中央大學物理學系

Department of Physics, National Central University

Colloquium

Emergent Band Features in Van-der-Waals Crystals and Thin Film Heterostructures

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Venue: S4-625

Time: 14:00-16:00

Abstract :

Van der Waals materials are promising candidates for next-generation electronic applications due to their potential to exhibit a range of novel physical phenomena, including charge density waves, topological states, superconductivity, and emergent band features. Tailoring the surfaces and interfaces of these materials offers a powerful approach to modulate their properties. Thin films and heterostructures are particularly important because they may exhibit distinct and potentially advantageous properties compared to their bulk counterparts, owing to effects such as size reduction, symmetry breaking, proximity coupling, and quantum confinement.

Our research primarily focuses on the investigation of quantum confinement, reduced dimensionality, topological order, phase transitions, and moiré physics within these materials. To advance this research, we have developed a molecular beam epitaxy (MBE) system at National Central University specifically designed for the growth of van der Waals materials. Additionally, we employ angle-resolved photoemission spectroscopy (ARPES) to probe and characterize the emergent quantum properties of these materials. The results obtained will provide comprehensive insights into the ground state band structure, which is critical for the understanding and development of solid-state physics.