Abstract Submitted
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Observation of unconventional Little-Parks resistance oscillations in mesoscopic rings of Sr_2RuO_4[1] XINXIN CAI, YIQUN YING, The Pennsylvania State University, DAVID FOBES, TIJIANG LIU, ZHIQIANG MAO, Tulane University, YING LIU, The Pennsylvania State University — Spin-triplet superconductor Sr_2RuO_4 may host half-flux-quantum (h/4e) states, which carry Majorana modes useful for topological quantum computing. Recent cantilever magnetometry measurements on micron-size samples of Sr_2RuO_4 in the presence of an in-plane magnetic field revealed unusual magnetization steps suggesting the presence of both integer and half-integer flux quanta. To observe h/4e resistance oscillations that will not only provide independent confirmation of the existence of the half-flux-quantum states but also provide insights into the physical origin of this novel phenomenon, we fabricated mesoscopic superconducting rings of Sr_2RuO_4 and carried out Little-Parks resistance oscillation measurements. Without the application of an in-plane field, resistance oscillations with a full-flux period (h/2e) and a large amplitude were observed. A pronounced second set of resistance peaks was found in one sample when the in-plane field and the measurement current were sufficiently large. This sample featured a large critical current density of $\sim 10^5 A/cm^2$, which we believe is of significance. Preparation and measurements of more samples are currently underway.

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