THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

SEMINAR

Novel Topological Physics in Low-dimensional Moiré Superlattices

by

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Time: 10:00 - 11:00 a.m.
Join ZOOM Meeting: https://bit.ly/42ZZLtV

ALL INTERESTED ARE WELCOME
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Abstract

Moiré superlattices, created by combinations of low-dimensional materials with small lattice mismatches or different orientations, offer a powerful platform for exploring fascinating physical phenomena. In this talk, I will introduce our recent discoveries in moiré-induced topological physics in 2D and 1D moiré superlattices, based on large-scale first-principles calculations. I will first demonstrate a novel and general scheme to realize dense arrays of low-dissipation topological conducting channels using 2D moiré heterobilayers formed by graphene and hexagonal boron nitride. Strong moiré potential has been revealed to provide periodic modulation of local topological orders, giving rise to topological arrays in the moiré superlattice. Furthermore, I will show that this moiré topological scheme could be extended to 1D moiré systems for designing novel topological heteronanotubes (THT). In particular, a new type of spiral THT has been discovered to induce remarkable magnetic fields owing to dense moiré nanopatterning. Our results provide rich opportunities for both fundamental science in moiré topological physics and practical applications for low-power nanodevices.

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