

Abstract Submitted
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Nanofabrication of Point Contact Junctions for Spectroscopic Studies of High-Temperature Superconductors¹ HAN ZHAO, OMAR MEHIO, WAN KYU PARK, JAMES ECKSTEIN, University of Illinois Urbana-Champaign, LAURA GREENE, National High Magnetic Field Laboratory, Florida State University — Point contact spectroscopy (PCS) probes the superconducting order parameter from Andreev reflection conductance spectrum. A new method to achieve robust junctions with a precise control of the geometry of the point contact by focused ion beam (FIB) nanofabrication techniques is currently under development. Preliminary application on niobium thin films shows consistent data that is insensitive to thermal cycling. This opens the possibility to perform PCS on a series of materials as a function of external variables, including temperature, magnetic field as a function of angle, and stress. Our preliminary data as a function of junction size show the expected resistance dependence, which will help us to determine more precisely when junctions are in the ballistic, or spectroscopic regime. Our plan is to apply this newly-developed method to probe the electronic nematic state in iron-based superconductors under applied magnetic field and uniaxial stress, to further understand the origin of the nematicity.

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