Fluctuation Current in Superconducting Loops

J. Berger

Department of Physics and Optical Engineering, ORT-Braude College, Karmiel, Israel

A superconducting loop that encloses noninteger flux holds a permanent current. On the average, this current is also present above T_c, and has been measured in recent years.[1] We are able to evaluate the permanent current within the TDGL or the Kramer–Watts-Tobin models for loops of general configuration, i.e., we don't require uniform cross section, material or temperature. Our results agree with experiments.[2]

The situations with which we deal at present include fluctuation superconductivity in two-band superconductors, metastable fluxoid states generated by quenching through T_c, and ratchet effects.

[1]Science **318**, 1440 (2007)

[2]J. Phys.: Cond. Matt., in press; http://arxiv.org/abs/0904.2120