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CMB polarization map self-calibration

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Accurate cosmological parameters estimates using polarization data put stringent requirements on maps calibration, as highlighted in the recent results of the Planck collaboration. In this talk, I will present the new results of a paper where we point out that a model-dependent determination of polarization calibration parameters can be achieved by the joint fit of the TE and EE CMB power spectra, thanks to the different functional dependence of TE and EE on polarization efficiency corrections. This provides a valuable cross-check to the polarization efficiencies determined using other approaches. We demonstrate that, in LCDM, the combination of the TE and EE constrain polarization efficiency corrections with sub-percent uncertainty with Planck data and 2% uncertainty with SPTpol data. We find similar conclusions in common LCDM extensions that include sampling the sum of the neutrino masses , the number of relativistic species , or the amplitude of lensing. The uncertainties on cosmologi-cal parameters are minimally impacted when marginalizing over the polarization efficiency corrections, except for the uncertainty on the amplitude of the primordial scalar power spectrum, which increases by 20-50%. However, this information can be fully recovered by the addition of TT data. For current and future ground-based experiments, SPT-3G and CMB-S4, we forecast the cosmological parameter uncertainties to be minimally degraded when marginalizing over polarization efficiency corrections. In addition, CMB-S4 could constrain its polarization calibration at the level of ~ 0.2% by combining TE and EE, and reach ~ 0.06% by also including TT. (paper to be submitted)

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