The POLARBEAR-2 experiment


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POLARBEAR-2 (PB-2) is a ground-based experiment to measure the polarization of the cosmic microwave background (CMB) located at the Atacama desert (5150 m in altitude) in Chile. The science goals of the POLARBEAR-2 are i) to detect or set an upper limit of the inflationary gravitational wave B-mode with the sensitivity of $r = 0.01$ with 95 % CL. and ii) to measure the weak gravitational lensing B-mode signal and extract the information, such as the sum of the neutrino masses with the limit of 90 meV by PB-2 alone and 40 meV by combining PB-2 and Planck at 68 % CL. PB-2 observes at the 95 and 150 GHz bands simultaneously using the multi-chroic dual-polarization antenna-coupled transition edge sensor bolometers together with SQUIDs and the frequency domain multiplexing readout system. The total number of the detectors with the two bands are 7855 that are 6 times higher than that of POLARBEAR-1(PB-1), and the expected focal plane combined statistical sensitivity is $5.7 \mu K \sqrt{s}$ with the beam size of 6 and 3.5 arcmin for the 95 and 150 GHz bands, respectively. The polarization signal is modulated by the sky rotation and the continuously rotating half-wave plate. PB-2 is scheduled to deploy in 2014 and the PB-2 receiver will be mounted on the Huan Tran telescope (HTT) on which the PB-1 receiver is currently mounted and observing. We present the overview of PB-2 and discuss the observational strategy and systematic effects.