

Abstract Submitted
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A Josephson STM with two niobium tips ANITA ROYCHOWDHURY, RAMI DANA, MICHAEL DREYER, Laboratory for Physical Sciences, University of Maryland, College Park, JAMES ROBERT ANDERSON, CHRISTOPHER J. LOBB, FREDERICK C. WELLSTOOD, University of Maryland, College Park — We are developing a dual-tipped scanning tunneling microscope (STM) that operates at milliKelvin temperatures. The two tips can be connected and brought into tunneling with a superconducting sample to form a SQUID loop. Our scheme involves holding one of the tips fixed while the other is scanned to image spatial variations in the gauge invariant phase difference on the superconducting surface. We have developed a novel technique to fabricate sharp Niobium tips using a reactive ion etcher. The tips have been tested at 4 K and exhibit both a superconducting gap and atomic resolution on Au(111) and Bi₂Se₃ samples. We will describe the experimental setup, our tip fabrication technique, and present initial results.

Anita Roychowdhury
University of Maryland, College Park

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