



# Seminar announcement

**Tuesday, October 17, 2023**

**1:30 pm**

**WSI, Seminar room S 101**

**ONLINE via ZOOM**

<https://tum-conf.zoom-x.de/j/65379900236?pwd=ckNDYStzK1V5RU1abHJTb1VLcThydz09>

Meeting-ID: 653 7990 0236

Kenncode: 192362

## **“Controlling spin properties in 2D materials and heterostructures”**

The spin-locked valley states in monolayer transition metal dichalcogenides (TMDs) have been proposed for classical and quantum information applications. Valley polarization can be realized by applying a magnetic field to Zeeman split the band edge states. However, the small valley splitting poses challenges for control of valley states. In this talk I will discuss an approach of using the proximity effect from a ferromagnetic substrate to enhance the valley splitting in monolayer TMDs. Using magnetic semiconductor EuS as a substrate in the TMD/EuS heterostructures, we have achieved a giant valley splitting, equivalent to field amplification of up to two orders of magnitude. I will also discuss our recent efforts of realizing novel covalent 2D magnets, as well as using Hall measurements to tease out hidden magnetic order in these 2D magnets. Finally, I will present our work on realizing 2D magnet/TMD heterostructures using dative epitaxy.

Adv. Mater., 2200117, (2022); Nat. Comm. 10, 4163 (2019); Nat. Nanotechnol., 12, 757 (2017)

**Prof. Hao Zeng**  
**Department of Physics**  
**University of Buffalo**  
**The State University of New York**  
**USA**