



Weekly Seminar

Disorder induced anisotropic topological phase transitions

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Time: 3:00 pm, Dec.10, 2025 (Wednesday)

时间: 2025年12月10日 (周三) 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

Disorder is ubiquitous in condensed matter systems. It plays pivotal role in many fundamental phenomena such as Anderson transition and transport. The interplay of disorder and topology gives rise to important phases such as quantum Hall effect and topological Anderson insulators. In this talk, I will first discuss how will disorder drive higher-order topological nontrivial phases, i.e., higher-order topological Anderson insulators [1], which can be characterized by anisotropic localization-delocalization-localization transition at the boundaries. Then I will focus on an important type of disorder, i.e., the random flux. We show that random flux is able to drive quantum phase transition from metals to higher-order topological insulators in the Benalcazar-Bernevig-Hughes model [2]. Finally, I will show the anisotropic phase transition sequence between weak and strong topological phases induced by random flux and the consequent new quantum criticality that lies outside quantum Hall universality [3].

References:

1. C. A. Li et al., Physical Review Letters 125 166801(2020);
2. C. A. Li et al., Physical Review B 106, L081410 (2022);
3. C. A. Li et al., Physical Review B 111, 214207 (2025).

About the speaker

Dr. Chang-An Li is a postdoc researcher at institute for theoretical physics and astrophysics, Würzburg University, Germany. He obtained his B.S. from Beijing Normal University in 2014 and his Ph.D in physics from The University of Hong Kong in 2019 under supervision of Prof. Shun-Qing Shen. After working as a postdoc at Westlake University in 2020, he moved to Würzburg University as a postdoc researcher. His research mainly focuses on topological phases of matter, disorder effect, and non-Hermitian physics. He has published 20+ first/corresponding author papers, including Physical Review Letters selected as Editors' suggestion and On the cover.