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The Effects of Instrumental Systematics on CMB Lensing Reconstruction

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The weak gravitational lensing of the CMB is an important cosmological tool that allows us to learn more about the structure, composition and evolution of the Universe. Upcoming CMB experiments, such as the Simons Observatory, will provide the most high-resolution and low-noise CMB measurements to date, from which we could reconstruct the lensing potential to unparalleled precision. To achieve this, the potential hindering of instrument systematics on the lensing reconstruction analysis must be considered, as these become more significant with low-noise CMB observations. In this talk, I will present our recent results regarding how various instrument systematics affect the CMB lensing reconstruction. Using simulations of temperature and polarization CMB maps for an SO-like instrument and scanning strategy, with the additions of systematics, we performed an optimal lensing reconstruction analysis to assess the significance of the resulting systematic-induced lensing biases. Specifically, we explored systematics relating to beam asymmetries and offsets, boresight pointing, gain drifts, gain calibration and electric crosstalk. I will show how these systematic effects bias the reconstructed lensing power spectrum and which effects may be a potential risk to future CMB experiments, and discuss possible mitigation strategies on the instrument level and in the analysis stage.

Presenter: MIRMELSTEIN, Mark (University of Sussex)

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