

The Department of Mechanical Engineering Presents

You Zhou, Ph.D.

Assistant Professor
Materials Science and Engineering
University of Maryland



Title: Wigner crystals and their melting in atomically thin heterostructures

Abstract: A Wigner crystal — a solid made entirely of electrons — is a model system for understanding electron correlation physics that underlies a wide range of phenomena, including high-temperature superconductivity and metal-insulator transitions. Despite decades of research, it has been challenging to realize Wigner crystals in the quantum regime where quantum fluctuations dominate over thermal ones. In this talk, I will introduce how atomically thin semiconductors, transition metal dichalcogenides, form an exciting new materials platform to investigate correlated electronic states. I will describe how we improve the materials quality, probe the formation of Wigner crystals from optical spectroscopy, and determine the phase diagrams of the crystals' classical and quantum melting. Finally, I will discuss how these experiments can open new avenues for simulating quantum many-body states and quantum information processing.



About the Speaker: Dr. You Zhou is an Assistant Professor in the Department of Materials Science and Engineering at the University of Maryland, College Park. He received his B.S. in Physics from Peking University. He earned his Ph.D. in Applied Physics from Harvard in 2015, where he worked on metal-insulator transitions in correlated oxides with Prof. Shriram Ramanathan. He was a postdoctoral fellow in Prof. Hongkun Park's group at Harvard University between 2015 and 2020, focusing on excitonic and electronic properties of two-dimensional semiconductors. He is a recent recipient of the NSF CAREER Award.

ZOOM
98733315827

THURSDAY, APRIL, 21, 2022
11:00AM-11:50AM