

Abstract Submitted
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Search for half-flux-quantum Little-Parks oscillations in mesoscopic rings of Sr_2RuO_4 ¹ XINXIN CAI, BRIAN ZAKRZEWSKI, YIQUN YING, Pennsylvania State Univ, DAVID FOBES, TIJIANG LIU, ZHIQIANG MAO, Tulane University, YING LIU, Pennsylvania State Univ — Recent cantilever magnetometry measurements on micron-sized, doubly-connected crystals of Sr_2RuO_4 have indicated that a half-flux-quantum state may be present in this material. To provide independent evidence for the presence of this new topological object by electrical transport measurements and examine its stability, we carried out Little-Parks (L-P) oscillation measurements, which trace out the phase boundary of a system, on mesoscopic rings of Sr_2RuO_4 . Sr_2RuO_4 rings were fabricated using a combination of mechanical exfoliation of Sr_2RuO_4 single crystals, photolithography, and focused ion beam techniques. Without an in-plane magnetic field, large-amplitude resistance oscillations of a full-flux quantum were found as ramping the out-of-plane field. When the in-plane field and the measurement current were sufficiently large, a pronounced second set of resistance peaks was observed in one sample, supporting the existence of half-flux-quantum states. Preparation and measurements on more samples have been carried out and the most recent measurements suggest that the half-flux-quantum states, if indeed present, are likely to be metastable.

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