北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Symmetry protected topological phases under disorder or decoherence

Zhen Bi

The Pennsylvania State University

Time: 3:00m, July. 13, 2023 (Thursday)

时间：2023年7月13日 （周四）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

Symmetry-protected topological phases have attracted significant attention in the field of condensed matter physics due to their remarkable properties, such as the presence of protected edge or surface modes. Although substantial progress has been made in understanding these phases in ideal, isolated systems, their behavior under non-ideal conditions involving symmetry-breaking disorder or decoherence presents a challenging area of study. In this talk, we will introduce a concept known as "averaged symmetry-protected topological phases". These phases exist within mixed ensembles where individual states break part of the protecting symmetry, but the symmetry is restored upon ensemble averaging. We will explore the physical properties and classification scheme for these unique phases. Additionally, we will introduce the notion of "strange correlator" as a theoretical and numerical tool for detecting these phases.

About the speaker

Zhen Bi is currently an Assistant Professor at the Pennsylvania State University. Zhen Bi obtained his bachelor degree in Physics from Peking University in 2012. He completed his Ph.D. in Physics at the University of California, Santa Barbara in 2017. Afterwards, he was a Pappalardo Fellow at the Massachusetts Institute of Technology from 2017-2020 before joining Penn State. A key focus of Zhen Bi's research lies in understanding the properties of topological phases of matter and exploring exotic phase transitions. This intricate study area holds significant promise for advancing our fundamental understanding of quantum many-body systems and holds potential applications in future quantum technologies.