10^9 A_s$	$2.103^{+0.027}_{-0.033}$	$H(0.61)$	$95.33 \pm 0.34$
$100\theta_{MC}$	$1.04116 \pm 0.00073$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.014$	$D_{\text{M}}(0.61)$	$2305 \pm 14$
$\tau$	$0.0560^{+0.0057}_{-0.0076}$	$D_{40}$	$1224 \pm 17$	$H(2.33)$	$235.88 \pm 0.74$
$Y_{He}$	$0.250 \pm 0.019$	$D_{220}$	$5719 \pm 40$	$D_{\text{M}}(2.33)$	$5763 \pm 18$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.016}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4561 \pm 0.0062$
$n_s$	$0.9681 \pm 0.0082$	$D_{1420}$	$815.0 \pm 5.2$	$\sigma_8(0.15)$	$0.7491 \pm 0.0069$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$229.6 \pm 2.4$	$f\sigma_8(0.38)$	$0.4747 \pm 0.0053$
$A_{217}^{CIB}$	$45 \pm 8$	$n_{s,0.002}$	$0.9681 \pm 0.0082$	$\sigma_8(0.38)$	$0.6641 \pm 0.0063$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.250 \pm 0.019$	$f\sigma_8(0.51)$	$0.4735 \pm 0.0049$
$A_{143}^{tSZ}$	$4.3^{+2.1}_{-2.5}$	$Y_P^{\text{BBN}}$	$0.251 \pm 0.019$	$\sigma_8(0.51)$	$0.6216 \pm 0.0059$
$A_{100}^{PS}$	$255 \pm 30$	Age/Gyr	$13.798 \pm 0.043$	$f\sigma_8(0.61)$	$0.4686 \pm 0.0046$
$A_{143}^{PS}$	$46 \pm 10$	$z_*$	$1090.18 \pm 0.65$	$\sigma_8(0.61)$	$0.5915 \pm 0.0057$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$r_*$	$144.73 \pm 0.35$	$f\sigma_8(2.33)$	$0.2983 \pm 0.0030$
$A^{kSZ}$	$< 5.90$	$100\theta_*$	$1.04123 \pm 0.00043$	$\sigma_8(2.33)$	$0.3076 \pm 0.0032$
$c_{100}$	$0.9986^{+0.0016}_{-0.0012}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.900 \pm 0.035$	$f_{2000}^{143}$	$31 \pm 4$
$c_{217}$	$0.9997^{+0.0018}_{-0.0024}$	$z_{\text{drag}}$	$1059.8 \pm 1.1$	$f_{2000}^{143 \times 217}$	$33.5 \pm 3.0$
$H_0$	$67.66 \pm 0.58$	$r_{\text{drag}}$	$147.44 \pm 0.40$	$f_{2000}^{217}$	$108.1 \pm 2.7$
$\Omega_\Lambda$	$0.6897 \pm 0.0069$	$k_{\text{D}}$	$0.14022 \pm 0.00058$	$\chi_{\text{lensing}}^2$	$9.35 \pm 0.75$
$\Omega_m$	$0.3103 \pm 0.0069$	$100\theta_{\text{D}}$	$0.16118 \pm 0.00074$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m h^2$	$0.1420 \pm 0.0011$	$z_{\text{eq}}$	$3378 \pm 26$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.3$
$\Omega_m h^3$	$0.09608 \pm 0.00073$	$k_{\text{eq}}$	$0.010310 \pm 0.000079$	$\chi_{6\text{DF}}^2$	$0.055 \pm 0.071$
$\sigma_8$	$0.8105 \pm 0.0075$	$100\theta_{\text{eq}}$	$0.8175 \pm 0.0047$	$\chi_{\text{MGS}}^2$	$1.34 \pm 0.49$
$S_8$	$0.824 \pm 0.012$	$100\theta_{\text{s,eq}}$	$0.4517 \pm 0.0024$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4514 \pm 0.0066$	$H(0.15)$	$72.93 \pm 0.52$	$\chi_{\text{prior}}^2$	$7.4 \pm 3.6$
$\sigma_8 \Omega_m^{0.25}$	$0.6049 \pm 0.0066$	$D_{\text{M}}(0.15)$	$640.9 \pm 5.0$	$\chi_{\text{CMB}}^2$	$4348 \pm 3000$
$\sigma_8/h^{0.5}$	$0.9853 \pm 0.0095$	$H(0.38)$	$83.01 \pm 0.42$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.2$
$r_{\text{drag}} h$	$99.76 \pm 0.89$	$D_{\text{M}}(0.38)$	$1529 \pm 10$		
$\langle d^2 \rangle^{1/2}$	$2.433 \pm 0.023$	$H(0.51)$	$89.72 \pm 0.37$		

$$\bar{\chi}_{\text{eff}}^2 = 7507.34; \Delta\bar{\chi}_{\text{eff}}^2 = 6291.96; R - 1 = 0.01969$$



20.9 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00021$	$r_{\text{drag}} h$	$99.0 \pm 1.2$	$D_{\text{M}}(0.15)$	$644.1 \pm 6.4$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.032$	$H(0.38)$	$82.79 \pm 0.50$
$100\theta_{MC}$	$1.04080 \pm 0.00065$	$z_{\text{re}}$	$7.56 \pm 0.82$	$D_{\text{M}}(0.38)$	$1535 \pm 13$
$\tau$	$0.0533 \pm 0.0081$	$10^9 A_s$	$2.092 \pm 0.036$	$H(0.51)$	$89.55 \pm 0.42$
$Y_{He}$	$0.243 \pm 0.016$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.013$	$D_{\text{M}}(0.51)$	$1988 \pm 15$
$\ln(10^{10} A_s)$	$3.040 \pm 0.017$	$D_{40}$	$1231 \pm 18$	$H(0.61)$	$95.20 \pm 0.36$
$n_s$	$0.9642 \pm 0.0081$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2313 \pm 17$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.42 \pm 0.85$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 5.0$	$D_{\text{M}}(2.33)$	$5768 \pm 18$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.7 \pm 2.1$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0086$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9642 \pm 0.0081$	$\sigma_8(0.15)$	$0.7474 \pm 0.0076$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.243 \pm 0.016$	$f\sigma_8(0.38)$	$0.4763 \pm 0.0070$
$A_{143}^{PS}$	$42_{-9}^{+10}$	$Y_P^{\text{BBN}}$	$0.244 \pm 0.016$	$\sigma_8(0.38)$	$0.6621 \pm 0.0067$
$A_{217}^{PS}$	$108_{-10}^{+20}$	Age/Gyr	$13.808 \pm 0.041$	$f\sigma_8(0.51)$	$0.4744 \pm 0.0062$
$A^{kSZ}$	$< 5.27$	$z_*$	$1089.91_{-0.54}^{+0.47}$	$\sigma_8(0.51)$	$0.6194 \pm 0.0063$
$c_{100}$	$0.9986_{-0.0014}^{+0.0018}$	$r_*$	$144.52 \pm 0.33$	$f\sigma_8(0.61)$	$0.4691 \pm 0.0057$
$c_{217}$	$0.9997_{-0.0024}^{+0.0021}$	$100\theta_*$	$1.04105 \pm 0.00034$	$\sigma_8(0.61)$	$0.5893 \pm 0.0060$
$H_0$	$67.29 \pm 0.74$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.031$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0031$
$\Omega_\Lambda$	$0.6843 \pm 0.0096$	$z_{\text{drag}}$	$1059.68 \pm 0.88$	$\sigma_8(2.33)$	$0.3060 \pm 0.0033$
$\Omega_m$	$0.3157 \pm 0.0096$	$r_{\text{drag}}$	$147.21 \pm 0.34$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1429 \pm 0.0013$	$k_{\text{D}}$	$0.14079_{-0.00046}^{+0.00060}$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.6$
$\Omega_m h^3$	$0.09611 \pm 0.00057$	$100\theta_{\text{D}}$	$0.16074_{-0.00064}^{+0.00052}$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\sigma_8$	$0.8093 \pm 0.0084$	$z_{\text{eq}}$	$3398 \pm 32$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$S_8$	$0.830 \pm 0.017$	$k_{\text{eq}}$	$0.010372 \pm 0.000098$	$\chi_{\text{lowl}}^2$	$23.6 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4547 \pm 0.0092$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0062$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6066 \pm 0.0086$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0032$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$H(0.15)$	$72.61 \pm 0.65$		

Best-fit  $\chi_{\text{eff}}^2 = 11920.73$ ;  $\Delta\chi_{\text{eff}}^2 = 9155.47$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.34$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.78$ ;  $R - 1 = 0.01242$

$\chi_{\text{eff}}^2$ : CMB - small\_100x143\_offlike5\_EE\_Aplanck\_B: 395.88 ( $\Delta$  -0.18) commander\_dx12\_v3\_2\_29: 22.85 ( $\Delta$  -1.09) CamSpec like\_10.7HM\_1400\_unified: 11499.82



20.10 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.429 \pm 0.028$	$D_M(0.38)$	$1527.7 \pm 9.3$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$z_{\text{re}}$	$7.68 \pm 0.83$	$H(0.51)$	$89.77 \pm 0.32$
$100\theta_{MC}$	$1.04101^{+0.00054}_{-0.00061}$	$10^9 A_s$	$2.095 \pm 0.037$	$D_M(0.51)$	$1979 \pm 11$
$\tau$	$0.0546 \pm 0.0082$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.013$	$H(0.61)$	$95.38 \pm 0.28$
$Y_{He}$	$0.246^{+0.014}_{-0.016}$	$D_{40}$	$1225 \pm 16$	$D_M(0.61)$	$2303 \pm 12$
$\ln(10^{10} A_s)$	$3.042 \pm 0.018$	$D_{220}$	$5729 \pm 40$	$H(2.33)$	$235.99 \pm 0.66$
$n_s$	$0.9675^{+0.0065}_{-0.0073}$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5760 \pm 15$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.7 \pm 5.1$	$f\sigma_8(0.15)$	$0.4547 \pm 0.0069$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.6 \pm 2.2$	$\sigma_8(0.15)$	$0.7469 \pm 0.0077$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9675^{+0.0065}_{-0.0073}$	$f\sigma_8(0.38)$	$0.4733 \pm 0.0061$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.246^{+0.014}_{-0.016}$	$\sigma_8(0.38)$	$0.6623 \pm 0.0068$
$A_{100}^{PS}$	$250 \pm 28$	$Y_P^{\text{BBN}}$	$0.248^{+0.014}_{-0.016}$	$f\sigma_8(0.51)$	$0.4721 \pm 0.0056$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.790 \pm 0.034$	$\sigma_8(0.51)$	$0.6198 \pm 0.0064$
$A_{217}^{PS}$	$108^{+20}_{-10}$	$z_*$	$1089.88^{+0.45}_{-0.56}$	$f\sigma_8(0.61)$	$0.4672 \pm 0.0053$
$A^{kSZ}$	$< 5.39$	$r_*$	$144.65 \pm 0.29$	$\sigma_8(0.61)$	$0.5898 \pm 0.0061$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04117 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0031$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.893 \pm 0.028$	$\sigma_8(2.33)$	$0.3067 \pm 0.0033$
$H_0$	$67.71 \pm 0.53$	$z_{\text{drag}}$	$1059.93 \pm 0.82$	$f_{2000}^{143}$	$30 \pm 3$
$\Omega_\Lambda$	$0.6899 \pm 0.0066$	$r_{\text{drag}}$	$147.32 \pm 0.31$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.6$
$\Omega_m$	$0.3101 \pm 0.0066$	$k_D$	$0.14059^{+0.00054}_{-0.00041}$	$f_{2000}^{217}$	$107.0 \pm 2.4$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$100\theta_D$	$0.16084^{+0.00051}_{-0.00064}$	$\chi_{\text{small}}^2$	$397.2 \pm 2.0$
$\Omega_m h^3$	$0.09623 \pm 0.00055$	$z_{\text{eq}}$	$3381 \pm 24$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.2$
$\sigma_8$	$0.8082 \pm 0.0085$	$k_{\text{eq}}$	$0.010319 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.053 \pm 0.065$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8172 \pm 0.0044$	$\chi_{\text{MGS}}^2$	$1.33 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4500 \pm 0.0072$	$100\theta_{s,\text{eq}}$	$0.4514 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6031 \pm 0.0075$	$H(0.15)$	$72.98 \pm 0.47$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$D_M(0.15)$	$640.4 \pm 4.5$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$r_{\text{drag}} h$	$99.75 \pm 0.84$	$H(0.38)$	$83.07 \pm 0.37$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11949.00$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.09$ ;  $R - 1 = 0.01838$



20.11 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02229 \pm 0.00020$	$r_{\text{drag}} h$	$99.0 \pm 1.0$	$D_{\text{M}}(0.15)$	$644.2 \pm 5.7$
$\Omega_c h^2$	$0.1199 \pm 0.0012$	$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.025$	$H(0.38)$	$82.78 \pm 0.45$
$100\theta_{MC}$	$1.04075 \pm 0.00063$	$z_{\text{re}}$	$7.59 \pm 0.77$	$D_{\text{M}}(0.38)$	$1535 \pm 12$
$\tau$	$0.0537 \pm 0.0076$	$10^9 A_s$	$2.093 \pm 0.033$	$H(0.51)$	$89.54 \pm 0.38$
$Y_{He}$	$0.241 \pm 0.015$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$D_{\text{M}}(0.51)$	$1988 \pm 14$
$\ln(10^{10} A_s)$	$3.041 \pm 0.016$	$D_{40}$	$1232 \pm 16$	$H(0.61)$	$95.19 \pm 0.33$
$n_s$	$0.9636 \pm 0.0077$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2313 \pm 15$
$y_{\text{cal}}$	$1.0005 \pm 0.0024$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$236.39 \pm 0.73$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.7 \pm 5.0$	$D_{\text{M}}(2.33)$	$5769 \pm 17$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.8 \pm 2.1$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0066$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9636 \pm 0.0077$	$\sigma_8(0.15)$	$0.7474 \pm 0.0066$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.241 \pm 0.015$	$f\sigma_8(0.38)$	$0.4762 \pm 0.0053$
$A_{143}^{PS}$	$42_{-9}^{+9}$	$Y_P^{\text{BBN}}$	$0.243 \pm 0.015$	$\sigma_8(0.38)$	$0.6620 \pm 0.0060$
$A_{217}^{PS}$	$109_{-10}^{+10}$	Age/Gyr	$13.810 \pm 0.039$	$f\sigma_8(0.51)$	$0.4743 \pm 0.0047$
$A^{kSZ}$	$< 5.16$	$z_*$	$1089.86_{-0.53}^{+0.45}$	$\sigma_8(0.51)$	$0.6194 \pm 0.0057$
$c_{100}$	$0.9986_{-0.0012}^{+0.0017}$	$r_*$	$144.53 \pm 0.29$	$f\sigma_8(0.61)$	$0.4690 \pm 0.0044$
$c_{217}$	$0.9997_{-0.0024}^{+0.0020}$	$100\theta_*$	$1.04104 \pm 0.00033$	$\sigma_8(0.61)$	$0.5892 \pm 0.0056$
$H_0$	$67.27 \pm 0.66$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.884 \pm 0.028$	$f\sigma_8(2.33)$	$0.2969 \pm 0.0029$
$\Omega_\Lambda$	$0.6843 \pm 0.0084$	$z_{\text{drag}}$	$1059.62 \pm 0.86$	$\sigma_8(2.33)$	$0.3060 \pm 0.0032$
$\Omega_m$	$0.3157 \pm 0.0084$	$r_{\text{drag}}$	$147.22 \pm 0.31$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1428 \pm 0.0012$	$k_{\text{D}}$	$0.14082_{-0.00043}^{+0.00054}$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.5$
$\Omega_m h^3$	$0.09608 \pm 0.00056$	$100\theta_{\text{D}}$	$0.16069_{-0.00063}^{+0.00051}$	$f_{2000}^{217}$	$106.7 \pm 2.3$
$\sigma_8$	$0.8092 \pm 0.0070$	$z_{\text{eq}}$	$3398 \pm 28$	$\chi_{\text{lensing}}^2$	$9.24 \pm 0.72$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010370 \pm 0.000084$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4547 \pm 0.0071$	$100\theta_{\text{eq}}$	$0.8138 \pm 0.0053$	$\chi_{\text{lowl}}^2$	$23.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6065 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0027$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9866 \pm 0.0093$	$H(0.15)$	$72.60 \pm 0.58$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11952.12$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.78$ ;  $R - 1 = 0.01489$



20.12 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00018$	$z_{\text{re}}$	$7.80 \pm 0.74$	$D_{\text{M}}(0.51)$	$1980 \pm 11$
$\Omega_c h^2$	$0.11919 \pm 0.00095$	$10^9 A_s$	$2.101 \pm 0.033$	$H(0.61)$	$95.35 \pm 0.28$
$100\theta_{MC}$	$1.04096^{+0.00054}_{-0.00060}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$D_{\text{M}}(0.61)$	$2304 \pm 12$
$\tau$	$0.0558 \pm 0.0074$	$D_{40}$	$1227 \pm 15$	$H(2.33)$	$236.03 \pm 0.61$
$Y_{\text{He}}$	$0.245^{+0.014}_{-0.015}$	$D_{220}$	$5733 \pm 39$	$D_{\text{M}}(2.33)$	$5761 \pm 14$
$\ln(10^{10} A_s)$	$3.045 \pm 0.015$	$D_{810}$	$2538 \pm 13$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0056$
$n_s$	$0.9667 \pm 0.0068$	$D_{1420}$	$817.1 \pm 5.0$	$\sigma_8(0.15)$	$0.7479 \pm 0.0066$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$230.8 \pm 2.1$	$f\sigma_8(0.38)$	$0.4743 \pm 0.0048$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9667 \pm 0.0068$	$\sigma_8(0.38)$	$0.6631 \pm 0.0060$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245^{+0.014}_{-0.015}$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0045$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.246^{+0.014}_{-0.015}$	$\sigma_8(0.51)$	$0.6206 \pm 0.0057$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.793 \pm 0.033$	$f\sigma_8(0.61)$	$0.4680 \pm 0.0043$
$A_{143}^{PS}$	$42^{+9}_{-8}$	$z_*$	$1089.84^{+0.45}_{-0.55}$	$\sigma_8(0.61)$	$0.5905 \pm 0.0054$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.64 \pm 0.27$	$f\sigma_8(2.33)$	$0.2978 \pm 0.0028$
$A^{kSZ}$	$< 5.25$	$100\theta_*$	$1.04115 \pm 0.00031$	$\sigma_8(2.33)$	$0.3070 \pm 0.0030$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.892 \pm 0.027$	$f_{2000}^{143}$	$29 \pm 3$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.88 \pm 0.81$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.5$
$H_0$	$67.66 \pm 0.50$	$r_{\text{drag}}$	$147.31 \pm 0.30$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\Omega_{\Lambda}$	$0.6893 \pm 0.0061$	$k_{\text{D}}$	$0.14065^{+0.00051}_{-0.00039}$	$\chi_{\text{lensing}}^2$	$9.20 \pm 0.71$
$\Omega_m$	$0.3107 \pm 0.0061$	$100\theta_{\text{D}}$	$0.16078^{+0.00050}_{-0.00063}$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.9$
$\Omega_m h^2$	$0.14221 \pm 0.00091$	$z_{\text{eq}}$	$3383 \pm 22$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.2$
$\Omega_m h^3$	$0.09621 \pm 0.00054$	$k_{\text{eq}}$	$0.010325 \pm 0.000067$	$\chi_{6\text{DF}}^2$	$0.054 \pm 0.063$
$\sigma_8$	$0.8093 \pm 0.0071$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0041$	$\chi_{\text{MGS}}^2$	$1.28 \pm 0.43$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0021$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0059$	$H(0.15)$	$72.93 \pm 0.44$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6042 \pm 0.0060$	$D_{\text{M}}(0.15)$	$640.9 \pm 4.3$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9840 \pm 0.0089$	$H(0.38)$	$83.03 \pm 0.35$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$r_{\text{drag}} h$	$99.66 \pm 0.78$	$D_{\text{M}}(0.38)$	$1528.6 \pm 8.9$		
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.022$	$H(0.51)$	$89.74 \pm 0.31$		

$$\bar{\chi}_{\text{eff}}^2 = 11958.04; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.40; R - 1 = 0.02077$$



20.13 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02253 \pm 0.00020$	$r_{\text{drag}} h$	$100.7 \pm 1.2$	$D_{\text{M}}(0.15)$	$635.4 \pm 6.1$
$\Omega_c h^2$	$0.1182 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.412 \pm 0.032$	$H(0.38)$	$83.47 \pm 0.49$
$100\theta_{MC}$	$1.04141^{+0.00061}_{-0.00070}$	$z_{\text{re}}$	$7.86 \pm 0.86$	$D_{\text{M}}(0.38)$	$1517 \pm 12$
$\tau$	$0.0565 \pm 0.0085$	$10^9 A_s$	$2.104 \pm 0.038$	$H(0.51)$	$90.11 \pm 0.41$
$Y_{He}$	$0.254^{+0.015}_{-0.018}$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$D_{\text{M}}(0.51)$	$1967 \pm 15$
$\ln(10^{10} A_s)$	$3.046 \pm 0.018$	$D_{40}$	$1216 \pm 18$	$H(0.61)$	$95.67 \pm 0.35$
$n_s$	$0.9729^{+0.0077}_{-0.0089}$	$D_{220}$	$5734 \pm 38$	$D_{\text{M}}(0.61)$	$2290 \pm 16$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$235.55 \pm 0.82$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$816.9 \pm 5.1$	$D_{\text{M}}(2.33)$	$5746 \pm 17$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.3^{+2.4}_{-2.1}$	$f\sigma_8(0.15)$	$0.4500 \pm 0.0083$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9729^{+0.0077}_{-0.0089}$	$\sigma_8(0.15)$	$0.7474 \pm 0.0079$
$A_{100}^{PS}$	$252 \pm 27$	$Y_P$	$0.254^{+0.015}_{-0.018}$	$f\sigma_8(0.38)$	$0.4702 \pm 0.0070$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.256^{+0.015}_{-0.018}$	$\sigma_8(0.38)$	$0.6635 \pm 0.0070$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.759 \pm 0.039$	$f\sigma_8(0.51)$	$0.4697 \pm 0.0063$
$A^{kSZ}$	$< 5.76$	$z_*$	$1089.93^{+0.47}_{-0.59}$	$\sigma_8(0.51)$	$0.6213^{+0.0061}_{-0.0068}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$r_*$	$144.76 \pm 0.33$	$f\sigma_8(0.61)$	$0.4655 \pm 0.0058$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04135 \pm 0.00033$	$\sigma_8(0.61)$	$0.5914^{+0.0058}_{-0.0065}$
$H_0$	$68.30 \pm 0.72$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.901 \pm 0.031$	$f\sigma_8(2.33)$	$0.2985^{+0.0030}_{-0.0034}$
$\Omega_\Lambda$	$0.6969 \pm 0.0088$	$z_{\text{drag}}$	$1060.46^{+0.82}_{-0.92}$	$\sigma_8(2.33)$	$0.3082^{+0.0031}_{-0.0036}$
$\Omega_m$	$0.3031 \pm 0.0088$	$r_{\text{drag}}$	$147.38 \pm 0.34$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m h^2$	$0.1413 \pm 0.0013$	$k_{\text{D}}$	$0.14032^{+0.00067}_{-0.00051}$	$f_{2000}^{143 \times 217}$	$32.8 \pm 2.6$
$\Omega_m h^3$	$0.09652 \pm 0.00056$	$100\theta_{\text{D}}$	$0.16106^{+0.00055}_{-0.00073}$	$f_{2000}^{217}$	$107.5 \pm 2.4$
$\sigma_8$	$0.8079 \pm 0.0087$	$z_{\text{eq}}$	$3362 \pm 31$	$\chi_{\text{small}}^2$	$397.5 \pm 2.4$
$S_8$	$0.812 \pm 0.016$	$k_{\text{eq}}$	$0.010261 \pm 0.000094$	$\chi_{\text{lowl}}^2$	$22.3 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4448 \pm 0.0089$	$100\theta_{\text{eq}}$	$0.8214 \pm 0.0060$	$\chi_{\text{H073p45}}^2$	$9.8 \pm 2.7$
$\sigma_8 \Omega_m^{0.25}$	$0.5994 \pm 0.0085$	$100\theta_{\text{s,eq}}$	$0.4535 \pm 0.0031$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.012$	$H(0.15)$	$73.50 \pm 0.63$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11954.03$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.08$ ;  $R - 1 = 0.04865$



## 20.14 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00021$	$r_{\text{drag}} h$	$99.1 \pm 1.2$	$D_{\text{M}}(0.15)$	$643.8 \pm 6.4$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.031$	$H(0.38)$	$82.81 \pm 0.50$
$100\theta_{MC}$	$1.04082 \pm 0.00065$	$z_{\text{re}}$	$7.71^{+0.54}_{-0.84}$	$D_{\text{M}}(0.38)$	$1535 \pm 13$
$\tau$	$0.0547^{+0.0048}_{-0.0085}$	$10^9 A_s$	$2.098^{+0.026}_{-0.036}$	$H(0.51)$	$89.57 \pm 0.41$
$Y_{He}$	$0.243 \pm 0.016$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.013$	$D_{\text{M}}(0.51)$	$1987 \pm 15$
$\ln(10^{10} A_s)$	$3.043^{+0.013}_{-0.017}$	$D_{40}$	$1231 \pm 18$	$H(0.61)$	$95.22 \pm 0.36$
$n_s$	$0.9645^{+0.0075}_{-0.0084}$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2312 \pm 17$
$y_{\text{cal}}$	$1.0005 \pm 0.0024$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.40 \pm 0.85$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 5.0$	$D_{\text{M}}(2.33)$	$5767 \pm 18$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.7 \pm 2.1$	$f\sigma_8(0.15)$	$0.4593 \pm 0.0085$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9645^{+0.0075}_{-0.0084}$	$\sigma_8(0.15)$	$0.7485^{+0.0063}_{-0.0073}$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.243 \pm 0.016$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0068$
$A_{143}^{PS}$	$42^{+10}_{-9}$	$Y_P^{\text{BBN}}$	$0.244 \pm 0.016$	$\sigma_8(0.38)$	$0.6631^{+0.0054}_{-0.0065}$
$A_{217}^{PS}$	$108^{+20}_{-10}$	Age/Gyr	$13.807 \pm 0.040$	$f\sigma_8(0.51)$	$0.4749 \pm 0.0060$
$A^{kSZ}$	$< 5.26$	$z_*$	$1089.91^{+0.47}_{-0.54}$	$\sigma_8(0.51)$	$0.6204^{+0.0050}_{-0.0061}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0014}$	$r_*$	$144.52 \pm 0.33$	$f\sigma_8(0.61)$	$0.4697 \pm 0.0054$
$c_{217}$	$0.9997^{+0.0022}_{-0.0024}$	$100\theta_*$	$1.04106 \pm 0.00034$	$\sigma_8(0.61)$	$0.5902^{+0.0048}_{-0.0058}$
$H_0$	$67.31 \pm 0.74$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.031$	$f\sigma_8(2.33)$	$0.2974^{+0.0025}_{-0.0030}$
$\Omega_\Lambda$	$0.6846 \pm 0.0096$	$z_{\text{drag}}$	$1059.71 \pm 0.87$	$\sigma_8(2.33)$	$0.3065^{+0.0026}_{-0.0033}$
$\Omega_m$	$0.3154 \pm 0.0096$	$r_{\text{drag}}$	$147.21 \pm 0.34$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1428 \pm 0.0013$	$k_{\text{D}}$	$0.14078^{+0.00060}_{-0.00046}$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.6$
$\Omega_m h^3$	$0.09613 \pm 0.00056$	$100\theta_{\text{D}}$	$0.16075^{+0.00052}_{-0.00064}$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\sigma_8$	$0.8104 \pm 0.0077$	$z_{\text{eq}}$	$3398 \pm 32$	$\chi_{\text{small}}^2$	$396.9 \pm 1.9$
$S_8$	$0.831 \pm 0.017$	$k_{\text{eq}}$	$0.010370 \pm 0.000098$	$\chi_{\text{lowl}}^2$	$23.6 \pm 1.5$
$\sigma_8 \Omega_m^{0.5}$	$0.4551 \pm 0.0091$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0062$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6073 \pm 0.0084$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0031$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.012$	$H(0.15)$	$72.63 \pm 0.65$		

 $\bar{\chi}_{\text{eff}}^2 = 11943.03$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.71$ ;  $R - 1 = 0.01121$



20.15 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02238 \pm 0.00018$	$\langle d^2 \rangle^{1/2}$	$2.431 \pm 0.026$	$D_M(0.38)$	$1527.4 \pm 9.3$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$z_{\text{re}}$	$7.81^{+0.60}_{-0.83}$	$H(0.51)$	$89.78 \pm 0.32$
$100\theta_{MC}$	$1.04102^{+0.00054}_{-0.00061}$	$10^9 A_s$	$2.101^{+0.027}_{-0.037}$	$D_M(0.51)$	$1979 \pm 11$
$\tau$	$0.0558^{+0.0054}_{-0.0083}$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.013$	$H(0.61)$	$95.39 \pm 0.28$
$Y_{He}$	$0.246^{+0.013}_{-0.016}$	$D_{40}$	$1225 \pm 16$	$D_M(0.61)$	$2303 \pm 12$
$\ln(10^{10} A_s)$	$3.045^{+0.013}_{-0.018}$	$D_{220}$	$5728 \pm 39$	$H(2.33)$	$235.98 \pm 0.66$
$n_s$	$0.9677^{+0.0064}_{-0.0073}$	$D_{810}$	$2537 \pm 14$	$D_M(2.33)$	$5760 \pm 15$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{1420}$	$816.7 \pm 5.1$	$f\sigma_8(0.15)$	$0.4552 \pm 0.0067$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.6 \pm 2.2$	$\sigma_8(0.15)$	$0.7479^{+0.0064}_{-0.0076}$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9677^{+0.0064}_{-0.0073}$	$f\sigma_8(0.38)$	$0.4738 \pm 0.0058$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.246^{+0.013}_{-0.016}$	$\sigma_8(0.38)$	$0.6631^{+0.0056}_{-0.0068}$
$A_{100}^{PS}$	$250 \pm 28$	$Y_P^{\text{BBN}}$	$0.248^{+0.014}_{-0.016}$	$f\sigma_8(0.51)$	$0.4726 \pm 0.0053$
$A_{143}^{PS}$	$43 \pm 9$	Age/Gyr	$13.789 \pm 0.034$	$\sigma_8(0.51)$	$0.6206^{+0.0052}_{-0.0063}$
$A_{217}^{PS}$	$108^{+10}_{-10}$	$z_*$	$1089.88^{+0.45}_{-0.56}$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0050$
$A^{kSZ}$	$< 5.35$	$r_*$	$144.65 \pm 0.29$	$\sigma_8(0.61)$	$0.5906^{+0.0050}_{-0.0061}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$100\theta_*$	$1.04117 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2978^{+0.0025}_{-0.0031}$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.893 \pm 0.028$	$\sigma_8(2.33)$	$0.3071^{+0.0027}_{-0.0033}$
$H_0$	$67.72 \pm 0.53$	$z_{\text{drag}}$	$1059.94 \pm 0.81$	$f_{2000}^{143}$	$30 \pm 3$
$\Omega_\Lambda$	$0.6900 \pm 0.0066$	$r_{\text{drag}}$	$147.32 \pm 0.31$	$f_{2000}^{143 \times 217}$	$32.2 \pm 2.6$
$\Omega_m$	$0.3100 \pm 0.0066$	$k_D$	$0.14059^{+0.00054}_{-0.00041}$	$f_{2000}^{217}$	$106.9 \pm 2.4$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$100\theta_D$	$0.16084^{+0.00050}_{-0.00065}$	$\chi_{\text{small}}^2$	$397.1 \pm 2.1$
$\Omega_m h^3$	$0.09624 \pm 0.00055$	$z_{\text{eq}}$	$3381 \pm 24$	$\chi_{\text{lowl}}^2$	$23.0 \pm 1.2$
$\sigma_8$	$0.8091^{+0.0071}_{-0.0083}$	$k_{\text{eq}}$	$0.010318 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.051 \pm 0.064$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8173 \pm 0.0045$	$\chi_{\text{MGS}}^2$	$1.34 \pm 0.47$
$\sigma_8 \Omega_m^{0.5}$	$0.4505 \pm 0.0071$	$100\theta_{s,\text{eq}}$	$0.4515 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6037 \pm 0.0072$	$H(0.15)$	$72.99 \pm 0.46$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$D_M(0.15)$	$640.3 \pm 4.5$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$r_{\text{drag}} h$	$99.77 \pm 0.84$	$H(0.38)$	$83.08 \pm 0.37$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11948.72$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.05$ ;  $R - 1 = 0.01724$



20.16 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_lensing\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00020$	$r_{\text{drag}} h$	$99.1 \pm 1.0$	$D_{\text{M}}(0.15)$	$643.8 \pm 5.6$
$\Omega_c h^2$	$0.1198 \pm 0.0012$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.024$	$H(0.38)$	$82.81 \pm 0.44$
$100\theta_{MC}$	$1.04077 \pm 0.00063$	$z_{\text{re}}$	$7.72^{+0.56}_{-0.79}$	$D_{\text{M}}(0.38)$	$1535 \pm 11$
$\tau$	$0.0548^{+0.0050}_{-0.0080}$	$10^9 A_s$	$2.098^{+0.025}_{-0.033}$	$H(0.51)$	$89.56 \pm 0.38$
$Y_{He}$	$0.242 \pm 0.015$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$D_{\text{M}}(0.51)$	$1987 \pm 14$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.016}$	$D_{40}$	$1232 \pm 16$	$H(0.61)$	$95.21 \pm 0.33$
$n_s$	$0.9640^{+0.0071}_{-0.0079}$	$D_{220}$	$5728 \pm 39$	$D_{\text{M}}(0.61)$	$2312 \pm 15$
$y_{\text{cal}}$	$1.0005 \pm 0.0024$	$D_{810}$	$2537 \pm 13$	$H(2.33)$	$236.36 \pm 0.73$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.7 \pm 5.0$	$D_{\text{M}}(2.33)$	$5768 \pm 17$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.8 \pm 2.1$	$f\sigma_8(0.15)$	$0.4590 \pm 0.0066$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9640^{+0.0071}_{-0.0079}$	$\sigma_8(0.15)$	$0.7481^{+0.0056}_{-0.0065}$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.242 \pm 0.015$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0053$
$A_{143}^{PS}$	$42^{+9}_{-9}$	$Y_P^{\text{BBN}}$	$0.243 \pm 0.015$	$\sigma_8(0.38)$	$0.6627^{+0.0050}_{-0.0059}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	Age/Gyr	$13.808 \pm 0.038$	$f\sigma_8(0.51)$	$0.4746 \pm 0.0047$
$A^{kSZ}$	$< 5.16$	$z_*$	$1089.86^{+0.45}_{-0.53}$	$\sigma_8(0.51)$	$0.6201^{+0.0048}_{-0.0057}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0012}$	$r_*$	$144.54 \pm 0.29$	$f\sigma_8(0.61)$	$0.4694 \pm 0.0043$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04105 \pm 0.00033$	$\sigma_8(0.61)$	$0.5899^{+0.0046}_{-0.0055}$
$H_0$	$67.31 \pm 0.65$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.885 \pm 0.028$	$f\sigma_8(2.33)$	$0.2973^{+0.0024}_{-0.0029}$
$\Omega_\Lambda$	$0.6848 \pm 0.0082$	$z_{\text{drag}}$	$1059.65 \pm 0.85$	$\sigma_8(2.33)$	$0.3063^{+0.0026}_{-0.0032}$
$\Omega_m$	$0.3152 \pm 0.0082$	$r_{\text{drag}}$	$147.23 \pm 0.31$	$f_{2000}^{143}$	$29 \pm 3$
$\Omega_m h^2$	$0.1428 \pm 0.0011$	$k_{\text{D}}$	$0.14081^{+0.00054}_{-0.00043}$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.5$
$\Omega_m h^3$	$0.09609 \pm 0.00056$	$100\theta_{\text{D}}$	$0.16070^{+0.00051}_{-0.00062}$	$f_{2000}^{217}$	$106.6 \pm 2.4$
$\sigma_8$	$0.8100 \pm 0.0066$	$z_{\text{eq}}$	$3396 \pm 27$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.69$
$S_8$	$0.830 \pm 0.013$	$k_{\text{eq}}$	$0.010365 \pm 0.000083$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\sigma_8 \Omega_m^{0.5}$	$0.4547 \pm 0.0071$	$100\theta_{\text{eq}}$	$0.8141 \pm 0.0052$	$\chi_{\text{lowl}}^2$	$23.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6069 \pm 0.0065$	$100\theta_{\text{s,eq}}$	$0.4499 \pm 0.0027$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9873 \pm 0.0091$	$H(0.15)$	$72.63 \pm 0.57$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11951.89$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.79$ ;  $R - 1 = 0.01571$



## 20.17 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_BAO\_lensing\_z

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02237 \pm 0.00018$	$z_{\text{re}}$	$7.87^{+0.62}_{-0.75}$	$D_{\text{M}}(0.51)$	$1980 \pm 11$
$\Omega_c h^2$	$0.11917 \pm 0.00094$	$10^9 A_s$	$2.104^{+0.027}_{-0.033}$	$H(0.61)$	$95.36 \pm 0.27$
$100\theta_{MC}$	$1.04097^{+0.00054}_{-0.00060}$	$10^9 A_s e^{-2\tau}$	$1.879 \pm 0.012$	$D_{\text{M}}(0.61)$	$2304 \pm 12$
$\tau$	$0.0564^{+0.0057}_{-0.0077}$	$D_{40}$	$1227 \pm 15$	$H(2.33)$	$236.02 \pm 0.61$
$Y_{He}$	$0.245^{+0.013}_{-0.015}$	$D_{220}$	$5732 \pm 39$	$D_{\text{M}}(2.33)$	$5761 \pm 14$
$\ln(10^{10} A_s)$	$3.046^{+0.013}_{-0.016}$	$D_{810}$	$2538 \pm 13$	$f\sigma_8(0.15)$	$0.4559 \pm 0.0055$
$n_s$	$0.9668^{+0.0063}_{-0.0071}$	$D_{1420}$	$817.0 \pm 5.0$	$\sigma_8(0.15)$	$0.7484^{+0.0059}_{-0.0067}$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{2000}$	$230.8 \pm 2.1$	$f\sigma_8(0.38)$	$0.4744 \pm 0.0048$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9668^{+0.0063}_{-0.0071}$	$\sigma_8(0.38)$	$0.6635^{+0.0052}_{-0.0060}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.245^{+0.013}_{-0.015}$	$f\sigma_8(0.51)$	$0.4732 \pm 0.0044$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.247^{+0.014}_{-0.015}$	$\sigma_8(0.51)$	$0.6210^{+0.0049}_{-0.0057}$
$A_{100}^{PS}$	$249 \pm 30$	Age/Gyr	$13.792 \pm 0.033$	$f\sigma_8(0.61)$	$0.4683 \pm 0.0042$
$A_{143}^{PS}$	$42^{+9}_{-8}$	$z_*$	$1089.84^{+0.45}_{-0.55}$	$\sigma_8(0.61)$	$0.5909^{+0.0047}_{-0.0055}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.64 \pm 0.27$	$f\sigma_8(2.33)$	$0.2980^{+0.0024}_{-0.0029}$
$A^{kSZ}$	$< 5.23$	$100\theta_*$	$1.04115 \pm 0.00031$	$\sigma_8(2.33)$	$0.3072^{+0.0026}_{-0.0031}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0011}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.893 \pm 0.026$	$f_{2000}^{143}$	$29 \pm 3$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.89 \pm 0.80$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.5$
$H_0$	$67.67 \pm 0.50$	$r_{\text{drag}}$	$147.31 \pm 0.30$	$f_{2000}^{217}$	$106.8 \pm 2.4$
$\Omega_\Lambda$	$0.6894 \pm 0.0061$	$k_{\text{D}}$	$0.14064^{+0.00051}_{-0.00039}$	$\chi_{\text{lensing}}^2$	$9.17 \pm 0.65$
$\Omega_m$	$0.3106 \pm 0.0061$	$100\theta_{\text{D}}$	$0.16079^{+0.00050}_{-0.00063}$	$\chi_{\text{simall}}^2$	$397.2 \pm 2.0$
$\Omega_m h^2$	$0.14219 \pm 0.00091$	$z_{\text{eq}}$	$3382 \pm 22$	$\chi_{\text{lowl}}^2$	$23.2 \pm 1.2$
$\Omega_m h^3$	$0.09621 \pm 0.00054$	$k_{\text{eq}}$	$0.010323 \pm 0.000066$	$\chi_{6\text{DF}}^2$	$0.052 \pm 0.061$
$\sigma_8$	$0.8098^{+0.0064}_{-0.0071}$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0040$	$\chi_{\text{MGS}}^2$	$1.29 \pm 0.43$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0021$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4513 \pm 0.0059$	$H(0.15)$	$72.94 \pm 0.44$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6045 \pm 0.0059$	$D_{\text{M}}(0.15)$	$640.8 \pm 4.3$	$\chi_{\text{CMB}}^2$	$7367 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9844 \pm 0.0086$	$H(0.38)$	$83.04 \pm 0.35$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$r_{\text{drag}} h$	$99.68 \pm 0.78$	$D_{\text{M}}(0.38)$	$1528.4 \pm 8.8$		
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.022$	$H(0.51)$	$89.75 \pm 0.31$		

$$\bar{\chi}_{\text{eff}}^2 = 11957.86; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.38; R - 1 = 0.02091$$



20.18 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_post\_Riess18\_zre6p5

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02253 \pm 0.00020$	$r_{\text{drag}} h$	$100.7 \pm 1.2$	$D_{\text{M}}(0.15)$	$635.3 \pm 6.0$
$\Omega_c h^2$	$0.1181 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.413 \pm 0.032$	$H(0.38)$	$83.48 \pm 0.49$
$100\theta_{MC}$	$1.04142^{+0.00061}_{-0.00070}$	$z_{\text{re}}$	$7.96^{+0.64}_{-0.86}$	$D_{\text{M}}(0.38)$	$1517 \pm 12$
$\tau$	$0.0575^{+0.0061}_{-0.0086}$	$10^9 A_s$	$2.108^{+0.029}_{-0.039}$	$H(0.51)$	$90.12 \pm 0.41$
$Y_{He}$	$0.254^{+0.015}_{-0.018}$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.012$	$D_{\text{M}}(0.51)$	$1967 \pm 15$
$\ln(10^{10} A_s)$	$3.048^{+0.014}_{-0.018}$	$D_{40}$	$1215 \pm 18$	$H(0.61)$	$95.68 \pm 0.35$
$n_s$	$0.9731^{+0.0077}_{-0.0089}$	$D_{220}$	$5733 \pm 38$	$D_{\text{M}}(0.61)$	$2290 \pm 16$
$y_{\text{cal}}$	$1.0007 \pm 0.0024$	$D_{810}$	$2538 \pm 13$	$H(2.33)$	$235.54 \pm 0.82$
$A_{217}^{CIB}$	$44 \pm 8$	$D_{1420}$	$816.9 \pm 5.1$	$D_{\text{M}}(2.33)$	$5746 \pm 17$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.3^{+2.4}_{-2.1}$	$f\sigma_8(0.15)$	$0.4503 \pm 0.0082$
$A_{143}^{tSZ}$	$4.6 \pm 2.2$	$n_{s,0.002}$	$0.9731^{+0.0077}_{-0.0089}$	$\sigma_8(0.15)$	$0.7481^{+0.0067}_{-0.0080}$
$A_{100}^{PS}$	$252 \pm 27$	$Y_P$	$0.254^{+0.015}_{-0.018}$	$f\sigma_8(0.38)$	$0.4705 \pm 0.0068$
$A_{143}^{PS}$	$43 \pm 9$	$Y_P^{\text{BBN}}$	$0.256^{+0.015}_{-0.018}$	$\sigma_8(0.38)$	$0.6641^{+0.0057}_{-0.0071}$
$A_{217}^{PS}$	$108^{+10}_{-10}$	Age/Gyr	$13.758 \pm 0.039$	$f\sigma_8(0.51)$	$0.4701 \pm 0.0061$
$A^{kSZ}$	$< 5.76$	$z_*$	$1089.93^{+0.47}_{-0.59}$	$\sigma_8(0.51)$	$0.6219^{+0.0053}_{-0.0067}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0011}$	$r_*$	$144.76 \pm 0.32$	$f\sigma_8(0.61)$	$0.4658 \pm 0.0056$
$c_{217}$	$0.9997^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04135 \pm 0.00033$	$\sigma_8(0.61)$	$0.5920^{+0.0051}_{-0.0064}$
$H_0$	$68.32 \pm 0.72$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.901 \pm 0.031$	$f\sigma_8(2.33)$	$0.2988^{+0.0026}_{-0.0033}$
$\Omega_\Lambda$	$0.6971 \pm 0.0088$	$z_{\text{drag}}$	$1060.48^{+0.82}_{-0.93}$	$\sigma_8(2.33)$	$0.3085^{+0.0028}_{-0.0036}$
$\Omega_m$	$0.3029 \pm 0.0088$	$r_{\text{drag}}$	$147.38 \pm 0.34$	$f_{2000}^{143}$	$30 \pm 4$
$\Omega_m h^2$	$0.1413 \pm 0.0013$	$k_{\text{D}}$	$0.14031^{+0.00067}_{-0.00052}$	$f_{2000}^{143 \times 217}$	$32.7 \pm 2.6$
$\Omega_m h^3$	$0.09653 \pm 0.00056$	$100\theta_{\text{D}}$	$0.16107^{+0.00055}_{-0.00073}$	$f_{2000}^{217}$	$107.5 \pm 2.4$
$\sigma_8$	$0.8086^{+0.0076}_{-0.0088}$	$z_{\text{eq}}$	$3362 \pm 31$	$\chi_{\text{small}}^2$	$397.4 \pm 2.4$
$S_8$	$0.813 \pm 0.016$	$k_{\text{eq}}$	$0.010260 \pm 0.000094$	$\chi_{\text{lowl}}^2$	$22.3 \pm 1.2$
$\sigma_8 \Omega_m^{0.5}$	$0.4450 \pm 0.0088$	$100\theta_{\text{eq}}$	$0.8215 \pm 0.0060$	$\chi_{\text{H073p45}}^2$	$9.7 \pm 2.7$
$\sigma_8 \Omega_m^{0.25}$	$0.5999 \pm 0.0083$	$100\theta_{\text{s,eq}}$	$0.4536 \pm 0.0031$	$\chi_{\text{prior}}^2$	$9.8 \pm 4.6$
$\sigma_8/h^{0.5}$	$0.978 \pm 0.012$	$H(0.15)$	$73.51 \pm 0.63$	$\chi_{\text{CMB}}^2$	$7360 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11953.75$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9149.01$ ;  $R - 1 = 0.05858$



20.19 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02230 \pm 0.00016$	$r_{\text{drag}} h$	$99.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$644.0 \pm 5.4$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.442 \pm 0.030$	$H(0.38)$	$82.80 \pm 0.39$
$100\theta_{MC}$	$1.04082 \pm 0.00034$	$z_{\text{re}}$	$7.56 \pm 0.81$	$D_{\text{M}}(0.38)$	$1535 \pm 11$
$\tau$	$0.0533 \pm 0.0079$	$10^9 A_s$	$2.092 \pm 0.035$	$H(0.51)$	$89.56 \pm 0.31$
$Y_{He}$	$0.2435 \pm 0.0038$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.012$	$D_{\text{M}}(0.51)$	$1988 \pm 13$
$\ln(10^{10} A_s)$	$3.041 \pm 0.017$	$D_{40}$	$1230 \pm 14$	$H(0.61)$	$95.21 \pm 0.25$
$n_s$	$0.9645 \pm 0.0048$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2312 \pm 14$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.44 \pm 0.86$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 4.9$	$D_{\text{M}}(2.33)$	$5767 \pm 12$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.7 \pm 1.7$	$f\sigma_8(0.15)$	$0.4590 \pm 0.0086$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9645 \pm 0.0048$	$\sigma_8(0.15)$	$0.7476 \pm 0.0069$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P$	$0.2435 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4764 \pm 0.0070$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.2448 \pm 0.0038$	$\sigma_8(0.38)$	$0.6623 \pm 0.0058$
$A_{217}^{PS}$	$109^{+20}_{-10}$	Age/Gyr	$13.807 \pm 0.026$	$f\sigma_8(0.51)$	$0.4745 \pm 0.0062$
$A^{kSZ}$	$< 5.26$	$z_*$	$1089.92 \pm 0.30$	$\sigma_8(0.51)$	$0.6196 \pm 0.0054$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.51 \pm 0.33$	$f\sigma_8(0.61)$	$0.4692 \pm 0.0057$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$100\theta_*$	$1.04106 \pm 0.00031$	$\sigma_8(0.61)$	$0.5894 \pm 0.0051$
$H_0$	$67.29 \pm 0.63$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.881 \pm 0.031$	$f\sigma_8(2.33)$	$0.2970 \pm 0.0026$
$\Omega_\Lambda$	$0.6843 \pm 0.0087$	$z_{\text{drag}}$	$1059.72 \pm 0.39$	$\sigma_8(2.33)$	$0.3061 \pm 0.0027$
$\Omega_m$	$0.3157 \pm 0.0087$	$r_{\text{drag}}$	$147.19 \pm 0.33$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$\Omega_m h^2$	$0.1429 \pm 0.0014$	$k_{\text{D}}$	$0.14079 \pm 0.00038$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.0$
$\Omega_m h^3$	$0.09614 \pm 0.00035$	$100\theta_{\text{D}}$	$0.16076 \pm 0.00023$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\sigma_8$	$0.8095 \pm 0.0078$	$z_{\text{eq}}$	$3399 \pm 32$	$\chi_{\text{small}}^2$	$397.0 \pm 1.8$
$S_8$	$0.830 \pm 0.017$	$k_{\text{eq}}$	$0.010374 \pm 0.000099$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4548 \pm 0.0092$	$100\theta_{\text{eq}}$	$0.8137 \pm 0.0061$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6068 \pm 0.0086$	$100\theta_{\text{s,eq}}$	$0.4496 \pm 0.0031$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.987 \pm 0.012$	$H(0.15)$	$72.62 \pm 0.54$	$\chi_{\text{CMB}}^2$	$7358 \pm 5000$

Best-fit  $\chi_{\text{eff}}^2 = 11927.35$ ;  $\Delta\chi_{\text{eff}}^2 = 9161.78$ ;  $\bar{\chi}_{\text{eff}}^2 = 11943.52$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.81$ ;  $R - 1 = 0.01118$   
 $\chi_{\text{eff}}^2$ : Abund - Yp\_Aver2015: 0.08 ( $\Delta$  0.06) CMB - simall\_100x143\_offlike5\_EE\_Aplanck\_B: 402.51 ( $\Delta$  6.45) commander\_dx12\_v3.2.29: 23.31 ( $\Delta$  -0.17) CamSpec like\_10.7HM\_1400\_unified: 11498.08



20.20 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.66 \pm 0.80$	$D_{\text{M}}(0.51)$	$1980.3 \pm 9.2$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$10^9 A_s$	$2.093 \pm 0.035$	$H(0.61)$	$95.34 \pm 0.20$
$100\theta_{MC}$	$1.04093 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.61)$	$2304.5 \pm 9.9$
$\tau$	$0.0544 \pm 0.0079$	$D_{40}$	$1226 \pm 12$	$H(2.33)$	$235.97 \pm 0.65$
$Y_{He}$	$0.2437 \pm 0.0038$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5761.9 \pm 9.7$
$\ln(10^{10} A_s)$	$3.041 \pm 0.017$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4546 \pm 0.0067$
$n_s$	$0.9665 \pm 0.0041$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.15)$	$0.7463 \pm 0.0067$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.7$	$f\sigma_8(0.38)$	$0.4731 \pm 0.0058$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9665 \pm 0.0041$	$\sigma_8(0.38)$	$0.6616 \pm 0.0058$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2437 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4718 \pm 0.0053$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2451 \pm 0.0038$	$\sigma_8(0.51)$	$0.6192 \pm 0.0054$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.795 \pm 0.022$	$f\sigma_8(0.61)$	$0.4669 \pm 0.0050$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.79 \pm 0.26$	$\sigma_8(0.61)$	$0.5892 \pm 0.0051$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.68 \pm 0.26$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0026$
$A^{kSZ}$	$< 5.24$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3064 \pm 0.0027$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.896 \pm 0.025$	$f_{2000}^{143}$	$29.3 \pm 2.9$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.79 \pm 0.38$	$f_{2000}^{143 \times 217}$	$31.9 \pm 2.0$
$H_0$	$67.66 \pm 0.46$	$r_{\text{drag}}$	$147.34 \pm 0.28$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$\Omega_\Lambda$	$0.6895 \pm 0.0062$	$k_{\text{D}}$	$0.14066 \pm 0.00035$	$\chi_{\text{small}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3105 \pm 0.0062$	$100\theta_{\text{D}}$	$0.16074 \pm 0.00023$	$\chi_{\text{lowl}}^2$	$23.10 \pm 0.88$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$z_{\text{eq}}$	$3381 \pm 24$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.2$
$\Omega_m h^3$	$0.09615 \pm 0.00035$	$k_{\text{eq}}$	$0.010318 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.052 \pm 0.063$
$\sigma_8$	$0.8075 \pm 0.0075$	$100\theta_{\text{eq}}$	$0.8172 \pm 0.0044$	$\chi_{\text{MGS}}^2$	$1.30 \pm 0.44$
$S_8$	$0.821 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4514 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4499 \pm 0.0071$	$H(0.15)$	$72.93 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6028 \pm 0.0072$	$D_{\text{M}}(0.15)$	$640.8 \pm 3.9$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\sigma_8/h^{0.5}$	$0.982 \pm 0.011$	$H(0.38)$	$83.03 \pm 0.29$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.70 \pm 0.79$	$D_{\text{M}}(0.38)$	$1528.6 \pm 7.8$		
$\langle d^2 \rangle^{1/2}$	$2.430 \pm 0.026$	$H(0.51)$	$89.73 \pm 0.24$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.33; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.32; R - 1 = 0.01547$$



**20.21**    **base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.443 \pm 0.022$	$D_M(0.38)$	$1534.4 \pm 9.5$
$\Omega_c h^2$	$0.1199 \pm 0.0012$	$z_{\text{re}}$	$7.61 \pm 0.76$	$H(0.51)$	$89.57 \pm 0.28$
$100\theta_{MC}$	$1.04082 \pm 0.00034$	$10^9 A_s$	$2.094 \pm 0.031$	$D_M(0.51)$	$1987 \pm 11$
$\tau$	$0.0537 \pm 0.0075$	$10^9 A_s e^{-2\tau}$	$1.881 \pm 0.011$	$H(0.61)$	$95.22 \pm 0.23$
$Y_{He}$	$0.2434 \pm 0.0038$	$D_{40}$	$1231 \pm 12$	$D_M(0.61)$	$2312 \pm 12$
$\ln(10^{10} A_s)$	$3.042 \pm 0.015$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$236.41 \pm 0.74$
$n_s$	$0.9644 \pm 0.0045$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5767 \pm 11$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$816.5 \pm 4.9$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0066$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.7$	$\sigma_8(0.15)$	$0.7478 \pm 0.0055$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9644 \pm 0.0045$	$f\sigma_8(0.38)$	$0.4763 \pm 0.0053$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2434 \pm 0.0038$	$\sigma_8(0.38)$	$0.6624 \pm 0.0049$
$A_{100}^{PS}$	$249 \pm 30$	$Y_P^{\text{BBN}}$	$0.2448 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4745 \pm 0.0047$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.806 \pm 0.025$	$\sigma_8(0.51)$	$0.6198 \pm 0.0046$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.91 \pm 0.28$	$f\sigma_8(0.61)$	$0.4692 \pm 0.0042$
$A^{kSZ}$	$< 5.27$	$r_*$	$144.52 \pm 0.28$	$\sigma_8(0.61)$	$0.5896 \pm 0.0044$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04106 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2971 \pm 0.0023$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.882 \pm 0.027$	$\sigma_8(2.33)$	$0.3062 \pm 0.0025$
$H_0$	$67.32 \pm 0.55$	$z_{\text{drag}}$	$1059.72 \pm 0.39$	$f_{2000}^{143}$	$29.5 \pm 2.8$
$\Omega_\Lambda$	$0.6847 \pm 0.0076$	$r_{\text{drag}}$	$147.20 \pm 0.29$	$f_{2000}^{143 \times 217}$	$32.1 \pm 2.0$
$\Omega_m$	$0.3153 \pm 0.0076$	$k_D$	$0.14079 \pm 0.00035$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\Omega_m h^2$	$0.1428 \pm 0.0012$	$100\theta_D$	$0.16075 \pm 0.00023$	$\chi_{\text{lensing}}^2$	$9.25 \pm 0.69$
$\Omega_m h^3$	$0.09614 \pm 0.00034$	$z_{\text{eq}}$	$3398 \pm 28$	$\chi_{\text{small}}^2$	$396.9 \pm 1.6$
$\sigma_8$	$0.8096 \pm 0.0061$	$k_{\text{eq}}$	$0.010371 \pm 0.000085$	$\chi_{\text{lowl}}^2$	$23.52 \pm 0.94$
$S_8$	$0.830 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0052$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0071$	$100\theta_{s,\text{eq}}$	$0.4497 \pm 0.0027$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6067 \pm 0.0065$	$H(0.15)$	$72.64 \pm 0.48$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9868 \pm 0.0092$	$D_M(0.15)$	$643.8 \pm 4.8$		
$r_{\text{drag}} h$	$99.09 \pm 0.95$	$H(0.38)$	$82.82 \pm 0.35$		

$\bar{\chi}_{\text{eff}}^2 = 11952.40$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.90$ ;  $R - 1 = 0.01479$



## 20.22 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_lensing/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO.l

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.78 \pm 0.73$	$D_{\text{M}}(0.51)$	$1980.9 \pm 8.7$
$\Omega_c h^2$	$0.11919 \pm 0.00095$	$10^9 A_s$	$2.099 \pm 0.031$	$H(0.61)$	$95.33 \pm 0.19$
$100\theta_{MC}$	$1.04092 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$D_{\text{M}}(0.61)$	$2305.1 \pm 9.5$
$\tau$	$0.0556 \pm 0.0073$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$236.02 \pm 0.60$
$Y_{\text{He}}$	$0.2437 \pm 0.0038$	$D_{220}$	$5732 \pm 39$	$D_{\text{M}}(2.33)$	$5762.2 \pm 9.6$
$\ln(10^{10} A_s)$	$3.044 \pm 0.015$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4556 \pm 0.0055$
$n_s$	$0.9661 \pm 0.0040$	$D_{1420}$	$817.2 \pm 4.8$	$\sigma_8(0.15)$	$0.7475 \pm 0.0056$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.7$	$f\sigma_8(0.38)$	$0.4741 \pm 0.0047$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9661 \pm 0.0040$	$\sigma_8(0.38)$	$0.6626 \pm 0.0049$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2437 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4727 \pm 0.0043$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2450 \pm 0.0038$	$\sigma_8(0.51)$	$0.6201 \pm 0.0046$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.795 \pm 0.022$	$f\sigma_8(0.61)$	$0.4678 \pm 0.0040$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.79 \pm 0.25$	$\sigma_8(0.61)$	$0.5901 \pm 0.0044$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.65 \pm 0.24$	$f\sigma_8(2.33)$	$0.2975 \pm 0.0023$
$A^{kSZ}$	$< 5.19$	$100\theta_*$	$1.04115 \pm 0.00029$	$\sigma_8(2.33)$	$0.3068 \pm 0.0024$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.023$	$f_{2000}^{143}$	$29.2 \pm 2.8$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.80 \pm 0.38$	$f_{2000}^{143 \times 217}$	$31.9 \pm 2.0$
$H_0$	$67.63 \pm 0.43$	$r_{\text{drag}}$	$147.32 \pm 0.26$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$\Omega_{\Lambda}$	$0.6890 \pm 0.0057$	$k_{\text{D}}$	$0.14068 \pm 0.00033$	$\chi_{\text{lensing}}^2$	$9.18 \pm 0.68$
$\Omega_m$	$0.3110 \pm 0.0057$	$100\theta_{\text{D}}$	$0.16073 \pm 0.00023$	$\chi_{\text{simall}}^2$	$397.2 \pm 1.8$
$\Omega_m h^2$	$0.14220 \pm 0.00091$	$z_{\text{eq}}$	$3383 \pm 22$	$\chi_{\text{lowl}}^2$	$23.21 \pm 0.83$
$\Omega_m h^3$	$0.09617 \pm 0.00034$	$k_{\text{eq}}$	$0.010324 \pm 0.000067$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.2$
$\sigma_8$	$0.8088 \pm 0.0061$	$100\theta_{\text{eq}}$	$0.8168 \pm 0.0041$	$\chi_{6\text{DF}}^2$	$0.053 \pm 0.061$
$S_8$	$0.823 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4512 \pm 0.0021$	$\chi_{\text{MGS}}^2$	$1.26 \pm 0.40$
$\sigma_8 \Omega_m^{0.5}$	$0.4510 \pm 0.0059$	$H(0.15)$	$72.91 \pm 0.37$	$\chi_{\text{DR12BAO}}^2$	$4.8 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6040 \pm 0.0058$	$D_{\text{M}}(0.15)$	$641.1 \pm 3.7$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9835 \pm 0.0085$	$H(0.38)$	$83.01 \pm 0.28$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.63 \pm 0.73$	$D_{\text{M}}(0.38)$	$1529.1 \pm 7.4$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\langle d^2 \rangle^{1/2}$	$2.435 \pm 0.021$	$H(0.51)$	$89.72 \pm 0.23$		

$$\bar{\chi}_{\text{eff}}^2 = 11958.34; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.69; R - 1 = 0.01579$$



**20.23**    **base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_zre6p5**

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02231 \pm 0.00016$	$r_{\text{drag}} h$	$99.1 \pm 1.1$	$D_{\text{M}}(0.15)$	$643.8 \pm 5.4$
$\Omega_c h^2$	$0.1199 \pm 0.0014$	$\langle d^2 \rangle^{1/2}$	$2.445 \pm 0.029$	$H(0.38)$	$82.82 \pm 0.39$
$100\theta_{MC}$	$1.04083 \pm 0.00034$	$z_{\text{re}}$	$7.72^{+0.56}_{-0.81}$	$D_{\text{M}}(0.38)$	$1534 \pm 11$
$\tau$	$0.0547^{+0.0050}_{-0.0082}$	$10^9 A_s$	$2.098^{+0.025}_{-0.034}$	$H(0.51)$	$89.57 \pm 0.31$
$Y_{He}$	$0.2435 \pm 0.0038$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.012$	$D_{\text{M}}(0.51)$	$1987 \pm 13$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.016}$	$D_{40}$	$1230 \pm 14$	$H(0.61)$	$95.22 \pm 0.25$
$n_s$	$0.9647 \pm 0.0048$	$D_{220}$	$5725 \pm 40$	$D_{\text{M}}(0.61)$	$2312 \pm 14$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{810}$	$2537 \pm 14$	$H(2.33)$	$236.41 \pm 0.86$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{1420}$	$816.5 \pm 4.9$	$D_{\text{M}}(2.33)$	$5767 \pm 12$
$\xi^{tSZ-CIB}$	—	$D_{2000}$	$230.7 \pm 1.7$	$f\sigma_8(0.15)$	$0.4594 \pm 0.0085$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$n_{s,0.002}$	$0.9647 \pm 0.0048$	$\sigma_8(0.15)$	$0.7486 \pm 0.0063$
$A_{100}^{PS}$	$248 \pm 30$	$Y_P$	$0.2435 \pm 0.0038$	$f\sigma_8(0.38)$	$0.4768 \pm 0.0069$
$A_{143}^{PS}$	$42 \pm 9$	$Y_P^{\text{BBN}}$	$0.2449 \pm 0.0038$	$\sigma_8(0.38)$	$0.6631^{+0.0048}_{-0.0056}$
$A_{217}^{PS}$	$109^{+20}_{-10}$	Age/Gyr	$13.806 \pm 0.026$	$f\sigma_8(0.51)$	$0.4750 \pm 0.0061$
$A^{kSZ}$	$< 5.23$	$z_*$	$1089.92 \pm 0.30$	$\sigma_8(0.51)$	$0.6204^{+0.0043}_{-0.0052}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$r_*$	$144.52 \pm 0.33$	$f\sigma_8(0.61)$	$0.4697 \pm 0.0055$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$100\theta_*$	$1.04107 \pm 0.00032$	$\sigma_8(0.61)$	$0.5902^{+0.0040}_{-0.0050}$
$H_0$	$67.32 \pm 0.63$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.882 \pm 0.031$	$f\sigma_8(2.33)$	$0.2975^{+0.0019}_{-0.0025}$
$\Omega_\Lambda$	$0.6847 \pm 0.0087$	$z_{\text{drag}}$	$1059.72 \pm 0.39$	$\sigma_8(2.33)$	$0.3065^{+0.0020}_{-0.0026}$
$\Omega_m$	$0.3153 \pm 0.0087$	$r_{\text{drag}}$	$147.20 \pm 0.33$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_m h^2$	$0.1428 \pm 0.0013$	$k_{\text{D}}$	$0.14078 \pm 0.00038$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.0$
$\Omega_m h^3$	$0.09615 \pm 0.00035$	$100\theta_{\text{D}}$	$0.16076 \pm 0.00023$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\sigma_8$	$0.8105 \pm 0.0073$	$z_{\text{eq}}$	$3398 \pm 32$	$\chi_{\text{small}}^2$	$396.9 \pm 1.8$
$S_8$	$0.831 \pm 0.017$	$k_{\text{eq}}$	$0.010371 \pm 0.000098$	$\chi_{\text{lowl}}^2$	$23.5 \pm 1.1$
$\sigma_8 \Omega_m^{0.5}$	$0.4551 \pm 0.0092$	$100\theta_{\text{eq}}$	$0.8139 \pm 0.0060$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6073 \pm 0.0085$	$100\theta_{\text{s,eq}}$	$0.4497 \pm 0.0031$	$\chi_{\text{prior}}^2$	$9.6 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.988 \pm 0.012$	$H(0.15)$	$72.64 \pm 0.54$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$

$\bar{\chi}_{\text{eff}}^2 = 11943.23$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.77$ ;  $R - 1 = 0.01041$



## 20.24 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_z

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.78^{+0.59}_{-0.82}$	$D_{\text{M}}(0.51)$	$1980.0 \pm 9.2$
$\Omega_c h^2$	$0.1191 \pm 0.0010$	$10^9 A_s$	$2.098^{+0.026}_{-0.036}$	$H(0.61)$	$95.35 \pm 0.20$
$100\theta_{MC}$	$1.04093 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.877 \pm 0.011$	$D_{\text{M}}(0.61)$	$2304.2 \pm 9.9$
$\tau$	$0.0556^{+0.0054}_{-0.0083}$	$D_{40}$	$1226 \pm 12$	$H(2.33)$	$235.95 \pm 0.65$
$Y_{\text{He}}$	$0.2438 \pm 0.0038$	$D_{220}$	$5729 \pm 39$	$D_{\text{M}}(2.33)$	$5761.7 \pm 9.7$
$\ln(10^{10} A_s)$	$3.043^{+0.012}_{-0.017}$	$D_{810}$	$2536 \pm 14$	$f\sigma_8(0.15)$	$0.4550 \pm 0.0066$
$n_s$	$0.9666 \pm 0.0041$	$D_{1420}$	$817.0 \pm 4.9$	$\sigma_8(0.15)$	$0.7471^{+0.0056}_{-0.0066}$
$y_{\text{cal}}$	$1.0006 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.7$	$f\sigma_8(0.38)$	$0.4735 \pm 0.0056$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9666 \pm 0.0041$	$\sigma_8(0.38)$	$0.6623^{+0.0047}_{-0.0058}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2438 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4722 \pm 0.0051$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2451 \pm 0.0038$	$\sigma_8(0.51)$	$0.6199^{+0.0043}_{-0.0054}$
$A_{100}^{PS}$	$248 \pm 30$	Age/Gyr	$13.794 \pm 0.022$	$f\sigma_8(0.61)$	$0.4674 \pm 0.0047$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.79 \pm 0.26$	$\sigma_8(0.61)$	$0.5899^{+0.0040}_{-0.0051}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.68 \pm 0.26$	$f\sigma_8(2.33)$	$0.2975^{+0.0020}_{-0.0026}$
$A^{kSZ}$	$< 5.21$	$100\theta_*$	$1.04116 \pm 0.00029$	$\sigma_8(2.33)$	$0.3067^{+0.0020}_{-0.0027}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.896 \pm 0.025$	$f_{2000}^{143}$	$29.3 \pm 2.8$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$z_{\text{drag}}$	$1059.80 \pm 0.38$	$f_{2000}^{143 \times 217}$	$31.9 \pm 2.0$
$H_0$	$67.67 \pm 0.46$	$r_{\text{drag}}$	$147.35 \pm 0.28$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$\Omega_{\Lambda}$	$0.6897 \pm 0.0062$	$k_{\text{D}}$	$0.14065 \pm 0.00035$	$\chi_{\text{simall}}^2$	$397.1 \pm 1.9$
$\Omega_m$	$0.3103 \pm 0.0062$	$100\theta_{\text{D}}$	$0.16073 \pm 0.00023$	$\chi_{\text{lowl}}^2$	$23.11 \pm 0.88$
$\Omega_m h^2$	$0.1421 \pm 0.0010$	$z_{\text{eq}}$	$3380 \pm 24$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.2$
$\Omega_m h^3$	$0.09616 \pm 0.00035$	$k_{\text{eq}}$	$0.010317 \pm 0.000073$	$\chi_{6\text{DF}}^2$	$0.051 \pm 0.062$
$\sigma_8$	$0.8083^{+0.0064}_{-0.0074}$	$100\theta_{\text{eq}}$	$0.8173 \pm 0.0044$	$\chi_{\text{MGS}}^2$	$1.31 \pm 0.44$
$S_8$	$0.822 \pm 0.013$	$100\theta_{\text{s,eq}}$	$0.4515 \pm 0.0023$	$\chi_{\text{DR12BAO}}^2$	$4.7 \pm 1.4$
$\sigma_8 \Omega_m^{0.5}$	$0.4503 \pm 0.0070$	$H(0.15)$	$72.94 \pm 0.39$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6033 \pm 0.0069$	$D_{\text{M}}(0.15)$	$640.7 \pm 3.9$	$\chi_{\text{BAO}}^2$	$6.1 \pm 1.1$
$\sigma_8/h^{0.5}$	$0.983 \pm 0.010$	$H(0.38)$	$83.03 \pm 0.29$	$\chi_{\text{CMB}}^2$	$7357 \pm 5000$
$r_{\text{drag}} h$	$99.72 \pm 0.79$	$D_{\text{M}}(0.38)$	$1528.4 \pm 7.8$		
$\langle d^2 \rangle^{1/2}$	$2.432 \pm 0.025$	$H(0.51)$	$89.74 \pm 0.24$		

$$\bar{\chi}_{\text{eff}}^2 = 11949.07; \Delta\bar{\chi}_{\text{eff}}^2 = 9150.26; R - 1 = 0.01536$$



20.25 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_lensing

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02232 \pm 0.00016$	$\langle d^2 \rangle^{1/2}$	$2.444 \pm 0.022$	$D_M(0.38)$	$1533.9 \pm 9.3$
$\Omega_c h^2$	$0.1198 \pm 0.0012$	$z_{\text{re}}$	$7.72^{+0.57}_{-0.76}$	$H(0.51)$	$89.59 \pm 0.28$
$100\theta_{MC}$	$1.04083 \pm 0.00034$	$10^9 A_s$	$2.098^{+0.023}_{-0.031}$	$D_M(0.51)$	$1986 \pm 11$
$\tau$	$0.0548^{+0.0053}_{-0.0078}$	$10^9 A_s e^{-2\tau}$	$1.880 \pm 0.011$	$H(0.61)$	$95.23 \pm 0.23$
$Y_{He}$	$0.2435 \pm 0.0038$	$D_{40}$	$1231 \pm 12$	$D_M(0.61)$	$2311 \pm 12$
$\ln(10^{10} A_s)$	$3.044^{+0.011}_{-0.015}$	$D_{220}$	$5727 \pm 39$	$H(2.33)$	$236.37 \pm 0.73$
$n_s$	$0.9646 \pm 0.0044$	$D_{810}$	$2537 \pm 13$	$D_M(2.33)$	$5767 \pm 11$
$y_{\text{cal}}$	$1.0005 \pm 0.0025$	$D_{1420}$	$816.5 \pm 4.9$	$f\sigma_8(0.15)$	$0.4589 \pm 0.0066$
$A_{217}^{CIB}$	$43 \pm 8$	$D_{2000}$	$230.7 \pm 1.7$	$\sigma_8(0.15)$	$0.7484 \pm 0.0051$
$\xi^{tSZ-CIB}$	—	$n_{s,0.002}$	$0.9646 \pm 0.0044$	$f\sigma_8(0.38)$	$0.4765 \pm 0.0053$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P$	$0.2435 \pm 0.0038$	$\sigma_8(0.38)$	$0.6630^{+0.0041}_{-0.0048}$
$A_{100}^{PS}$	$248 \pm 28$	$Y_P^{\text{BBN}}$	$0.2448 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4747 \pm 0.0046$
$A_{143}^{PS}$	$42 \pm 9$	Age/Gyr	$13.805 \pm 0.025$	$\sigma_8(0.51)$	$0.6203^{+0.0038}_{-0.0045}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$z_*$	$1089.90 \pm 0.28$	$f\sigma_8(0.61)$	$0.4695 \pm 0.0042$
$A^{kSZ}$	$< 5.26$	$r_*$	$144.53 \pm 0.28$	$\sigma_8(0.61)$	$0.5902^{+0.0036}_{-0.0043}$
$c_{100}$	$0.9986^{+0.0018}_{-0.0015}$	$100\theta_*$	$1.04107 \pm 0.00031$	$f\sigma_8(2.33)$	$0.2974^{+0.0018}_{-0.0023}$
$c_{217}$	$0.9996^{+0.0020}_{-0.0024}$	$D_M(z_*)/\text{Gpc}$	$13.883 \pm 0.026$	$\sigma_8(2.33)$	$0.3065^{+0.0019}_{-0.0025}$
$H_0$	$67.35 \pm 0.54$	$z_{\text{drag}}$	$1059.73 \pm 0.39$	$f_{2000}^{143}$	$29.4 \pm 2.8$
$\Omega_\Lambda$	$0.6852 \pm 0.0074$	$r_{\text{drag}}$	$147.21 \pm 0.29$	$f_{2000}^{143 \times 217}$	$32.0 \pm 2.0$
$\Omega_m$	$0.3148 \pm 0.0074$	$k_D$	$0.14077 \pm 0.00034$	$f_{2000}^{217}$	$106.8 \pm 1.9$
$\Omega_m h^2$	$0.1428 \pm 0.0011$	$100\theta_D$	$0.16075 \pm 0.00023$	$\chi_{\text{lensing}}^2$	$9.21 \pm 0.66$
$\Omega_m h^3$	$0.09615 \pm 0.00034$	$z_{\text{eq}}$	$3396 \pm 27$	$\chi_{\text{simall}}^2$	$396.9 \pm 1.7$
$\sigma_8$	$0.8102 \pm 0.0058$	$k_{\text{eq}}$	$0.010366 \pm 0.000083$	$\chi_{\text{lowl}}^2$	$23.50 \pm 0.94$
$S_8$	$0.830 \pm 0.013$	$100\theta_{\text{eq}}$	$0.8142 \pm 0.0051$	$\chi_{\text{Aver15}}^2$	$0.9 \pm 1.3$
$\sigma_8 \Omega_m^{0.5}$	$0.4546 \pm 0.0071$	$100\theta_{s,\text{eq}}$	$0.4499 \pm 0.0026$	$\chi_{\text{prior}}^2$	$9.7 \pm 4.4$
$\sigma_8 \Omega_m^{0.25}$	$0.6069 \pm 0.0064$	$H(0.15)$	$72.67 \pm 0.47$	$\chi_{\text{CMB}}^2$	$7366 \pm 5000$
$\sigma_8/h^{0.5}$	$0.9873 \pm 0.0090$	$D_M(0.15)$	$643.5 \pm 4.7$		
$r_{\text{drag}} h$	$99.15 \pm 0.93$	$H(0.38)$	$82.84 \pm 0.34$		

$\bar{\chi}_{\text{eff}}^2 = 11952.14$ ;  $\Delta\bar{\chi}_{\text{eff}}^2 = 9150.88$ ;  $R - 1 = 0.01491$



20.26 base\_yhe\_CamSpecHM\_TTTEEE\_lowl\_lowE\_Aver15\_post\_BAO\_lensing\_zre6p5/base\_yhe\_plikHM\_TTTEEE\_lowl\_lowE\_Aver15\_post

Parameter	68% limits	Parameter	68% limits	Parameter	68% limits
$\Omega_b h^2$	$0.02236 \pm 0.00015$	$z_{\text{re}}$	$7.85^{+0.61}_{-0.75}$	$D_{\text{M}}(0.51)$	$1980.6 \pm 8.7$
$\Omega_c h^2$	$0.11917 \pm 0.00094$	$10^9 A_s$	$2.102^{+0.025}_{-0.032}$	$H(0.61)$	$95.34 \pm 0.19$
$100\theta_{MC}$	$1.04092 \pm 0.00032$	$10^9 A_s e^{-2\tau}$	$1.878 \pm 0.011$	$D_{\text{M}}(0.61)$	$2304.8 \pm 9.4$
$\tau$	$0.0563^{+0.0057}_{-0.0077}$	$D_{40}$	$1228 \pm 12$	$H(2.33)$	$236.00 \pm 0.59$
$Y_{\text{He}}$	$0.2437 \pm 0.0038$	$D_{220}$	$5732 \pm 39$	$D_{\text{M}}(2.33)$	$5762.0 \pm 9.6$
$\ln(10^{10} A_s)$	$3.045^{+0.012}_{-0.015}$	$D_{810}$	$2537 \pm 13$	$f\sigma_8(0.15)$	$0.4558 \pm 0.0055$
$n_s$	$0.9662 \pm 0.0040$	$D_{1420}$	$817.1 \pm 4.8$	$\sigma_8(0.15)$	$0.7479 \pm 0.0053$
$y_{\text{cal}}$	$1.0007 \pm 0.0025$	$D_{2000}$	$230.9 \pm 1.7$	$f\sigma_8(0.38)$	$0.4742 \pm 0.0046$
$A_{217}^{CIB}$	$43 \pm 8$	$n_{s,0.002}$	$0.9662 \pm 0.0040$	$\sigma_8(0.38)$	$0.6630^{+0.0044}_{-0.0049}$
$\xi^{tSZ-CIB}$	—	$Y_P$	$0.2437 \pm 0.0038$	$f\sigma_8(0.51)$	$0.4729 \pm 0.0042$
$A_{143}^{tSZ}$	$4.7 \pm 2.2$	$Y_P^{\text{BBN}}$	$0.2450 \pm 0.0038$	$\sigma_8(0.51)$	$0.6205^{+0.0040}_{-0.0046}$
$A_{100}^{PS}$	$248 \pm 28$	Age/Gyr	$13.795 \pm 0.022$	$f\sigma_8(0.61)$	$0.4680 \pm 0.0039$
$A_{143}^{PS}$	$42 \pm 9$	$z_*$	$1089.79 \pm 0.25$	$\sigma_8(0.61)$	$0.5904^{+0.0038}_{-0.0044}$
$A_{217}^{PS}$	$109^{+10}_{-10}$	$r_*$	$144.66 \pm 0.24$	$f\sigma_8(2.33)$	$0.2977^{+0.0019}_{-0.0023}$
$A^{kSZ}$	$< 5.19$	$100\theta_*$	$1.04115 \pm 0.00029$	$\sigma_8(2.33)$	$0.3070^{+0.0020}_{-0.0025}$
$c_{100}$	$0.9986^{+0.0017}_{-0.0014}$	$D_{\text{M}}(z_*)/\text{Gpc}$	$13.894 \pm 0.023$	$f_{2000}^{143}$	$29.2 \pm 2.8$
$c_{217}$	$0.9996^{+0.0021}_{-0.0024}$	$z_{\text{drag}}$	$1059.80 \pm 0.38$	$f_{2000}^{143 \times 217}$	$31.8 \pm 2.0$
$H_0$	$67.64 \pm 0.43$	$r_{\text{drag}}$	$147.33 \pm 0.26$	$f_{2000}^{217}$	$106.7 \pm 1.9$
$\Omega_{\Lambda}$	$0.6892 \pm 0.0057$	$k_{\text{D}}$	$0.14068 \pm 0.00033$	$\chi^2_{\text{lensing}}$	$9.14 \pm 0.63$
$\Omega_m$	$0.3108 \pm 0.0057$	$100\theta_{\text{D}}$	$0.16073 \pm 0.00023$	$\chi^2_{\text{simall}}$	$397.2 \pm 1.9$
$\Omega_m h^2$	$0.14217 \pm 0.00091$	$z_{\text{eq}}$	$3382 \pm 22$	$\chi^2_{\text{lowl}}$	$23.21 \pm 0.83$
$\Omega_m h^3$	$0.09617 \pm 0.00034$	$k_{\text{eq}}$	$0.010323 \pm 0.000066$	$\chi^2_{\text{Aver15}}$	$0.9 \pm 1.2$
$\sigma_8$	$0.8092 \pm 0.0058$	$100\theta_{\text{eq}}$	$0.8169 \pm 0.0040$	$\chi^2_{6\text{DF}}$	$0.051 \pm 0.059$
$S_8$	$0.824 \pm 0.011$	$100\theta_{\text{s,eq}}$	$0.4513 \pm 0.0021$	$\chi^2_{\text{MGS}}$	$1.27 \pm 0.40$
$\sigma_8 \Omega_m^{0.5}$	$0.4511 \pm 0.0058$	$H(0.15)$	$72.92 \pm 0.37$	$\chi^2_{\text{DR12BAO}}$	$4.8 \pm 1.3$
$\sigma_8 \Omega_m^{0.25}$	$0.6042 \pm 0.0057$	$D_{\text{M}}(0.15)$	$641.0 \pm 3.7$	$\chi^2_{\text{prior}}$	$9.7 \pm 4.4$
$\sigma_8/h^{0.5}$	$0.9840 \pm 0.0082$	$H(0.38)$	$83.02 \pm 0.28$	$\chi^2_{\text{CMB}}$	$7366 \pm 5000$
$r_{\text{drag}} h$	$99.66 \pm 0.73$	$D_{\text{M}}(0.38)$	$1528.9 \pm 7.4$	$\chi^2_{\text{BAO}}$	$6.1 \pm 1.0$
$\langle d^2 \rangle^{1/2}$	$2.436 \pm 0.020$	$H(0.51)$	$89.73 \pm 0.23$		
$\bar{\chi}^2_{\text{eff}} = 11958.15$ ; $\Delta\bar{\chi}^2_{\text{eff}} = 9150.65$ ; $R - 1 = 0.01663$					