PAP Seminar Announcement

Atomic-Level Control of Quantum Material Growth: From Quantized Anomalous Hall Effect to High Tc Superconductivity

Prof. Qi-Kun Xue
Department of Physics, Tsinghua University

Date: 22 June 2017 (Thursday)
Time: 2.00pm to 3.00pm
Venue: Research & Graduate Studies Office, Level 2 Conference Room, CBC-02-01.
Host: Prof Xiong Qihua

Abstract

Molecular beam epitaxy (MBE) has been well-known as a powerful technique for preparing semiconductors think films and heterostructures. Combining MBE with two surface sensitive tools—scanning tunneling microscopy (STM) and angle resolved photoemission spectroscopy (ARPES), can even push its power to an unprecedented level in control of quantum materials. We apply MBE-STM-ARPES to topological insulators and high Tc superconductors, which have recently attracted extensive attention. We show how quantized anomalous Hall effect could be achieved by atomic-level control of band-engineered and magnetically doped topological insulators with MBE-STM-ARPES. We then show the discovery of the interface enhanced high temperature superconductivity in single unit-cell FeSe films on SrTiO3 and the nodeless pairing in monolayer CuO films on BSSCO using similar approach.

Short Biography

Qi-Kun Xue, received his BSc in Shan-Dong University in 1984, and PhD degree in condensed matter physics from Institute of Physics, the Chinese Academy of Sciences (CAS) in 1994. From 1994 to 2000, he worked as a Research Associate at IMR, Tohoku University, Japan and a visiting Assistant Professor at Department of Physics, North Carolina State University, USA. He became a professor at Institute of Physics, CAS in 1999. He was elected into The Chinese Academy of Sciences in 2005. Since 2005, he has been a professor in Department of Physics, Tsinghua University. From 2010 to 2013, he was the Chair of Department of Physics and the Dean of School of Sciences. He became the Vice President for Research in May 2013, Tsinghua University. He won the TWAS Prize in Physics in 2010.