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Quantum Interference Proximity Transistor FRANCESCO GIAZOTTO, NEST CNR-INFM and Scuola Normale Superiore, Piazza dei Cavalieri 7, I-56126 Pisa, Italy, JOONAS PELTONEN, MATTHIAS MESCHKE, JUKKA PEKOLA, Low Temperature Laboratory, Helsinki University of Technology, P.O. Box 3500, 02015 TKK, Finland — We present the realization and characterization of a novel-concept interferometer, the superconducting quantum interference proximity transistor (SQUIPT). Its operation relies on the modulation with the magnetic field of the density of states (DOS) of a proximized metallic wire embedded in a superconducting ring. Flux noise down to $\sim 10\mu\Phi_0 \mathrm{Hz}^{-1/2}$ (Φ_0 is the flux quantum) can be achieved even for a non-optimized design, with an intrinsic power dissipation (of the order of $\sim$100 fW) which is several orders of magnitude smaller than in conventional superconducting interferometers. Our results are in good agreement with the theoretical prediction of the SQUIPT behavior, and suggest that optimization of the device parameters would lead to a large enhancement of sensitivity for the detection of tiny magnetic fields. The features of this setup and their potential relevance for applications are further discussed.

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