22.
Accession Number
12188384
Author
Kogut A. Fixsen DJ. Chuss DT. Dotson J. Dwek E. Halpern M. Hinshaw GF. Meyer SM. Moseley SH. Seiffert MD. Spergel DN. Wollack EJ.
Author/Editor Affiliation
Kogut A. Fixsen DJ. Chuss DT. Dwek E. Moseley SH. Wollack EJ. : Goddard Space Flight Center, Code 665, Greenbelt, MD 20771, USA
Dotson J. : Ames Research Center, MS 245-6, Mofett Field, CA 94035, USA
Halpern M. Hinshaw GF. : University of British Columbia, Vancouver, BC V67 1Z1, Canada
Meyer SM. : University of Chicago, 5801 South Ellis Ave, Chicago, IL 60637, USA
Seiffert MD. : Jet Propulsion Laboratory, M/S 169-506, Pasadena, CA 91109, USA
Spergel DN. : Dept of Astrophysical Sciences, Princeton University, Princeton, NJ 08544, USA
Title
the Primordial Inflation Explorer (PIXIE): a Nulling Polarimeter for Cosmic Microwave Background Observations
Source
Journal of Cosmology and Astroparticle Physics, vol.2011, no.7, July 2011, 025 (34 pp.). Publisher: IOP Publishing Ltd., UK.
Abstract
The Primordial Inflation Explorer (PIXIE) is an Explorer-class mission to measure the gravity-wave signature of primordial inflation through its distinctive imprint on the linear polarization of the cosmic microwave background. The instrument consists of a polarizing Michelson interferometer configured as a nulling polarimeter to measure the difference spectrum between orthogonal linear polarizations from two co-aligned beams. Either input can view the sky or a temperature-controlled absolute reference blackbody calibrator. PIXIE will map the absolute intensity and linear polarization (Stokes I, Q, and U parameters) over the full sky in 400 spectral channels spanning 2.5 decades in frequency from 30 GHz to 6 THz (1 cm to 50 um wavelength). Multi-moded optics provide background-limited sensitivity using only 4 detectors, while the highly symmetric design and multiple signal modulations provide robust rejection of potential systematic errors. The principal science goal is the detection and characterization of linear polarization from an inflationary epoch in the early universe, with tensor-to-scalar ratio r < 10^{-3} at 5 standard deviations. The rich PIXIE data set will also constrain physical processes ranging from Big Bang cosmology to the nature of the first stars to physical conditions within the interstellar medium of the Galaxy. (64 References).