Abstract Submitted
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Aharanov-Bohm quantum interference in $LaAlO_3/SrTiO_3$ Hall bar structures[1] PATRICK IRVIN, SHICHENG LU, ANIL ANNADI, GUANGLEI CHENG, MICHELLE TOMCZYK, MENGCHEN HUANG, JEREMY LEVY, University of Pittsburgh, HYUNGWOO LEE, CHANG-BEOM EOM, University 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 $LaAlO_3/SrTiO_3$.

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Patrick Irvin
University of Pittsburgh

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