Weekly Seminar

Molecular-Beam Epitaxy of Layered Compounds: Topological Insulator & Transition Metal Dichalcogenide

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Time: 4:00pm, Dec. 24, 2014 (Wednesday)
时间：2014年12月24日（周三）下午4:00
Venue: Room 607, Science Building 5
地点：理科五号楼607会议室

Abstract

In this talk, I shall introduce our recent efforts of growing epitaxial films of layered compounds, Bi_2Se_3 and $MoSe_2$, which are a topological insulator (TI) and transition-metal dichalcogenide (TMD), respectively, by molecular beam epitaxy (MBE). The TIs and TMDs are quantum materials of great current interests. Epitaxial growth of such films falls into the category of van der Waals epitaxy. I shall first demonstrate growth of single domain Bi_2Se_3 epifilms by using vicinal InP(111)A substrate, followed by an introduction of growth of a high-index Bi_2Se_3(221) film on InP(001). For the latter, anisotropic topological surface states are revealed and opportunities of examining the strain effect are suggested. Finally, I will present MBE growth of ultrathin $MoSe_2$, where we discover a surprising network of grain boundary defects. The one-dimensional metallic modes are seen to be modulated by the moiré potentials as well as quantum confinement effect and their formation process will be discussed.

About the Speaker

Maohai Xie got his Bachelor degree from Tianjin University in 1985, Master degree from Chinese Academy of Science in 1988 and PhD from University of London in 1994. Since 1995 to 1997, he has been a Postdoctoral Research Fellow in the Imperial of Science, Technology and Medicine, London, UK. Then he joined in the faulty of the University of Hong Kong. His Research Interests are Epitaxial growth and properties of ultrathin films and quantum structures of semiconductors, metals, topological insulators and monolayer transition-metal dichalcogenides; Surfaces and electronic structures of ultrathin films; properties related to quantum size effects; Electron diffraction, scanning probe microscopy and photoelectron spectroscopy.