Cosmology based reviews

Big-Bang Cosmology

Inflation

Big-Bang Nucleosynthesis

The Cosmological Parameters

Dark Matter

Dark Energy

Cosmic Microwave Background

Neutrinos in Cosmology - New!

Strong team effort-from all participating authors

Experimental Tests of Gravitational Theory

Cosmic Rays

Minor Changes

Most reviews underwent relatively minor changes.

Primary reason: no new Planck results (prior to 2018).

Major Changes

Dark Matter

Drees-Gerbier

Experimental section fully updated with results from DM searches over the last 2 years (direct and indirect).

Main changes relate to: LUX, XENON1T, PandaX.
Shift of CDMS, EEDLWEISS, and CRESST to low mass wimps.

Updated Summary Figures and Tables for direct detection searches

Last year for this set of authors

Major Changes

Dark Energy

Weinberg-White

Updates from BOSS and eBOSS and other BAO measurements

Added discussion of equation of state parameter, w, with new and updated figures.

Updated discussion on tensions in H_0

Neutrinos in Cosmology

Lesgourgues-Verde

New Review added.

Includes:
Contributions of relic neutrinos to overall density,
neutrino temperature

Effect of neutrinos on the CMB and matter power spectrum.
Constraints on N_{eff}

Neutrinos in Cosmology

Lesgourgues-Verde

Table 25.1: Summary of $N_{\rm eff}$ constraints.

	Model	68%CL	Ref.
CMB alone			
Pl15[TT+lowP]	ΛCDM+$N_{\rm eff}$	3.13 ± 0.32	[29]
Pl15[TT+lowP]	ΛCDM+$N_{\rm eff}$+$\sum m_\nu$	3.08 ± 0.31	[35]
CMB + probes of background evolution			
Pl15[TT+lowP] + BAO	ΛCDM+$N_{\rm eff}$	3.15 ± 0.23	[29]
Pl15[TT+lowP] + BAO	ΛCDM+$N_{\rm eff}$+$\sum m_\nu$	$3.18^{+0.24}_{-0.27}$	[35]
CMB + probes of background evolution + LSS			
Pl15[TT+lowP+lensing] + BAO	ΛCDM+$N_{\rm eff}$	$3.08^{+0.22}_{-0.24}$	[35]
" + BAO + JLA + HST	ΛCDM+$N_{\rm eff}$	3.41 ± 0.22	[31]
" + BAO	ΛCDM+$N_{\rm eff}$+$\sum m_\nu$	3.2 ± 0.5	[29]
Pl15[TT,TE,EE+lowP+lensing]	ΛCDM+$N_{\rm eff}$+5-params.	$2.93^{+0.51}_{-0.48}$	[34]

Neutrinos in Cosmology

Lesgourgues-Verde

New Review added.

Includes:

Contributions of relic neutrinos to overall density,

neutrino temperature

Effect of neutrinos on the CMB and matter power spectrum.

Constraints on N_{eff}

Constraints on Σm_ν

New

Neutrinos in Cosmology

Lesgourgues-Verde

Table 25.2: Summary of $\sum m_\nu$ constraints.

	Model	95% CL (eV)	Ref.
CMB alone			
Pl15[TT+lowP]	ΛCDM+$\sum m_\nu$	< 0.72	[29]
Pl15[TT+lowP]	ΛCDM+$\sum m_\nu$+$N_{\rm eff}$	< 0.73	[35]
Pl16[TT+SimLow]	ΛCDM+$\sum m_\nu$	< 0.59	[32]
CMB + probes of background evolution			
Pl15[TT+lowP] + BAO	ΛCDM+$\sum m_\nu$	< 0.21	[29]
Pl15[TT+lowP] + JLA	ΛCDM+$\sum m_\nu$	< 0.33	[35]
Pl15[TT+lowP] + BAO	ΛCDM+$\sum m_\nu$+$N_{\rm eff}$	< 0.27	[35]
CMB + probes of background evolution + LSS			
Pl15[TT+lowP+lensing]	ΛCDM+$\sum m_\nu$	< 0.68	[29]
Pl15[TT+lowP+lensing] + BAO	ΛCDM+$\sum m_\nu$	< 0.25	[35]
Pl15[TT+lowP] + $P(k)_{\rm DR12}$	ΛCDM+$\sum m_\nu$	< 0.30	[50]
Pl15[TT,TE,EE+lowP] + BAO+ $P(k)_{\rm WZ}$	ΛCDM+$\sum m_\nu$	< 0.14	[52]
Pl15[TT,TE,EE+lowP] + BAO+ $P(k)_{\rm DR7}$	ΛCDM+$\sum m_\nu$	< 0.13	[52]
Pl15[TT+lowP+lensing] + Lyα	ΛCDM+$\sum m_\nu$	< 0.12	[48]
Pl16[TT+SimLow+lensing] + BAO	ΛCDM+$\sum m_\nu$	< 0.17	[48]
Pl15[TT+lowP+lensing] + BAO	ΛCDM+$\sum m_\nu$+Ω_k	< 0.37	[35]
Pl15[TT+lowP+lensing] + BAO	ΛCDM+$\sum m_\nu$+w	< 0.37	[35]
Pl15[TT+lowP+lensing] + BAO	ΛCDM+$\sum m_\nu$+$N_{\rm eff}$	< 0.32	[29]
Pl15[TT,TE,EE+lowP+lensing]	ΛCDM+$\sum m_\nu$+5-params.	< 0.66	[34]

Future

New Review on Dark Matter

Stefano Profumo, Professor at University of California (Santa Cruz): a theorist with expertise on dark matter and astroparticle physics. He has also recently written a book entitled: An introduction to Particle Dark Matter.

Laura Baudis, Professor at the University of Zurich, a well known experimentalist.
She began working in the Heidelberg group.
She was later a member of CDMS, CDMS II, and SuperCDMS, and subsequently XENON10, XENON100.
In addition to her current work on XENON1T, she is project coordinator for DARWIN and is also in the GERDA collaboration looking for neutrinoless double beta-decay.

For Discussion

New Review on Gravitational Waves

2015: 1st direct observation of GW from merger of black holes

2017: 1st observation of neutron star collision followed by multiple EM observations.

New review? or add-on to Experimental Tests of Gravitational Theory by Damour.