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Cantilever micro-susceptometry of mesoscopic Bi2212 samples¹ HRYHORIY POLSHYN, RAFFI BUDAKIAN, University of Illinois at Urbana-Champaign, GENDA GU, Brookhaven National Laboratory — Fluxoid quantization provides a direct means to study phase coherence. In cuprate superconductors, there have been observations which suggest that phase coherent superconducting fluctuations may persist at temperatures significantly above Tc. The focus of this work is to study the vortex states in mesoscopic cuprate superconducting samples to directly probe phase coherence over a wide range of temperatures. We present cantilever torque susceptometry measurements of micron and sub-micron size Bi2212 rings and disks. The high sensitivity of this technique allowed observation of transitions between different fluxoid states of a single ring, and the discrete vortex states of micron size disks. The dependence of magnetic susceptibility on diameter and wall thickness of the ring was investigated. Measurements were made at different values of the in-plane magnetic field, and over a wide range of temperatures.

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