Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Atacama B-mode Search: Scientific Motivations and Design Overview KI WON YOON, National Institute of Standards & Technology — The Atacama B-mode Search (ABS) is a new experiment designed to characterize the polarization of the cosmic microwave background (CMB) to unprecedented levels at degree angular scales, where the signature of primordial gravitational waves from an inflationary epoch in the early universe is expected to peak. ABS employs a novel optical design using a cryogenically-cooled crossed-Dragone reflective telescope coupled to an array of ∼200 direct-machined feedhorns, each of which in turn couples the incoming radiation onto a "polarimeter-on-a-chip" consisting of a planar ortho-mode transducer, microstrip band-defining filters, and a pair of transition-edge sensors (TES) that measure both polarizations simultaneously. The array will be initially designed for operation at 145 GHz. ABS is currently scheduled to begin observation in the Atacama Desert of Chile in late 2009.

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Date submitted: 13 Jan 2009 Electronic form version 1.4