



Weekly Seminar

Majorana search and topologically protected quantum computation: Challenges and progress

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Time: 4:00Pm, Oct. 31, 2018 (Wednesday)

时间: 2018年10月31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

Topological materials provide a protection from decoherence at the hardware level by using emergent non-Abelian anyons. The simplest non-Abelian anyon involves a defect that binds a Majorana zero-energy mode, predicted to appear quite naturally in certain superconducting systems. I will review recent progress in the Majorana search, and the challenges in the validation of Majorana devices. Later I will introduce a simple measurement scheme to overcome the problem, and show robust, clear, and universal experimental signatures of Majorana zero modes. I will also discuss a serious type of errors in general topological quantum computation and Majorana qubit. Diabatic corrections only vanish as a power-law function with the length of time for the braid. This power-law behavior can wash out the advantages of topological quantum computation. We found that such diabatic errors can be detected and corrected by applying a sequence of parity measurements.

About the speaker

2005年本科毕业于北京大学, 2012年获美国Duke大学博士, 2012-2014年在美国密西根州立大学从事博士后研究, 2014-2017年在StationQ, 微软研究院, 加利福尼亚分部任博士后研究员。2018年获“青年千人”计划资助并加入清华大学物理系任助理教授。

研究领域为理论量子物理和凝聚态物理, 其目前的研究兴趣包括: 拓扑量子计算(物理实现和架构), 拓扑量子器件的运输和量子调控, 多体相互作用量子系统中的非平衡态。