

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**An Ultra-Sensitive Electrometer based on the Cavity-Embedded Cooper-Pair Transistor**<sup>1</sup> JULIANG LI, Department of Physics & Astronomy, Dartmouth College, MARCO MILLER, Department of Physics, Ulm Univeristy, ALEX RIMBERG, Department of Physics & Astronomy, Dartmouth College — We discuss use of a cavity-embedded Cooper-pair transistor (cCPT) as a potentially quantum-limited electrometer. The cCPT consists of a Cooper pair transistor placed at the voltage antinode of a 5.7 GHz shorted quarter-wave resonator so that the CPT provides a galvanic connection between the cavity's central conductor and ground plane. The quantum inductance of the CPT, which appears in parallel with the effective inductance of the cavity resonance, can be modulated by application of either a gate voltage to the CPT island or a flux bias to the CPT/cavity loop. Changes in the CPT inductance shift the cavity resonant frequency, and therefore the phase of a microwave signal reflected from the cavity. The reflected wave is amplified by both SLUG and HEMT amplifiers before its phase is measured. Results of recent measurements on the cCPT electrometer will be compared with theoretical predictions.

<sup>1</sup>This work was supported by the NSF under Grant No. DMR-1104821, by the ARO under Contract No, W911NF-13-1-0377 and by AFOSR/DARPA under Agreement No. FA8750-12-2-0339.

Juliang Li  
Department of Physics & Astronomy, Dartmouth College

Date submitted: 14 Nov 2014

Electronic form version 1.4