



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

Occupation-Dependent Particle Separation in One-Dimensional Non-Hermitian Lattices

by

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ALL INTERESTED ARE WELCOME

Abstract

Non-Hermitian skin effect (NHSE) is a distinctive phenomenon in systems described by non-Hermitian Hamiltonians, where “bulk” eigenstates are spatially localized at the boundary of systems. Since its discovery, tremendous progress has been made in various aspects of NHSE that differ drastically from Hermitian systems, such as the modified topological bulk-boundary correspondence and unidirectional non-unitary dynamics.

In this talk, I will introduce a mechanism for particle separation based on their occupation conditions in the unit cells, which arises from the interplay between different skin accumulating channels and many-body effect. Namely, at single-particle level, a directional reversal of NHSE can be induced by a destructive interference of non-reciprocity of different sublattices, which is eliminated for hardcore bosons (or fermions) that fully occupy a unit cell. In this way, “paired” and “unpaired” particles tend to accumulate toward opposite directions, which is demonstrated by both static eigensolutions and numerical simulation of dynamical evolution.