北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Conformal Hilbert Spaces in Chern Bands and non-Abelian anyons in Abelian topological phases

Yang Bo

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Time: 3:00 pm, June 29, 2026 (Monday)

时间：2026年6月29日（周一）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

Strongly interacting electrons confined to a two-dimensional Chern band lead to collective anyonic excitations that can potentially be manipulated for the robust storage and processing of quantum information. These anyons, however, are not featureless point particles; under realistic conditions they have rich dynamics from inter-anyon interaction, and we can even probe the internal structures of individual anyons. Using the Landau levels as the simplest example, we introduce the formalism of conformal Hilbert spaces as the theoretical tool for characterizing the algebraic structure of the many-body Hilbert spaces in Chern bands. The formalism is particularly useful for characterising the nature of and the relationship between different types of anyons. Among several applications we will focus on the possibility of accessing non-Abelian anyons in Abelian fractional topological phases, and the "high energy physics" of gapped excitations emerging from the interplay between quantum geometry and topology. We will also outline how this formalism can be generalized to moire Chern bands, and their experimental consequences.

About the speaker

Associate Professor Yang Bo obtained his Bachelor's degree in Science from Stanford University with a double major in physics and mathematics, and PhD in theoretical physics from Princeton University. He was the research scientist from 2014 to 2020 at the Institute of High Performance Computing under A*STAR, focusing on non-linear dynamics, complex systems and traffic flow modelling/simulation. He joined the Nanyang Technological University with the National Research Foundation Fellowship in 2020. Dr. Yang Bo is interested in emergent behaviours from both classical and quantum many body systems, with a particular focus on fractional quantum Hal, topological materials and classical logistics systems.