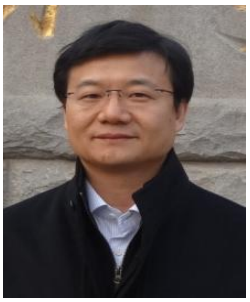
北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Intrinsic Josephson junctions: fabrication, physics and applications

Huabing Wang
Nanjing University



Time: 10:00am, December 29, 2015 (Tuesday)
时间：2015年12月29日 （周二）上午10:00
Venue: Room w563, School of Physics , Peking university
地点：北京大学物理学院，西563会议室

Abstract

Copper oxide superconductors are intrinsically of layered structures, with superconducting and non-superconducting layers interleaving each other. Thus a piece of sample consists of thousands of junctions. In the case of $Bi_2Sr_2CaCu_2O_{8+\delta}$, each junction measures approximately 1.5 nm thick and the junctions are stacked in series in a *c*-axial direction of the crystal. This type of junction is called intrinsic Josephson junction, or IJJ [1]. The discovery of IJJs in high-T_c superconductors opens the path to a new field of 3-dimensional microelectronics at the nanometer scale. However, with conventional fabrication process, samples are fabricated on the surface of a single crystal. The surface degradation of superconductivity makes it almost impossible to obtain desired junctions in 3-dimensional stacks. Introduced in this talk will be the novel double-sided fabrication method [2], device physics and electronic applications of intrinsic Josephson junctions [3-5].

[1] R. Kleiner et al., Phys. Rev. Lett. 68, 2394 (1992).
[2] H. B. Wang et al., Appl. Phys. Lett. 78, 4010 (2001)
[3] L. Ozyuzer et al., Science 318, 1291 (2007).
[4] H. B. Wang et al., Phys. Rev. Lett. 102, 017006 (2009).
[5] H. B. Wang et al., Phys. Rev. Lett. 105, 057002 (2010).

About the speaker

王华兵，国家“千人计划”特聘专家，南京大学电子科学与工程学院特聘教授。**1995**年在南京大学获得博士学位，此后历任南京大学副教授、日本东北大学副教授、日本国家材料科学研究所主干研究员等职。多年来，在超导电子学和太赫兹器件等方面开展了很多研究工作。发明的超导单晶集成电路的“双面制作技术”以及高温超导本征结检测和产生太赫兹波辐射的研究，是国际上有关领域的标志性工作。获得**2010**年度江苏省科学技术奖一等奖；由于在高温超导单晶集成电路及太赫兹器件的研究方面的贡献，获得**2003**年日本“丸文研究奖励奖”。