

The QUEST Experiment

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The QU Extragalactic Survey Telescope (QUEST) is designed to search for polarization of the Cosmic Microwave Background (CMB) radiation at millimeter wavelengths. The instrument comprises an array of 62 polarization-sensitive bolometers mounted on a 2.6m telescope that will be located on the Chajnantor Plateau in the Chilean Andes. The QUEST receiver is designed to operate at frequencies of 100 and 150 GHz to allow CMB polarization to be distinguished from astrophysical foregrounds. We expect QUEST to begin operations in early 2004. In two years QUEST will complete two surveys – a shallow survey of 500 square degrees will allow a precise determination of the power spectrum of E-mode polarization caused by density fluctuations, and a deeper survey of 30 square degrees will detect B-modes produced by gravitational lensing and could also detect, or set strong limits on, B-mode polarization from gravitational waves.

A major challenge for CMB polarization experiments will be to distinguish the tiny polarized signal from systematic effects, astrophysical foregrounds and, for ground-based experiments, atmospheric effects. I will describe how the design of QUEST is intended to minimize these effects. I will also argue that ground-based experiments such as QUEST are an essential precursor to any CMB polarization satellite, and that they offer a valuable opportunity to develop the necessary hardware and techniques for such a mission.