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### **Detection of Degree-Scale CMB B-Mode Polarization with BICEP2**

JAMIE BOCK, California Institute of Technology

We report results from the BICEP2 experiment, a Cosmic Microwave Background (CMB) polarimeter specifically designed to search for the signal of inflationary gravitational waves in the B-mode power spectrum. We find an excess of B-mode power over the lensed  $\lambda$ -CDM model which is inconsistent with the null hypothesis at a significance of  $> 5$  sigma. Through jackknife tests and simulations based on detailed calibration measurements we show that systematic contamination is much smaller than the observed excess. We also estimate potential foreground signals and find that available models predict these to be considerably smaller than the observed signal. Additionally, cross-correlating BICEP2 against 100 GHz maps from the BICEP1 experiment, the excess signal is confirmed with 3-sigma significance and its spectral index is found to be consistent with that of the CMB, disfavoring synchrotron or dust at 2.3 sigma and 2.2 sigma, respectively. The observed B-mode power spectrum is wellfit by a lensed  $\lambda$  CDM + tensor theoretical model with tensor/scalar ratio  $r = 0:20+0:07 -0:05$ , with  $r = 0$  disfavored at 7.0 sigma. We also discuss recent developments and future prospects.