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Persistent currents in normal metal rings HENDRIK BLUHM, NICHOLAS C. KOSHNICK, JULIE A. BERT, Stanford, MARTIN E. HUBER, University of Colorado Denver and NIST, KATHRYN A. MOLER, Stanford — We have measured the magnetic response of more than 20 individual mesoscopic gold rings at low temperatures. The rings were characterized one by one using a scanning SQUID microscope, which also enabled in situ measurements of the sensor background. All measured rings show a paramagnetic linear susceptibility and a poorly understood anomaly around zero field, both of which we attribute to unpaired defect spins. The response of some sufficiently small rings also has a component that is periodic in the flux through the ring. Its period is close to h/e, and its sign and amplitude vary from ring to ring. Including rings without a detectable periodic response, the amplitude distribution is consistent with predictions for the typical h/e persistent current in diffusive metal rings. The temperature dependence of the response, measured for two rings, is also consistent with theory.

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