

CONDENSED MATTER SCIENCES SEMINAR SERIES

Professor Rui He

University of Texas, Arlington

Host

Dr Naipeng Zhang

Title

Raman spectroscopy of 2D magnets

Friday, September 18th, 2026

1st Floor – B101 15:00-16:00

Abstract

Van der Waals (2D) materials with intrinsic magnetism have attracted massive interest because of their potential applications in data storage and spintronics devices. Atomic layers of chromium triiodide (CrI₃) are one of such 2D ferromagnetic (FM) materials that have been demonstrated to realize long range FM order in its monolayer limit. Raman spectroscopy is a convenient and powerful technique to probe the lattice, electronic, and magnetic excitations in 2D magnets. In this talk, I will present our Raman spectroscopy studies of magnons (spin waves) in bulk CrI₃ and studies of moiré magnetism in twisted double bilayer CrI₃. We have revealed a novel mixed state of layered antiferromagnetism (AFM) and FM in 3D bulk CrI₃ and have revealed the emergence of finite net magnetization that originates from spin frustrations and noncollinear spin texture introduced by moiré superstructures in twisted double bilayer CrI₃. I will also show our Raman spectroscopy studies of spin-induced nematicity in few-layer XY-type magnet NiPS₃ and our observation of phonon Zeeman splitting in monolayer MoS₂ which is usually considered as a non-magnetic material. Our Raman spectroscopy studies offer an unprecedented venue for probing novel magnetic states and phases in 2D magnets.