

Abstract Submitted
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Fabrication of Small Edge Josephson Junctions Between Sr_2RuO_4 and Al BRIAN ZAKRZEWSKI, XINXIN CAI, YIQUN YING, Pennsylvania State Univ, DAVID FOBES, TIJIANG LIU, ZHIQIANG MAO, Tulane University, YING LIU, Pennsylvania State Univ — Sr_2RuO_4 is predicted to have a chiral p-wave orbital pairing. However, attempts to measure the chiral edge currents have yielded results inconsistent with theoretical predictions. Josephson junctions between Sr_2RuO_4 and an s-wave superconductor such as Al may provide an avenue for directly measuring the edge currents. We report progress on fabricating these junctions, using Al electrodes with no oxide barrier. The Josephson junctions are placed on the naturally formed edges of cleaved Sr_2RuO_4 thin crystal, which is expected to feature a surface less disordered than ramped junctions prepared by focused ion beam and ion mills. Transmission electron microscope studies provide a powerful tool to characterize the interface. We have systematically investigated the effects of nanofabrication processes on the quality of the junction interface. In particular, several post-lithography processes appear to cause irreversible damage to the surface layer of Sr_2RuO_4 , which highlights potential issues for general small scale device fabrication. We also report preliminary measurements of Josephson tunneling from these devices.

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