Decomposing CMB Lensing Power with Simulation

Ethan Anderes
anderes@ucdavis.edu
Department of Statistics, University of California at Davis, USA

Over the past year, data from two ground based telescopes, ACT and SPT, have resulted in the first direct measurement of the weak lensing power spectrum solely from cosmic microwave background (CMB) measurements. In the coming years, the data from Planck and upcoming experiments ACTpol and SPTpol will begin probing this lensing at much greater resolution. The state-of-the-art estimator of weak lensing, the quadratic estimator developed by Hu and Okomoto, works in part through a delicate cancelation of terms in a Taylor expansion of the lensing effect on the CMB. In this talk we present a new simulation based approach for exploring the nature of this cancelation and the resulting higher order bias they create. Along with new FFT algorithms our method can easily analyze all polarization estimators along with some recently proposed modifications used to mitigate higher order bias. We illustrate our simulation methodology by uncovering some surprising behavior of the quadratic estimate.