

Systematic uncertainties in optimal de-lensing of CMB B modes with cross-correlation of CMB and galaxy survey

miércoles, 16 de septiembre de 2026 11:40 (25)

In the era of high-precision Cosmic Microwave Background (CMB) anisotropy measurements, detection of primordial gravitational waves (PGWs) will be one of the main goals of current CMB experiments. Detection of a divergence-free (B-mode) component in CMB polarisation will provide direct evidence of inflationary PGWs in the early universe. However, weak gravitational lensing of CMB photons due to intervening mass distributions of the Universe distorts the primordial polarisation patterns, introducing an additional lensing-induced B-mode signal. Removing these lensing-induced B-modes is essential for improving constraints on the amplitude of PGWs. In this work, we test a tomographic delensing method on simulations of the Rubin Observatory LSST galaxy catalogue and Simons Observatory (SO) CMB maps. A significant improvement in delensing efficiency is achieved by using a multi-tracer approach, where we split the galaxy dataset into tomographic redshift bins. However, uncertainties in photometric redshift measurements pose a problem for optimal weighting of the tracers. We explore the impact of photometric redshift errors with realistic simulations and build a pipeline to propagate these uncertainties to constraints on the amplitude of primordial gravitational waves. Additionally, we explore constraints on the galaxy bias, $b(z)$, and the amplitude of matter fluctuations parameter, σ_8 , through tomographic cross-correlations using realistic simulations of photometric measurements from LSST 10-year datasets.

Primary author(s) : DEKA, Kishan

Presenter(s) : DEKA, Kishan

Clasificación de la sesión : Morning Session (Wednesday)