ICFO



# INSIGHT SEMINAR: Recent Progresses on 2D Charge-Transferonics

ZHENG VITTO HAN

February 14, 2025
11:00 to 12:00
Seminar Room

**ABSTRACT:**
In this talk, we will introduce mesoscopic physics activities at the Liaoning Academy of Materials (LAM). One of the main focuses is the synergetic interplay between two interacting 2D electronic layers. Using the graphene/CrOCl van der Waals hybrid system as an example, we show that electron-electron interactions induce a long-wavelength charge order in the Cr-3d surface state of CrOCl (~ 0.7 nm below graphene). This charge order acts as a quantum superlattice, imposing a moire-like potential on graphene or other 2D layers, leading to exotic interaction-driven phenomena [1-4], including robust quantum Hall phases, exciton-enhanced correlated insulators, and interfacial p-doping in 2D semiconductors. We define this universal effect as ?charge-transferonics,' with many emergent phenomena yet to be explored.

**BIO:**

Zheng Vitto Han is a research professor at the Institute of Optoelectronics, Shanxi University. He is also director of the Institute of Quantum Materials and Devices, LAM. His studies mainly focus on the emerging physical properties of functional materials in mesoscopic sizes, and on further implementing these interesting properties in future applications of nano-assemblies and nanoelectronics.

**Hosted by:** Prof. Dr. Adrian Bachtold