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Supercurrent diode effect and finite momentum superconductivity

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时间: 9月16日 (星期四) 15:00—16:30
地点: 北京大学物理大楼中212大教室

报告人简介 (Aboutspeaker) : Noah F. Q. Yuan got his Ph. D. from the Hong Kong University of Science and Technology in 2017, and then went to MIT as a postdoc in Liang Fu's group. He is mainly interested in superconductivity and two-dimensional materials, and has been working on topological superconductivity, moiré superlattices, supercurrent diode effect and other related topics.

摘要 (Abstract) : When both inversion and time-reversal symmetries are broken, the critical current of a superconductor can be nonreciprocal. In this work we show that in certain classes of two-dimensional superconductors with antisymmetric spin-orbit coupling, Cooper pairs acquire a finite momentum upon the application of an in-plane magnetic field, and as a result, critical currents in the direction parallel and antiparallel to the Cooper pair momentum become unequal. This supercurrent diode effect is also manifested in the polarity-dependence of in-plane critical fields induced by a supercurrent. These nonreciprocal effects may be found in polar SrTiO₃ film, few-layer MoTe₂ in the Td phase, and twisted bilayer graphene in which the valley degree of freedom plays the role analogous to spin.

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http://www.phy.pku.edu.cn/icmp/xsjl/njtwl__bjdxlt.htm