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Gravitational Lensing of the Microwave Background in the 2500 Square Degree SPT Survey OLIVER ZAHN, UC Berkeley, SOUTH POLE TELESCOPE COLLABORATION — The South Pole Telescope (SPT) is a 10-meter microwave background telescope located at the geographic South Pole that completed a deep multi-band survey of ∼2,500 square degrees of the southern sky in Fall 2011. The high angular resolution and sensitivity enable a reconstruction of the matter potential integrated toward the last scattering surface, effectively weighing the Hubble volume. The inferred lensing potential power spectrum is a sensitive probe of cosmological structure growth and geometry beyond the temperature and polarization power spectra. I will present the results of our analysis using an optimal trispectrum estimator to achieve the highest signal-to-noise measurement of gravitational lensing of the CMB to date. Careful control of astrophysical and instrumental contaminants of the non-Gaussian signature of lensing allow us to place robust constraints on dark energy and the sum of the masses of neutrinos. I will also discuss how the correlation of our lensing maps with galaxy clustering surveys can yield novel astrophysical and cosmological information. The talk will conclude by previewing the potential of joint analyses of our lensing measurements with Planck satellite data, as well as of new data currently being collected by SPTpol.

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