



北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Topological Physics in Quantum Critical Systems

余雪佳

福州大学



Time: 3:00 pm, Apr.15, 2025 (Tuesday)

时间: 2025年4月15日 (周二) 下午3:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Topology forms a cornerstone of modern condensed matter and statistical physics, offering a new framework to classify the phases and phase transitions beyond the traditional Landau paradigm. However, it has long been widely believed that topological physics is destroyed when the bulk energy gap closes, making it highly nontrivial to consider topology in gapless quantum critical systems. To address these challenges, recent advancements have sought to generalize the notion of topological physics to systems without a bulk energy gap, including quantum critical points and gapless phases, collectively referred to as gapless symmetry-protected topological phases. The discovery of nontrivial topology in quantum critical systems suggests that topology plays a crucial role in classifying phase transitions even if they belong to the same universality class, fundamentally enriching the textbook understanding of phase transitions. Moreover, extending topological concepts to gapless quantum many-body systems challenges the traditional belief in condensed matter physics that topological edge states are typically associated with bulk energy gaps. Given its importance, In this talk, I will introduce recent progress in the study of topological physics in quantum critical systems, covering both theoretical and experimental advancements.

About the speaker

余雪佳, 博士毕业于北京大学物理学院国际量子材料科学中心, 导师为徐莉梅教授。现为福州大学物理系教授, 福建省高层次人才。曾获北京市优秀博士论文奖与北京大学优秀毕业生等荣誉。一直从事统计物理中量子相变拓扑物理相关的理论研究, 取得一定成绩, 受Physics Reports编辑部的邀请, 正在撰写国际上首篇关于量子相变拓扑物理方向的长篇综述(62页)。以第一或通讯作者发表论文18余篇, 包括5篇 PRL、1篇Communications Physics、13篇Phys. Rev系列。