

# CONDENSED MATTER SCIENCES SEMINAR

## Professor Xiao-Xiao Zhang

University of Florida

Host

Dr Luis Balicas

Title

**Optical probing of electronic and spin states in 2D quantum materials**

**Friday, October 6<sup>th</sup>, 2023**

**1<sup>st</sup> Floor – B101**

**15:00-16:00**

**Abstract**

Atomically thin van der Waals materials provide a versatile and unique platform for studying physical interactions under low dimensionality and developing novel compact devices with tunable functionalities. In the first half of the talk, I will present our recent progress in understanding the exciton-polaron interactions and the modified Fermi Sea screening in the 2D semiconductor of WSe<sub>2</sub>. Our results will highlight the importance of polaron interactions with different valley and spin-polarized carriers, which allow us to extract the evolution of screening as the exciton number become comparable to the charge carrier density. In the second half, I will present the optical studies in 2D spin-crossover molecular crystals, including the fabrication and the identification of layer-dependent spin-crossover transitions with optical spectroscopies. I will also discuss the recent results of probing 2D magnetic and spin states using nanomechanical resonator devices that demonstrate the coupling between the spin degree of freedom and the material's mechanical properties.

**Bio**

Xiao-Xiao Zhang is an assistant professor in the Physics Department at the University of Florida. She obtained her Ph.D. degree from Columbia University and went to Stanford and Cornell University as a postdoc before joining UF. She is a recipient of the NSF Early Career Award and DOE Early Career Award.