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A minimally noisy and maximally likely CMB lensing estimator

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Gravitational lensing of the Cosmic Microwave Background (CMB) is becoming one of our sharpest cosmological probes, with surveys such as SPT-3G and the Simons Observatory delivering deep polarization maps. In this talk, I will present a new optimal estimator for CMB lensing, which outperforms the widely used quadratic estimator in both accuracy and robustness. I will highlight recent advances that rely exclusively on cross-correlations between independent CMB map splits, effectively eliminating instrumental and atmospheric noise biases in the lensing power spectrum. This approach enables unbiased and nearly optimal lensing reconstruction, paving the way for precision cosmology with next-generation CMB surveys.

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