



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

Title: Using in-plane magnetic fields to disentangle the intertwined orders in a cuprate high temperature superconductor

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Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

High temperature superconductivity appears in the cuprates when a spin order is destroyed, while the role of charge is less known. Recently, charge density wave (CDW) was found below the superconducting dome in $\text{YBa}_2\text{Cu}_3\text{O}_y$ when a high magnetic field is applied perpendicular to the CuO_2 plane, which was suggested to arise from incipient CDW in the vortex cores that becomes overlapped. By ^{63}Cu -nuclear magnetic resonance, we recently discovered a long-range CDW order induced by an in-plane field, setting in above the dome in single-layered $\text{Bi}_2\text{Sr}_{2-x}\text{La}_x\text{CuO}_6$ (ref.1). The onset temperature T_{CDW} takes over the antiferromagnetic order temperature T_N beyond a critical doping level at which superconductivity starts to emerge, and scales with the pseudogap temperature T^* . These results provide important insights into the relationship between spin order, CDW and the pseudogap, and their connections to high-temperature superconductivity.

1) S. Kawasaki, Z. Li, M. Kitahashi, C.T. Lin, A.P. Reyes, P.L. Kuhns and G.-q. Zheng, Nat. Commun. 8, 1267 (2017).