北京大学量子材料科学中心
International Center for Quantum Materials, PKU
Weekly Seminar

Majorana fermion induced Equal Spin Andreev reflections heterostructures

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Time: 4:00pm, April. 16, 2014 (Wednesday)
2014 4 16 4:00
Venue: Room 607, Conference Room A , Science Building 5
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Abstract

It has been shown theoretically that Majorana fermions induce resonant Andreev reflections and cause zero bias conductance peaks (ZBCP) in electron spectroscope measurements. The Majorana induced ZBCP has been possibly observed in semi-conductor/superconductor heterostructures but the origin of the ZBCP is still under debate.

In this talk, we show that Majorana fermions induce a special type of Andreev reflection processes whereby electrons with certain spin polarization are reflected as holes with the same spin. On the other hand, electrons with opposite spin cannot undergo Andreev reflections and are reflected as electrons [1]. We call these processes Majorana fermion induced selective equal spin Andreev reflections (SESARs). We show that SESARs can be used to detect Majorana fermions. In a related work, we show that Majorana fermions in a special type of BDI class topological superconductors can be used to generate correlated spin-polarized currents [2].

[1] J. He, T. K. Ng, P. A. Lee and K. T. Law, Phys. Rev. Lett. 112, 037001 (2014).
[2] J. He, J. S. Wu, T.P. Choy, X. J. Liu, Y. Tanaka and

2008. After spending one year as a joint postdoc fellow of HKUST-IA
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