UNL Department of Physics and Astronomy presents:

Two-Dimensional Magnetic Quantum Materials

PRESENTED BY

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Refreshments will be served in the JH 1st Floor Vending Area at 3:30

ABSTRACT

The family of two-dimensional (2D) quantum materials has grown rapidly to encompass a wide range of electronic properties. The realization of long-range magnetic order in van der Waals layered materials has been elusive till recently. The reduced dimensionality in these 2D magnets may give rise to novel physical properties different from those in bulk. The experimental development of 2D magnets could bring new advances in encoding information using quantum materials. In this talk, I will describe two examples of probing layer-dependent magnetic phenomena in layered crystals using magneto-optics and transport measurements. (1) In a ferromagnetic insulator, vanadium triiodide, we observed robust and enhanced ferromagnetism down to the atomically thin limit. The magnetic properties are coupled to layer stacking orders. (2) In a layered antiferromagnetic topological insulator, $MnBi_2Te_4$, we found that the magnetic states exhibit even-odd layer number effects. The tuning of magnetic states corresponds to concurrent topological phase transitions. These 2D magnetic quantum materials become model platforms to understand and control spins in quantum-confined systems. Finally, I will briefly discuss future opportunities in this emerging field of research.