

Conference: SPIE Astronomical Instrumentation Conference
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Title: The Primordial Inflation Polarization Explorer (PIPER)

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Abstract:

The Primordial Inflation Polarization Explorer (PIPER) is a balloon-borne instrument to measure the gravity-wave signature of primordial inflation through its distinctive imprint on the polarization of the cosmic microwave background. PIPER combines cold (1.5 K) optics, 5120 bolometric detectors, and rapid polarization modulation using VPM grids to achieve both high sensitivity and excellent control of systematic errors. A series of flights alternating between northern and southern hemisphere launch sites will produce maps in Stokes I, Q, U, and V parameters at frequencies 200, 270, 350, and 600 GHz (wavelengths 1500, 1100, 850, and 500 microns) covering 85% of the sky. We describe the PIPER instrument and discuss the current status and expected science returns from the mission.