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Probing Reionization and Large-Scale Structure with the 2500 Square Degree SPT-SZ Survey ELIZABETH GEORGE, UC Berkeley, SOUTH POLE TELESCOPE COLLABORATION — The South Pole Telescope (SPT) is a 10-meter mm-wavelength telescope located at the South Pole. The SPT recently completed a 2500 square degree survey with arcminute resolution at observing frequencies of 95, 150, and 220 GHz. I will present measurements from the SPT survey of the Cosmic Microwave Background (CMB) power spectrum from angular multipoles between $2000<\ell<9400$. This measurement is sensitive to secondary anisotropies of the CMB, in particular the thermal and kinetic Sunyaev-Zel'dovich (SZ) effects, the cosmic infrared background (CIB), and radio galaxies. I will discuss how we can use the SPT data to constrain the kinetic SZ power and determine how long the epoch of reionization lasted, and together with the Planck optical depth constraint, when it began and ended. I will also present constraints on the sum of the neutrino masses based on the thermal SZ power spectrum and bispectrum. Finally, I will discuss future constraints enabled by the combination of the SPT data with higher frequency measurements from the Herschel-SPIRE instrument. The combined data sets will provide further improvements in the CIB and SZ power spectra constraints, leading to unprecedented constraints on structure formation and the reionization history of the universe.

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