

报告题目: Limiting behaviors in superconductors with a restricted sample geometry

报告人: Ying Liu
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报告人介绍:

刘荧教授分别从北京大学物理系获学士学位、中科院物理研究所硕士学位、美国明尼苏达大学博士学位。现任美国宾州州立大学物理系教授、上海交通大学鸿文讲席教授、浙江大学光彪学者、中组部“千人计划”入选者、国家重大科学研究计划（量子调控）首席科学家。他的主要研究方向为凝聚态实验和量子材料物理。在反常超导，量子相变、纳米物理、强关联体系等方面的研究上取得了世界公认的成果，发表论文近 90 篇，其中 *Science* 4 篇、*Nature* 1 篇、*Nature Physics* 2 篇、*PNAS* 2 篇、*Phys. Rev. Lett.* 9 篇。曾获得美国自然科学基金委的事业奖（NSF Career Award）、中国自然科学基金委的杰青（B 类）、和中国教育部长江教授（B 类）。刘荧教授是美国物理学会会士。

报告摘要:

Superconductors with a designed restricted geometry, which have been shown to exhibit limiting behaviors not found in the bulk, may provide insight into how macroscopic quantum phase coherence can be engineered, which may in turn be relevant for achieving very high temperature superconductivity. The Little-Parks effect observed in doubly connected superconductors, the quantum oscillations of the superconducting transition temperature with the applied flux, is well known. Its limiting behavior, referred to originally by de Gennes as the destructive regime, is found in ultrasmall doubly connected samples in which the global superconducting phase coherence is lost near the half-flux quanta because of the competition between the kinetic and the condensation energies of the system. I will present measurements on doubly connected quasi 1D cylinders and ultrasmall loops of Al, the observation of the destructive regime in both types of samples, as well as the restoration of the lost global phase coherence by manipulating sample geometries. I will also describe briefly our recent experimental efforts in the study of atomically

thin, single-crystalline flakes of NbSe₂ (prepared by mechanical exfoliation) as well as nanostructures fabricated on these flakes.

报告时间：12月11日（周二） 10:30-11:30

报告地点：物理系三层报告厅