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# 【174】Breakdown of induced p ± i p pairing in a superconductor-semiconductor hybrid

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Superconductor-semiconductor hybrids are platforms for realizing effective p-wave superconductivity. Spin-orbit coupling, combined with the proximity effect, causes the two-dimensional semiconductor to inherit p ± i p intraband pairing. An external magnetic field can then result in transitions to the normal state, partial Bogoliubov Fermi surfaces, or topological phases with Majorana modes. Experimentally probing the hybrid superconductor-semiconductor interface is challenging due to the shunting effect of the conventional superconductor. Consequently, the nature of induced pairing remains an open question. Here, we use the cQED architecture to probe induced superconductivity in a 2-D Al-InAs hybrid system. We observe a strong suppression of superfluid density and enhanced dissipation driven by magnetic field, which cannot be accounted for by the de-pairing theory of an s-wave superconductor. These observations are explained by a picture of independent intraband p ± i p superconductors giving way to partial Bogoliubov Fermi surfaces, and allow for the first characterization of key properties of the hybrid superconducting system.

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