

Cosmic Microwave Background Polarization and Fundamental Physics

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Cosmic Microwave Background (CMB) polarization experiments have the potential to reveal evidence for the universe's initial conditions via a detection of, or constraint on, the CMB's large-scale B-mode (curl-mode) polarization pattern. In addition to constraints on inflationary gravitational waves, CMB polarization experiments will also inform our understanding of fundamental physics via constraints on Helium abundance, neutrino masses and primordial magnetic fields. Furthermore, constraints on exotic physics such as cosmic birefringence will improve with current generation CMB polarimeters. I will review recent results from the POLARBEAR and BICEP experiments and discuss upgrades to these experiments that will dramatically enhance our understanding of fundamental (and exotic) physics.

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