

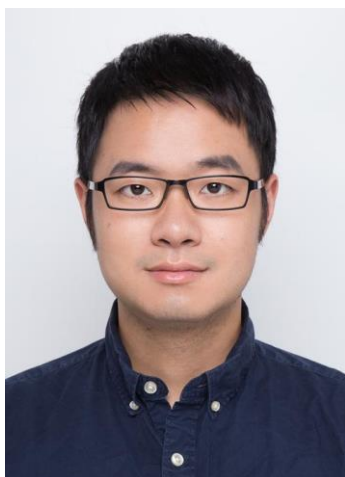


Weekly Seminar

Detecting quantum anomalies in open systems

Shenghan Jiang

Kavli Institute for Theoretical Sciences, UCAS



Time: 3:00 pm, April. 24, 2024 (Wednesday)

时间: 2024年4月24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

直播链接: <https://www.koushare.com/live/details/33828>

Abstract

Symmetries and quantum anomalies serve as powerful tools for constraining complicated quantum many-body systems in closed systems.

In this work, we introduce a novel and experimentally feasible approach to detect quantum anomalies in open systems. Specifically, we claim that the mixed anomaly between translation and spin rotation symmetry gives distinctive characteristics for half-integer and integer spin chains in measurements of $\langle \exp(i\theta S_z^{\text{tot}}) \rangle$ as a function of θ . Notably, the half-integer spin chain manifests a topological phenomenon akin to the "level crossing" observed in closed systems. Based on the matrix product density operator and transfer matrix formalism, we analytically establish and numerically demonstrate the unavoidable singular behavior for half-integer spin chains. Conceptually, our work demonstrates a way to discuss notions like "spectral flow" and "flux threading" in open systems not necessarily with a Hamiltonian.

About the speaker

Shenghan Jiang currently serves as an Assistant Professor at the Kavli ITS, UCAS. He obtained his Ph.D. from Boston College at 2017, and conducted Postdoctoral research at Caltech. Shenghan's research interests focus on emergent phenomena in strongly correlated quantum many-body systems, particularly in topological order, tensor network representations, and exotic quantum phase transitions.

