北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Weekly Seminar

Recent experimental progresses on the quantum anomalous Hall effect

Ke He

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Time: 4:00pm, Oct. 19, 2016 (Wednesday)

时间：2016年10月19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

The quantum anomalous Hall (QAH) effect is a quantum Hall effect induced by spontaneous magnetization instead of an external magnetic field. The effect occurs in two-dimensional (2D) insulators with topologically nontrivial electronic band structure characterized by a non-zero Chern number. The experimental observation of the QAH in thin films of magnetically doped topological insulators (TIs) paves the ways for practical applications of dissipationless quantum Hall edge states and for realizations of the novel quantum phenomena, but a temperature as low as 30 mK is required to reach a perfect quantization. Further studies in these directions require magnetic TI materials that can show the QAH effect at higher temperature. We have performed systematic studies on the QAH effect in magnetically doped TI films with different thicknesses, magnetic dopants and compositions [2,3]. The results clarify the relations between the QAH effect and the energy band structure, electronic localization and ferromagnetism of a magnetic TI film and provide insights into designing and fabrication of high temperature QAH materials.

[1] C. -Z. Chang et al., Science 340, 167 (2013).

[2] X. Feng et al., Adv. Mater. 28, 6386 (2016).

[3] Y. Ou et al., APL Mater. 4, 086101 (2016).

About the speaker

Dr. Ke He received his bachelor degree from Department of Physics, Shandong University in 2000 and PhD degree from Institute of Physics, Chinese Academy of Sciences in 2006. After working as a postdoctoral researcher in the University of Tokyo for three years, he joined Institute of Physics, Chinese Academy of Sciences in 2009 as an associate professor. From September, 2013, he joined Department of Physics, Tsinghua University as an associate professor and became a professor since July 2016. The main research interests of Dr. Ke He in recent years are molecular beam epitaxy growth of topological materials and investigations on their topological quantum effects.