THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

2D-Material Topological Photonics Based on Non-Hermitian Quantum Mechanics

by

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Date: April 23, 2021 (Friday)
Time: 4:00 - 5:00 p.m.
Join ZOOM Meeting: https://cuhk.zoom.us/j/95524430594

ALL INTERESTED ARE WELCOME
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Abstract

Non-Hermitian photonic systems with gains and/or losses have recently emerged as a powerful approach for topology-protected optical transport and novel device applications. To date, most of these systems employ coupled optical systems of diffraction-limited dielectric waveguides or microcavities, which exchange energy spatially or temporally. Recently, we introduce a diffraction-unlimited approach using a plasmon–exciton coupling (polariton) system with tunable plasmonic resonance (energy and linewidth) and coupling strength. By using a chirped silver nanogroove cavity array and coupling a single tungsten disulfide monolayer with a large contrast in resonance linewidth, we show the tuning capability through energy level anticrossing and plasmon–exciton hybridization (linewidth crossover), as well as spontaneous symmetry breaking across the exception point at zero detuning. This two-dimensional hybrid material system can be applied as a scalable and integratable platform for non-Hermitian photonics, featuring seamless integration of two-dimensional materials, broadband tuning, and operation at room temperature.

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