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Latest Results from SPTpol (12' + 3')

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All-sky surveys of the primary temperature anisotropies of the Cosmic Microwave Background (CMB) are now cosmic variance limited on large to intermediate scales. Surveys sensitive to smaller scales are additionally contaminated by brighter secondary anisotropies such as the thermal and kinematic Sunyaev-Zel'dovich effects and emission from unresolved sources. To place tighter constraints on cosmology from CMB primary anisotropies we turn to measurements of CMB polarization. Not only is polarization another probe of Λ CDM cosmology, but secondary anisotropies are expected to have low polarized emission, which opens more of the so-called CMB damping tail to cosmological study. We present new ground-based 150 GHz measurements of anisotropies in CMB E -mode and temperature- E -mode correlation in a 500 square-degree patch of sky observed with the SPTpol instrument. Installed on the South Pole Telescope in early 2012, SPTpol is a dichroic receiver with 180 and 588 transition edge sensor (TES) polarimeters sensitive to 95 and 150 GHz, respectively. Over a range of spherical harmonic multipoles $50 \leq \ell < 10000$ we detect 9 acoustic peaks in the E -mode angular auto-power spectrum. With these spectra we constrain Λ CDM cosmology independently from temperature-only measurements, and present new joint constraints with the Planck temperature auto-power spectrum. The CMB is also gravitationally lensed by large-scale structure. We use our high-fidelity map of E -mode polarization, in conjunction with SPTpol maps of B -mode polarization and temperature, to map the lensing potential of the CMB and measure its corresponding power spectrum. Finally, the CMB lensing potential can be combined with our E -mode map to estimate the amount of lensing B modes present in the field, which can be *delensed* to improve constraints on primordial B modes and the energy scale of inflation through the tensor-to-scalar ratio, r .

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