

Electric-field Control of Spin in Ferroelectric vdW Heterostructures



5 September 2025

Prof. Junling WANG

City University of Hong Kong

Venue: N23-3022

Time: 14:30 - 15:30

Hosted by: Prof. Yongqing CAI

Abstract

Multiferroic materials, such as BiFeO_3 , allow for the electric-field control of magnetization because of their magnetoelectric coupling effect. They have been studied extensively for the rich underlying physics and potential applications in spintronic devices. However, research on conventional multiferroic materials have encountered serious obstacles, e.g., small coupling coefficients of Type-I multiferroics and low temperature/high conductivity of Type-II multiferroics. Recent developments on 2D ferroelectric materials open a new paradigm in the field. Their unique layered structure allows for the coexistence of switchable polarization and high conductivity, even superconductivity. In this talk, I will discuss the unique properties of 2D ferroelectric materials and the opportunities they brought in term of electric-field control of spin and magnetization.

Biography

Prof. Junling WANG obtained his B.S. degree from Nanjing University in 1999, and Ph.D. degree from University of Maryland, College Park in 2005. After a short postdoc training at PennState University, he joined Nanyang Technological University as an Assistant Professor in 2006. He was promoted to Associate Professor with tenure in 2011 and Full Professor in 2017. In 2024, he joined City University of Hong Kong (CityU) as a Chair Professor in Physics. Prof. Wang's research activities focus on multiferroic materials. His pioneering work on BiFeO_3 thin films has attracted much attention in the field. His recent interests also include 2D vdW materials that possess ferroelectric and/or magnetic properties. Through materials processing, structural and electrical/magnetic characterizations, he strives to understand the fundamental physics of multiferroic materials at low dimensions and develop new materials/devices for the next generation electronics and spintronics. He has published over 170 papers in high impact journals, including Science, Science Advances, Nature Materials and Nature Communications. His work has been cited more than 20700 times with an H-index of 59 (google scholar).