



Weekly Seminar

Effective equilibrium and effective linear response in non-equilibrium anyonic systems with braiding

Gu Zhang

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Time: 3:00 pm, April 29, 2026 (Wednesday)

时间: 2026年4月29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

Anyonic braiding is among the fundamental building blocks of topological quantum computation. Among the anyonic braiding processes, time-domain braiding requires the existence of non-equilibrium edges. During this talk, I will introduce our framework to effectively describe these braiding-involved non-equilibrium edges in terms of equilibrium languages, including (i) the effective equilibrium where both tunneling charge and heat currents vanish, and (ii) around this effective equilibrium, an effective linear response technique. The location of the effective equilibrium, and the corresponding linear-response transport coefficients directly reflect the fractional charge and statistics of the anyons involved, avoiding the need to measure higher-order current correlations. Moreover, the emergence of finite thermoelectric (Peltier and Seebeck) coefficients signifies the presence of real anyon tunneling and collisions (as opposed to virtual braiding in the time domain), intimately associated with the broken particle-hole symmetry, specific to anyonic gases.

About the speaker

Dr. Gu Zhang received his Bachelor's Degree from the School of Physics of Nanjing University, in 2012. He then studied in the group of Prof. Harold U. Baranger of Duke University, where he obtained his PhD Degree in 2018. After graduation, he worked as a post-doctoral researcher from 2018 to 2021, in Institut für Theorie der Kondensierten Materie (TKM) of Karlsruhe Institute of Technology, with Prof. Igor V. Gornyi and Prof. Alexander Mirlin. From 2021 to early 2025, he joined the Group of Prof. Ke He of Beijing Academy of Quantum Information and Sciences, where he worked as an Assistant Researcher. Starting from April 2025, he became an Associated Professor of the School of Physics, Nanjing University. His research mainly focuses on quantum transport in Mesoscopic systems and quantum devices, and anyonic braiding of topological edge states.