Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Coulomb blockade phenomena in confined $LaAlO_3/SrTiO_3$ nanowires[1] MICHELLE TOMCZYK, GUANGLEI CHENG, SHICHENG LU, University of Pittsburgh, JOSHUA VEAZEY, Hope College, MENGCHEN HUANG, PATRICK IRVIN, University of Pittsburgh, SANGWOO RYU, CHANG-BEOM EOM, University of Wisconsin-Madison, JEREMY LEVY, University of Pittsburgh — The $LaAlO_3/SrTiO_3$ interface hosts a rich variety of phenomena, including gate-tunable conductivity, ferromagnetism, and low-temperature superconductivity. Nanowires at the interface are fabricated with conductive AFM lithography; this flexible process allows complex nanostructures to be created to study the various phenomena at the interface. Here, tunneling barriers are created to confine a section of wire. Low temperature transport through these confined wires is gate-tunable, exhibiting superconductivity in the strong coupling regime and Coulomb blockade in the weak coupling regime. The Coulomb peaks exhibit interesting behavior in an external magnetic field. The peaks are insensitive to low fields; however, they begin to split and shift above a critical magnetic field. The curious splitting of each Coulomb peak above a critical field could provide insight into the fundamental magnetic, superconducting, and spin-orbit properties at the interface.

[1]We gratefully acknowledge support for this work from AFOSR (FA9550-10-1-0524, FA9550-12-1-0268, FA9550-12-1-0342).

Michelle Tomczyk
University of Pittsburgh

Date submitted: 15 Nov 2013 Electronic form version 1.4