

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**A Dual Tip STM for Imaging the Superconducting Phase Difference**<sup>1</sup> ANITA ROYCHOWDHURY, M.A. GUBRUD, Physics Department, University of Maryland, College Park and Laboratory for Physical Sciences, DAN SULLIVAN, NASA/Goddard, MICHAEL DREYER, Physics Department, University of Maryland and Laboratory for Physical Sciences, J.R. ANDERSON, C.J. LOBB, F.C. WELLSTOOD, Physics Department, University of Maryland, College Park — We have built a dual tipped STM, with each tip capable of independently scanning a sample. We will use the STM at ultra-low (mK) temperatures to study superconducting samples. The two tips along with the superconducting sample constitute a SQUID. This configuration is designed to minimize fluctuations in the Josephson phase of one of the tips, which scans the sample, while the other tip acts as a reference junction. Calculations and separate experiments on test SQUIDS indicate this arrangement will enable us to measure spatial variations of the gauge-invariant phase difference at the atomic scale.

<sup>1</sup>This project was funded in part by NSF and the Laboratory for Physical Sciences.

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Date submitted: 28 Dec 2010

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