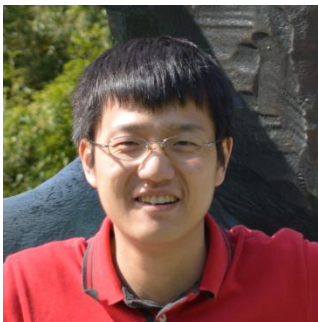# Special Seminar

The formalism of conformal Hilbert spaces and the fractionalization of anyons in FQH systems

Prof. Bo Yang

Nanyang Technological University of Singapore

Time: 10:00am, June. 30, 2023 (Friday)

时间：2023年6月30日 （周五）上午10:00

Venue: Room w563, Physics building, Peking University

地点：北京大学物理楼，西563会议室

Abstract

The fractional quantum Hall (FQH) effect is a family of strongly correlated topological systems in two-dimension, with exotic low lying charge excitations that are anyonic and even non-Abelian. Here we propose a unified framework in understanding the integer and fractional quantum Hall systems via Hilbert space truncation. This framework is closely related to the well-known microscopic pseudopotential and Jack polynomial formalism, and we show a more general method in constructing Hilbert spaces within multiple Landau level withs emergent conformal symmetry[1,2]. These conformal Hilbert spaces (CHS) have well-defined topological properties with anyons as "elementary particles". The hierarchical structure of the CHS allows us to reveal internal structures of anyons. I will also briefly discuss the emergence of multiple gravitons and the spin-statistics theorem of (deformable) anyons[3,4].

[1] Bo Yang, Phys. Rev. B. (Rapid Communication) 100, 241302(R) (2019).
[2] Ha Quang Trung and Bo Yang, Phys. Rev. Lett. 127, 046402 (2021).
[3] Yuzhu Wang and Bo Yang, Nat. Commun. 14, 2317 (2023).
[4] Ha Quang Trung, Yuzhu Wang and Bo Yang, Phys. Rev. B. 107, L201301 (Letter) (2023).

About the speaker

Dr. Yang Bo obtained his Bachelor's degree in physics and mathematics from Standard University, and his Ph.D degree in condensed matter physics from Princeton University in 2013, advised by Prof. Duncan Haldane. He is currently the assistant Professor at Nanyang Technological University of Singapore. He was awarded the National Research Foundation Fellowship in 2020. His research interests include strongly correlated topological systems in lower dimensions (in particular the fractional quantum Hall effect), complex systems and non-linear dynamics, as well as traffic modelling and optimisation (https://sites.google.com/view/yang-bo/publicationspreprints).

Host: 杜瑞瑞<rrd@pku.edu.cn>