北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Weekly Seminar

Enhanced superconductivity in one-unit cell FeSe film grown on $SrTiO_3$

Xucun Ma

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Time: 4:00pm, June 24, 2015 (Wednesday)

时间：2015年6月24日（周三）下午4:00

Venue: Room w563, Physics building,Peking University

地点：北京大学物理楼，西563会议室

Abstract

Heterostructure based interface engineering has been proved an effective method for finding new superconducting systems and raising superconducting transition temperature. Recently discovered high temperature superconductivity in one unit-cell (UC) FeSe films on $SrTiO_3$ substrate grown by molecular beam epitaxy has attracted intensive attention. In sharp contrast to FeSe films on graphene where a 2.2 meV superconducting gap is observed on thick (~ 16.5 nm) films and no superconducting gap on 1-UC FeSe down to 2.3 K, 1-UC FeSe films on STO substrate exhibit unexpected large superconducting gaps of 15-20 meV. Interestingly, the anomalously large superconducting gap is only found in the first UC FeSe but not on 2-UC or thicker layers, indicating that interface plays a crucial role in the enhanced superconductivity in 1-UC FeSe films on STO substrate. In this talk, a comprehensive study of 1-UC FeSe films by *in situ* scanning tunneling microscopy/spectroscopy and angle-resolved photoemission spectroscopy and *ex situ* transport measurements will be presented to discuss the possible superconducting mechanism in this well-defined heterostructure.

About the speaker

马旭村，1992年本科毕业于北京大学化学与分子工程学院，获化学学士学位，2000年在中国科学院物理研究所获得博士学位，2000年至2002在德国马普研究学会微结构物理研究所从事博士后研究，2003年至2007年在中国科学院物理研究所任副研究员，2007年起任研究员和研究组组长。2013年9月调入清华大学物理系任研究员。主要研究方向为低维结构的控制生长与量子效应研究，近期主要关注于超导薄膜及异质结构、拓扑绝缘体等研究方向。