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Title:

Paramagnetic Instability of Small Unconventional Superconductors

Abstract:

The diamagnetism is an essential property of all superconductors. However, we will show that small topological (or unconventional) superconductors can be intrinsically paramagnetic by solving the quasiclassical Eilenberger equation and the Maxwell equation self-consistently on two-dimensional superconducting disks in weak magnetic fields. Because of the topologically nontrivial character of the wave function, the unconventional superconductors host the zero-energy surface Andreev bound states which always accompany so called odd-frequency Cooper pairs. The paramagnetic property of the odd-frequency pairs explains the paramagnetic response of the disks at low temperature.