Abstract Submitted
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Modeling Strongly Interacting Electrons on Helium Coupled to a Microwave Resonator GE YANG, University of Chicago, DAVID G. REES, National Chiao Tung University Institute of Physics, LEONIDAS OCOLA, DAVID CZAPLEWSKI, Argonne National Laboratory Center for Nanoscale Materials, GERWIN KOOLSTRA, DAVID MCKAY, DAVID I. SCHUSTER, University of Chicago — Electrons on helium is a unique two-dimensional electron gas system formed at the interface of a quantum liquid (superfluid helium) and vacuum. If single electrons on helium can be isolated, the motional and spin states could form the building blocks for hybrid quantum computing [1,2]. However, to trap single electrons we must start from a 2-dimensional gas of many electrons, which is a strongly interacting classical gas. In our experiment, we trap mesoscopic samples of electrons in a micron-sized trap at the end of a centimeter-long quarter wavelength microwave cavity, and interrogate the system via the change in the microwave resonance frequency. Here, we will present a simple numeric model that we developed to understand the coupled cavity-electron on helium system in a micron-sized trap, and insights towards building a single electron quantum dot. [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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