

Constraints on primordial gravitational waves from POLARBEAR data and the cross-correlation of gravitational lensing with optical survey by the Subaru HSC

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POLARBEAR is a ground-based experiment which is designed to measure the Cosmic Microwave Background (CMB) polarization at the James Ax Observatory at an elevation of 5,190 m in the Atacama Desert in Chile. Our science goals are for searching for the B-mode signal created by primordial gravitational waves (PGWs), as well as for characterizing the B-mode signal from gravitational lensing. POLARBEAR started observations in early 2012 at 150 GHz and has published a series of results from its first and second seasons, including the first measurement of a non-zero B-mode auto-power spectrum at sub-degree scales where the dominant signal is gravitational lensing of the CMB. In 2014, we installed a continuously rotating half wave plate (HWP) at the focus of the primary mirror to search PWGs and demonstrate control of low frequency noise. In this talk, I present the result of an upper limit of large angular scale B-mode signal induced by PGWs with the HWP. I also present our result of cross-correlation of gravitational lensing between our CMB data and optical survey by the Subaru HSC. Finally I show the status of Simons Array, which consists of three new receivers that will have about 20 times better sensitivity than POLARBEAR and observe at 90, 150, 220, and 270 GHz.

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