北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Weekly Seminar

Spin transport in antiferromagnetic insulators: progress and challenges

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Time: 4: 00 Pm, Dec. 18, 2019 (Wednesday)

时间：2019年12月18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

Spin transport is the key process for the operation of spin-based devices, which has been the focus of the spintronics research in the last two decades. Conductive materials such as semiconductors and metals, in which the spin transport relies on electron diffusion, were employed as the channels for spin transport in most studies. Due to the absence of conduction electron, insulators were excluded from the candidates for spin current channel before 2010. However, since the demonstration of the spin transmission through ferromagnetic insulator, it was realized that insulators with magnetic ordering can also serve as channels for spin transport[1]. In this talk I would like to introduce our recent progress of spin transport in antiferromagnetic insulators, e.g., the observations of temperature dependence of spin transmission, and spin current switching[2,3]. I would like to discuss the challenges for developing the functionality of antiferromagnetic insulator as well[4].

[1] Y. Kajiwara, K. Harii, S. Takahashi, J. Ohe, K. Uchida, M. Mizuguchi, H. Umezawa, H. Kawai, K. Ando, K. Takanashi, S. Maekawa & E. Saitoh *et al.* Nature 464, 262–266 (2010)

[2] Zhiyong Qiu, Dazhi Hou*, Joseph Barker, Kei Yamamoto, Olena Gomonay, Eiji Saitoh, “Spin colossal magnetoresistance in an antiferromagnetic insulator”, Nature Materials 17 (7), 577, (2018)

[3] Zhiyong Qiu, Jia Li, Dazhi Hou*, Elke Arenholz, Alpha T N’Diaye, Ali Tan, Ken-ichi Uchida, Koji Sato, Satoshi Okamoto, Yaroslav Tserkovnyak, Z. Q. Qiu, Eiji Saitoh, “Spin-current probe for phase transition in an insulator”, Nature Communications, 7, 12670 (2016)

[4] Dazhi Hou*, Zhiyong Qiu and Eiji Saitoh, NPG Aisa Materials (2019)

About the speaker

侯达之博士，现任职于中国科学技术大学，微尺度物质科学国家研究中心，特任研究员。本科毕业于复旦大学物理系，后于2007-2013年间，师从复旦大学金晓峰教授攻读博士学位。博士毕业后，于日本东北大学Eiji Saitoh教授组，2013-2019年间先后担任博士后与助教。主要从事电子自旋和磁性有关的电输运研究，在反铁磁材料中的自旋输运、以及反常霍尔效应研究两方面取得了一定的成果。国际重要学术期刊上已发表论文共23篇，其中第一作者或通讯作者文章9篇，包括Nature Materials 1篇， Physical Review Letters 2篇，Nature Communications 2篇，NPG Asia Materials综述论文1篇，总引用数951次（Google Scholar）。同时担任Nature Physics, Nature Communications, Physical Review Letters 等重要杂志审稿人。