Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Aharanov-Bohm quantum interference in a reconfigurable electron system[1] P. IRVIN, S. LU, A. ANNADI, G. CHENG, M. TOMCZYK, M. HUANG, J. LEVY, Univ of Pittsburgh, J.-W. LEE, H. LEE, C.-B. EOM, Univ of Wisconsin-Madison — Aharanov-Bohm (AB) interference can arise in transport experiments when magnetic flux threads through two or more transport channels. The existence of this behavior requires long-range ballistic transport and is typically observed only in exceptionally clean materials. We observe AB interference in wide ($w \sim 100$ nm) channels created at the $LaAlO_3/SrTiO_3$ interface using conductive AFM lithography. Interference occurs above a critical field $B \sim 4$ T and increases in magnitude with increasing magnetic field. The period of oscillation implies a ballistic length that greatly exceeds the micron-scale length of the channel, consistent with Fabry-Perot interference in 1D channels. The conditions under which AB oscillations are observed will be discussed in the context of the electron pairing mechanism in $LaAlO_3/SrTiO_3$.

[1]We gratefully acknowledge financial support from AFOSR FA9550-12-1-0342 (CBE), NSF DMR-1234096 (CBE), and ONR N00014-15-1-2847 (JL)

Patrick Irvin
Univ of Pittsburgh

Date submitted: 11 Nov 2016 Electronic form version 1.4