Physics & Astronomy Colloquium
Spring 2021

Tuesday, Mar 9th at 3:30 pm

(Zoom colloquia: Please find the meeting information below)

Dr. Rui He

ECE, Texas Tech University

Raman spectroscopy of van der Waals magnet CrI_3

Van der Waals (or 2D) materials with intrinsic ferromagnetism have attracted massive interest because of their potential applications in data storage and spintronics devices. Atomic layers of chromium triiodide (CrI_3) are one of such 2D ferromagnetic (FM) materials that have been demonstrated to realize long range FM order in its monolayer limit. In this talk, I will present our recent Raman spectroscopy studies of magnons (spin waves) and magnetism-induced phonons in bulk and thin layers of CrI_3. Using magnetic field- and temperature-dependent ultralow frequency Raman spectroscopy, we reveal a novel mixed state of layered antiferromagnetism (AFM) and FM in 3D CrI_3 bulk crystals where the layered AFM survives in the surface layers and the FM appears in deeper bulk layers. In thin layers (1-4 layers) of CrI_3, we use a combination of polarized Raman spectroscopy experiment and magnetism-phonon coupling calculation to study the rich magneto-Raman effect. Our results explain why a van der Waals magnet may show different magnetic behaviors in its layered and bulk forms and reveal the spin-phonon coupling physics in its atomic layers.

Zoom meeting ID: 995 291 7599 Passcode: PHAS

(Find more information at Department Colloquia Webpage)