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Cosmology from CMB Polarization with POLARBEAR and the Simons Array

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POLARBEAR is a cosmic microwave background (CMB) polarization experiment located in the Atacama desert in Chile. The science goals of the POLARBEAR project are to do a deep search for CMB B-mode polarization created by inflationary gravitational waves, as well as characterize the CMB B-mode signal from gravitational lensing. POLARBEAR-1 started observations in 2012, and in 2014, the POLARBEAR team published results from its first season of observations on a small fraction of the sky. These results include the first measurement of a non-zero B-mode polarization angular power spectrum, measured at sub-degree scales where the dominant signal is gravitational lensing of the CMB. To improve on these measurements, POLARBEAR is expanding to include an additional two telescopes with multi-chroic receivers, known as the Simons Array. With high sensitivity and large sky coverage, the Simons Array will create a detailed survey of B-mode polarization, and its spectral information will be used to extract the CMB signal from astrophysical foregrounds. We present the status of this funded instrument and its expected capabilities.

Summary

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