

Abstract Submitted  
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**A Blackbody Microwave Source  
for CMB Polarimeter Development**<sup>1</sup> ALEC LINDMAN, Rhodes College —

I present an evolved design for a thermally isolated blackbody source operating at 90GHz and 120GHz, frequencies of interest to Cosmic Microwave Background measurements. The NASA GSFC Experimental Cosmology lab is developing transition edge sensor bolometers for the CLASS and PIPER missions to measure CMB polarization; the source described here is for use in an existing 150mK test package to quantify the detectors' properties. The design is optimized to minimize heat loading into the ADR and cryocoolers by employing a Kevlar kinematic suspension and additional thermal breaks. The blackbody light is coupled to a detector by means of an electroformed waveguide, which is mated to the source by an ultraprecise ring-centered flange design; this precision is critical to maintain the vacuum gap between the heated source and the cold waveguide, which is an order of magnitude smaller than the allowable misalignment of the standard military-spec microwave flange design. The source will provide at least 50% better thermal isolation than the existing 40GHz source, as well as a smaller thermal time constant to enable faster measurement cycles.

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