ASU Department of Physics
Arizona State University

COLLOQUIUM

Thursday, August 29, 2024

Refreshments at 3:15pm outside PSF 101
Colloquium from 3:30pm - 4:30pm in PSF 101

Emergent Phases in Quantum Magnets: Fractionalization, fragmentation and New Particles

Professor Onur Erten

Arizona State University

Abstract:

In recent years, bilayers and moiré superlattices of van der Waals materials have surfaced as new tunable quantum platforms for the realization of emergent phases. While moiré-induced electronic phases have been extensively explored, moiré engineering of magnetic phases is a newer emerging topic. In the first part of my talk, I will discuss how stacking dependent interlayer exchange can be used to create novel spin textures such as skyrmions. I will illustrate this mechanism by applying it to twisted bilayers of Cr-based trihalides and RuCl3. In the second part, I will focus on quantum spin liquid bilayers and discuss how twist angle and interlayer exchange can be utilized to create new topological phases such as vison crystals with emergent quasiparticles including `fractionalized Goldstone modes' in these systems.

Biography:

Onur Erten obtained his doctorate at The Ohio State University and worked at Rutgers University and Max Planck Institute for the Physics of Complex Systems before joining Arizona State University as an assistant professor. His research interests lie in the field of theoretical condensed matter physics: strongly correlated electron systems, quantum magnetism, superconductivity and topological phases in quantum materials.

Host: Prof. Antia Botana
View our Fall 2024 Physics Colloquium schedule at https://physics.asu.edu/colloquia