



Seminar

How to diagnose a topological phase transition at a finite temperature

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Time: 10:00 am, May.21, 2025 (Wednesday)

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Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Quantum phase transition at zero temperature (QPT) can be probed by measuring various thermodynamics quantities at a finite temperature. They satisfy single-parameter scalings determined by the infra-red properties of the system which dictate the local geometry. How to detect a topological phase transition (TPT) at zero temperature remains unexplored and challenging. Here we show that it can be diagnosed by measuring transport properties at a finite temperature. They satisfy two-parameter scalings determined by both the infra-red and the ultra-violet properties of the system which dictate the global topology. We demonstrate our findings by studying the TPTs in the Quantum Anomalous Hall systems. Our methods and results may lead to a resolution of several long-standing puzzles on the nature of plateau-plateau transitions in integer and fractional quantum Hall systems. They can also be extended to explore TPTs in many other systems. Experimental detections at a finite temperature are discussed.

About the speaker

Prof. Ye received Ph.D from Yale University. Currently, he is a chair professor at the newly found Great Bay university in Dongguan, Guangdong, China. He is a condensed matter theorist working on the interdisciplinary field of condensed matter, quantum optics, cold atoms, non-relativistic quantum field theory and conformal field theory. Recently, he has been particularly interested to explore possible deep connections among quantum/topological phases, Sachdev-Ye-Kitaev models and quantum black holes from material's point of views.