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A dual tip STM for superconducting phase-difference detection¹ ANITA ROYCHOWHDURY, M.A. GUBRUD, DAN SULLIVAN, MICHAEL DREYER, Laboratory for Physical Sciences and Physics Dept., University of Maryland, College Park, J.R. ANDERSON, C.J. LOBB, F.C. WELLSTOOD, Physics Department, University of Maryland, College Park — We have built a dual tipped Pan-style STM, with each tip capable of independently scanning a sample. We have tested it at room temperature on graphite samples, and calibrated both scanners using atomic steps seen on graphite. We intend to use the STM at ultra-low (mK) temperatures to measure the spatial variation of the gauge-invariant phase difference in superconducting samples at the atomic scale. The two tips will function as the junctions of an asymmetric SQUID, with one tip acting as a reference while the other scans the sample. We will reduce fluctuations in the Josephson phase of the scanning tip by adding capacitance across the junctions and minimizing the geometric inductance.

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