

Title: The Primordial Inflation Explorer

Abstract:

The Primordial Inflation Explorer 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. PIXIE uses an innovative optical design to achieve background-limited sensitivity in 400 spectral channels spanning 2.5 decades in frequency from 30 GHz to 6 THz (1 cm to 50 micron wavelength). 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. I describe the PIXIE instrument and mission architecture needed to detect the inflationary signature using only 4 semiconductor bolometers.