“Best” Cosmological Parameters:

Table 3 from ***Wilkinson Microwave Anisotropy Probe (WMAP)* Observations: Preliminary Maps and Basic Results**,

C. L. Bennett et al. (2003), accepted by the *Astrophysical Journal*;

available at `http://lambda.gsfc.nasa.gov/`

Description	Symbol	Value	+ uncertainty	− uncertainty
Total density	Ω_{tot}	1.02	0.02	0.02
Equation of state of quintessence	w	< -0.78	95% CL	—
Dark energy density	Ω_Λ	0.73	0.04	0.04
Baryon density	$\Omega_b h^2$	0.0224	0.0009	0.0009
Baryon density	Ω_b	0.044	0.004	0.004
Baryon density (cm^{-3})	n_b	2.5×10^{-7}	0.1×10^{-7}	0.1×10^{-7}
Matter density	$\Omega_m h^2$	0.135	0.008	0.009
Matter density	Ω_m	0.27	0.04	0.04
Light neutrino density	$\Omega_\nu h^2$	< 0.0076	95% CL	—
CMB temperature (K)[a]	T_{cmb}	2.725	0.002	0.002
CMB photon density (cm^{-3})[b]	n_γ	410.4	0.9	0.9
Baryon-to-photon ratio	η	6.1×10^{-10}	0.3×10^{-10}	0.2×10^{-10}
Baryon-to-matter ratio	$\Omega_b \Omega_m^{-1}$	0.17	0.01	0.01
Fluctuation amplitude in $8h^{-1}$ Mpc spheres	σ_8	0.84	0.04	0.04
Low-z cluster abundance scaling	$\sigma_8 \Omega_m^{0.5}$	0.44	0.04	0.05
Power spectrum normalization (at $k_0 = 0.05\ \mathrm{Mpc}^{-1}$)[c]	A	0.833	0.086	0.083
Scalar spectral index (at $k_0 = 0.05\ \mathrm{Mpc}^{-1}$)[c]	n_s	0.93	0.03	0.03
Running index slope (at $k_0 = 0.05\ \mathrm{Mpc}^{-1}$)[c]	$dn_s/d\ln k$	-0.031	0.016	0.018
Tensor-to-scalar ratio (at $k_0 = 0.002\ \mathrm{Mpc}^{-1}$)	r	< 0.90	95% CL	—
Redshift of decoupling	z_{dec}	1089	1	1
Thickness of decoupling (FWHM)	Δz_{dec}	195	2	2
Hubble constant	h	0.71	0.04	0.03
Age of universe (Gyr)	t_0	13.7	0.2	0.2
Age at decoupling (kyr)	t_{dec}	379	8	7
Age at reionization (Myr, 95% CL))	t_r	180	220	80
Decoupling time interval (kyr)	Δt_{dec}	118	3	2
Redshift of matter-energy equality	z_{eq}	3233	194	210
Reionization optical depth	τ	0.17	0.04	0.04
Redshift of reionization (95% CL)	z_r	20	10	9
Sound horizon at decoupling (°)	θ_A	0.598	0.002	0.002
Angular size distance to decoupling (Gpc)	d_A	14.0	0.2	0.3
Acoustic scale[d]	ℓ_A	301	1	1
Sound horizon at decoupling (Mpc)[d]	r_s	147	2	2

[a] from *COBE* (Mather, J. C. et al., 1999, ApJ, 512, 511)

[b] derived from *COBE* (Mather, J. C. et al., 1999, ApJ, 512, 511)

[c] $l_{\mathrm{eff}} \approx 700$

[d] $\ell_A \equiv \pi \theta_A^{-1} \quad \theta_A \equiv r_s\ d_a^{-1}$