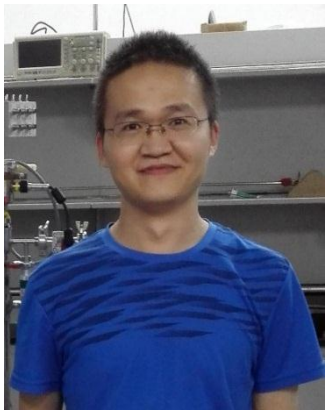
Searching for Majorana zero modes in two-dimensional systems

Fanming Qu

Institute of Physics, CAS



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时间: 2017年4月5日 （周三）下午4:00

Venue: w563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

Majorana zero modes have been proposed and observed in several solid state systems. This talk will present the current progress and focus on two-dimensional (2D) platforms with strong spin-orbit coupling. First, we study superconductivity mediated by the edge-modes of InAs/GaSb, a 2D topological insulator. Using superconducting quantum interference, we demonstrate tuning between edge-dominated and bulk-dominated superconducting transport regimes as a function of electrostatic gating [1]. Secondly, we investigate the phase diagram of InAs/GaSb by measuring dual-gated Hall bars [2]. Most importantly, by tuning the band alignment and Fermi level through top and back gates, we explore the transition between the trivial and topological insulating phases characterized by a normal gap and a hybridization gap, respectively. Thirdly, we fabricate quantum point contacts on InSb quantum wells and realize quantized conductance from the ballistic transport. In a vector magnet, we observe large g-factor anisotropy [3].

References

[1] V. Pribiag*, A. Beukman*, F. Qu*, *et al*., Nature Nano. 10, 593 (2015).
[2] F. Qu*, A. Beukman*, *et al*., Phys. Rev. Lett. 115, 036803 (2015).
[3] F. Qu, *et al*., Nano Lett. 16, 7509 (2016)

About the Speaker

Fanming Qu received his B.E. degree from Nankai University, Tianjin, China, in 2007 and Ph.D degree from Institute of Physics, Chinese Academy of Sciences in 2012. And then he worked as a postdoc in Delft University of Technology, the Netherlands, from 2012 to 2016. He joined Institute of Physics in August 2016 under the CAS Pioneer Hundred Talents Program, and he has been pre-selected by the 1000 Talents Recruitment Program for Young Talents. His research focuses on low temperature quantum transport, including topological materials, Majorana fermions and topological quantum computing.