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Fluctuation Superconductivity in Mesoscopic Quasi-1D Superconducting Rings NICHOLAS C. KOSHNICK, HENDRIK BLUHM, Stanford University, MARTIN E. HUBER, CU-Denver, KATHRYN A. MOLER, Stanford University — We experimentally probe the phase rigidity of quasi-1D superconducting rings in regimes where fluctuation effects are important. The results demonstrate a scanning SQUID microscope technique which can distinguish the field from thermodynamic currents in individual mesoscopic samples from seven orders of magnitude of applied background field. Contrary to earlier results [1] we find agreement with theoretical predictions for phase rigidity when small phase gradients are present around the ring. We show that this theoretical framework can also explain the qualitatively different fluctuations at finite flux Φ in a regime where the Little-Parks effect is important $T_c(\Phi) < T < T_c(\Phi = 0)$.
Reference 1. Xiaxian, Z. and J.C. Price, Susceptibility of a mesoscopic superconducting ring. Physical Review B, 1997. 55(5): p. 3128-40.

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