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PIPER's Continuous Adiabatic Demagnetization Refrigerator Eric Switzer (GFSC)

Tuesday 15 December 2015 16:40 (25 minutes)

The Primordial Inflation Polarization ExploreR (PIPER) is a balloon-borne instrument being developed at NASA Goddard. It will measure the CMB polarization at 200, 270, 350, and 600 GHz across 85% of the sky, seeking the B-mode signature of inflationary gravitational waves on large angular scales. It employs a Continuous Adiabatic Demagnetization Refrigerator (CADR) to cool its detectors to 100 mK. The CADR architecture is robust (solid-state), stable, and efficient, so is of great interest to future CMB missions. I will describe PIPER's CADR, its thermodynamics, and hardware with contrast to single-shot coolers. Magnetic fields and temperature stability are key instrumental constraints for PIPER's Transition-edge superconducting detectors and readout chain. I will describe recent operation of the CADR, its characterization, stability and magnetic fields.

Presenter: Dr SWITZER, Eric (GFSC)

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