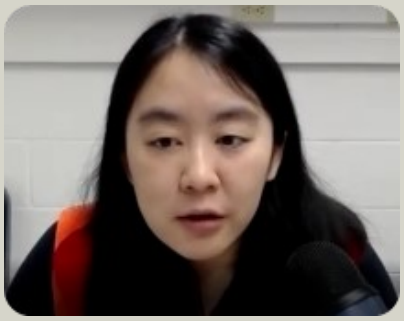
UNL Department of Physics and Astronomy presents:

Spintronics with 2D and Topological Materials: Outstanding Opportunities in Van der Waals Heterostructures

PRESENTED BY

KELLY LUO,

Cornell University



THURSDAY

MARCH 3

4:00 PM

IN JH 136

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

ABSTRACT

Advances in quantum science and technology rely on ever-improving control over quantum degrees of freedom including electron spin, photons, and magnons, which can store, transmit, and exchange information. Understanding their mutual interactions, propagation, and non-equilibrium dynamics within solid-state systems is a crucial challenge at the forefront of this effort. My research broadly investigates the dynamics and effective couplings among these quantum degrees of freedom. Specifically, my talk will center around two themes: 1. developing multifunctional vdW heterostructures for spin-based quantum information processing; 2. accelerating next-generation spin-orbit torque MRAM devices based on 2D and topological materials. By employing ultrafast optical scanning microscopy, Sagnac interferometry, and microwave electronics, I will discuss how we harness the outstanding opportunities enabled by the pristine van der Waals interfaces of 2D materials with unparalleled Kerr sensitivity, temporal, and spatial resolutions. Our work aims to bridge the urgent needs of the microelectronics industry by enabling new forms of nonvolatile magnetic memory, low-power computing, optical interconnects, and multifunctional hybrid materials with widespread societal impact.