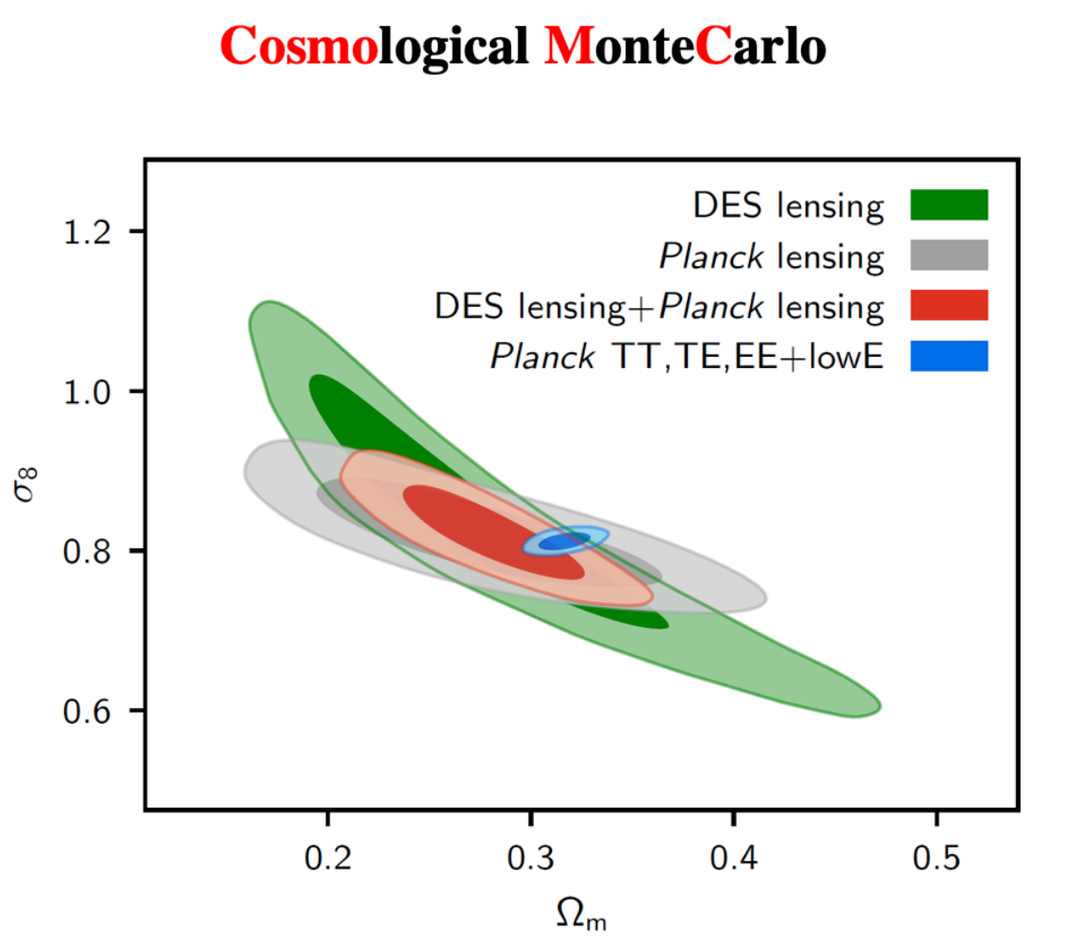
CosmoMC: Installation and How to use them



Samples from Planck 2018 and DES 1 Yr lensing likelihoods compared to Planck 2018 CMB.

PB (Pongsapat Boonaom)

CosmoMC

CosmoMC is a **Markov-Chain Monte-Carlo** engine used to perform cosmological parameter estimation.

Language: Fortran and Python wrapper

The code calls **CAMB** and performs MCMC over user selected parameters.

CosmoMC Structure

- **batch 1/2/3 :** contains **.ini** files with settings for the available likelihoods.

- **camb :** contains the **CAMB** code (you can modify code for your model).

- **data :** contains the actual **datasets**.

- **source :** source code of CosmoMC.

Setup

- your_model.ini
  - **Experiments:** decide which **likelihoods** will be used.
  - **General settings :** calls general options file (default common.ini).
    - **CosmoMC options :** chains name, actions, method, check point.
- batch3/common.ini (generally doesn’t need to be modified)
- batch3/params_CMB_defaults.ini (generally doesn’t need to be modified)

Tutorial Exercises

1. Installing Planck 2018 Likelihood and CosmoMC

2. Installing new Likelihood (**BK18**)

3. Setting for a simple running case. Using **Planck 2018 data (TT,TE,EE), Planck lensing, BK18 and BAO**.

4. Analysing CosmoMC chains using **GetDist**

Open link:

https://github.com/CraverBoyyy/CosmoMC-Installation

Installing new Likelihood (BK18)

1. Download likelihood data via:

   http://bicepkeck.org/bk18_2021_release.html

2. Extract the **BK18_cosmomc.tgz**

3. Move all files to their directories

4. Setting in **.ini** files

Planck 2018 Results. X. Constraints on Inflation

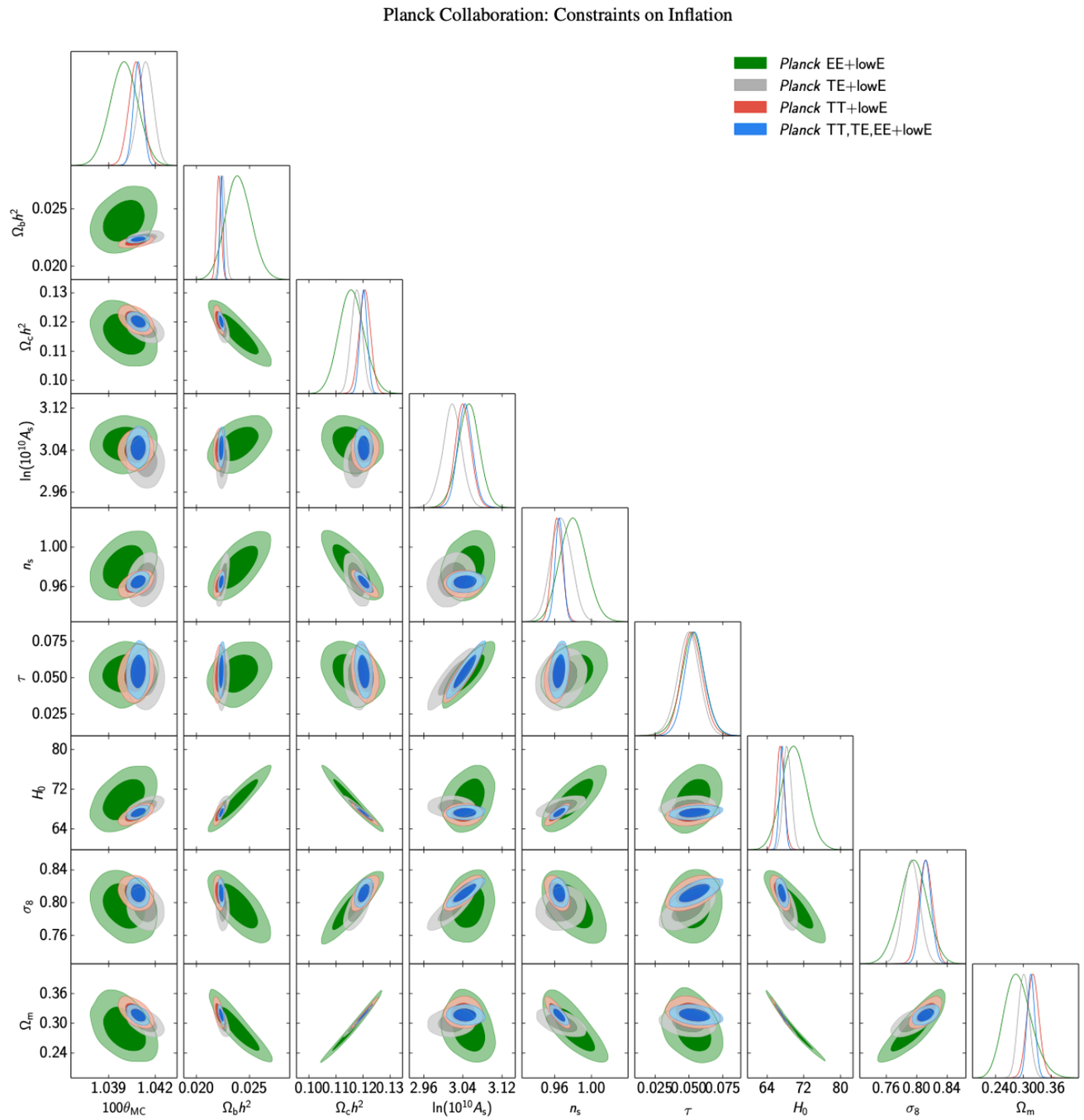


Fig. 2. Marginalized joint 68 % and 95 % CL regions for the cosmological parameters in ΛCDM with *Planck* TT, EE, TE, and joint TT,TE,EE, all in combination with the EE likelihood at low multipoles.

Extra Exercise: Planck 2018 Results. VI. Cosmological parameters

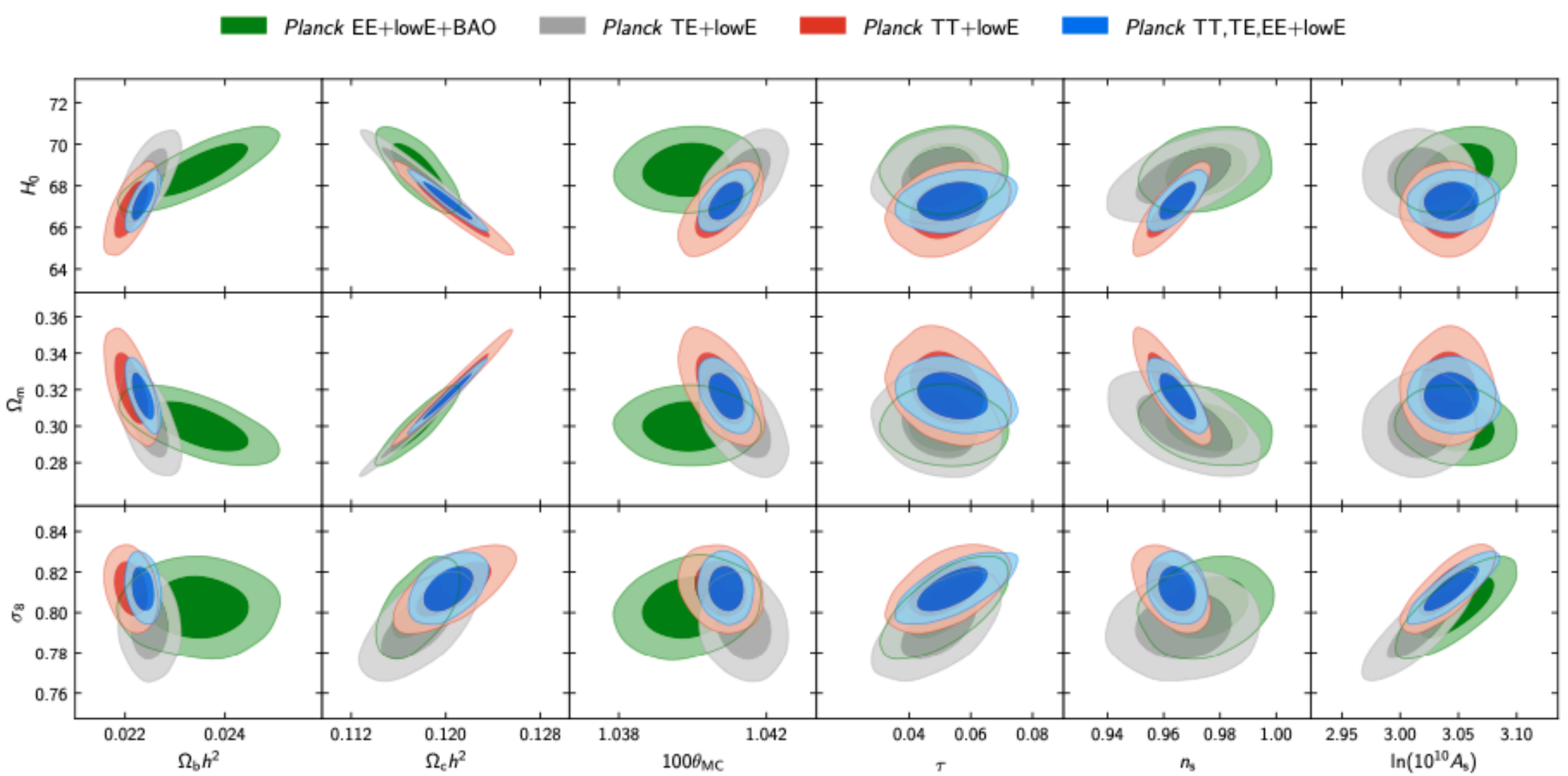


Fig. 5. Constraints on parameters of the base-ΛCDM model from the separate *Planck* EE, TE, and TT high-ℓ spectra combined with low-ℓ polarization (lowE), and, in the case of EE also with BAO (described in Sect. 5.1), compared to the joint result using *Planck* TT,TE,EE+lowE. Parameters on the bottom axis are our sampled MCMC parameters with flat priors, and parameters on the left axis are derived parameters (with H_0 in km s^{-1}Mpc^{-1}). Contours contain 68 % and 95 % of the probability.

Cobaya

CobayaSampler/
cobaya

Code for Bayesian Analysis

22 Contributors

55 Used by

108 Stars

110 Forks

References

- https://cosmologist.info/cosmomc/
- https://www.uco.es/~ajcuesta/cosmomc-ugr---day-1.pdf
- https://www.uco.es/~ajcuesta/cosmomc.pdf
- http://icg.port.ac.uk/~jschewts/cantata/CAMB/CosmoMC_lectur