

21 Dec Tuesday

12:00 – 12:45

Chair: WANG Qinghai (王清海)

Duality Between Non-Hermiticity And Curved Space

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Professor ZHANG Ren received his Ph.D. degree from the Renmin University of China in 2014. Before he joined Xi'an Jiaotong University, ZHANG Ren was a postdoctoral fellow at Tsinghua University from 2014 to 2017. In 2017, he joined Xi'an Jiaotong University as an associate professor. His research interest includes ultracold atomic physics and non-Hermitian physics.

Abstract:

Quantum systems are often characterized into two distinct categories, Hermitian and non-Hermitian ones. Extraordinary properties of non-Hermitian systems, ranging from the non-Hermitian skin effect to the supersensitivity to boundary conditions, have been widely explored. Whereas these intriguing phenomena have been considered peculiar to non-Hermitian systems, I will show that they originate from a duality between non-Hermitian models in flat spaces and their counterparts, which could be Hermitian, in curved spaces. For instance, one-dimensional (1D) models with chiral tunnelings are equivalent to their duals in two-dimensional (2D) hyperbolic spaces with or without magnetic fields. The dictionary translating between non-Hermiticity and curved spaces delivers an unprecedented routine connects Hermitian and non-Hermitian physics, unfolds deep geometric roots of non-Hermitian phenomena, and establishes non-Hermiticity as a powerful protocol to engineer curvatures and to explore quantum Hall physics in curved spaces.