Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Microwave Measurements Electrons on Helium with Superconducting Coplanar Waveguide Resonators GE YANG, Department of Physics, University of Chicago, ANDREAS FRAGNER, Applied Physics Department, Yale University, BING LI, Department of Physics, University of Chicago, ROB SCHOELKOPF, Applied Physics Department, Yale University, DAVID I. SCHUSTER, Department of Physics, University of Chicago, ELECTRONS ON HELIUM COLLABORATION — Electrons on helium is a unique two-dimensional electron gas system formed at the interface of a quantum liquid (superfluid helium) and vacuum. The motional and spin states of single-electron quantum dots defined on such systems have been proposed for hybrid quantum computing [1,2]. Traditional AC transport experiments of electrons on helium are conducted at kilohertz frequencies. Here, we will present microwave measurements of electrons trapped in a 5GHz superconducting coplanar waveguide resonator with 1 MHz bandwidth. The effect of trapping parameters on the resonance, and experimental progress towards a single trapped electron regime will also be discussed.

[1] S. Lyon, Phys. Rev. A. 74, 5 (2006)
[2] D.I. Schuster, et al. Phys. Rev. Lett. 105, 040503 (2010)

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Date submitted: 17 Dec 2012 Electronic form version 1.4