



Seminar

Manipulating Majorana Zero Modes in Quantum Nanowires

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Venue: Conference Room A (607), No. 5 Science Building

地点: 理科五号楼607会议室

Abstract

The search for non-Abelian Majorana zero modes has become an exciting pursuit in condensed matter systems, driven by both the pursuit of exotic fundamental physics and the applications to a building block for fault-tolerant topological quantum computer. In this talk I will discuss the manipulation of Majorana zero bound modes in quantum nanowires. The talk is organized in three parts. The first part will review the fundamentals of the topological superconductor, followed by an introduction to the recent experimental progresses in the 1D systems. Then, motivated by the experimental studies, I will present our recent results in the Majorana quantum nanowires with broken inversion symmetry. Finally, I will turn to the time-reversal invariant (DIII class) topological superconductors and introduce the symmetry protected non-Abelian statistics for Majorana doublets realized in such 1D topological superconductors.

About the Speaker

Dr Xiongjun Liu received his PhD from Texas A&M University in 2011. Then Dr. Liu has worked as a postdoctoral research associate for one year in Joint Quantum Institute and Condensed Matter Theory Center, University of Maryland. In Aug 2012, Dr. Liu joined Institute for Advanced Study, HKUST to be an IAS postdoctoral fellow, joint with MIT. He has authored and co-authored over 30 papers in Phys. Rev. Lett., Nature Comm., Phys. Rev. B and Phys. Rev. A, etc. His current research interest includes: (1) Condensed Matter Theory, focused on topological superconductor, topological insulator, and semiconductor spintronics; (2) Cold atoms, focused on the simulation of topological states, spin-orbit coupling effects, and many-body states.