

# CONDENSED MATTER SCIENCES SEMINAR

## Professor Donna Sheng

California State University, Northridge

### Host

Dr Cyprian Lewandowski

### Title

**Topological Chiral Superconductivity in the Triangular-Lattice Hofstadter-Hubbard Model**

Friday, February 27<sup>th</sup>, 2026

1<sup>st</sup> Floor – B101

15:00-16:00

### Abstract

Moiré materials provide exciting platforms for studying the interplay of strong electronic correlation and band topology. In this talk, I will report our recent progress on identifying unconventional topological superconductivity for the lightly doped Hofstadter-Hubbard model on a triangular lattice. Based on large-scale density matrix renormalization group and tensor network simulations, we find strong evidence for a robust chiral superconducting (SC) phase with dominant power-law pairing correlations for finite cylinders, nonzero pairing orders for infinite 2D systems, and a quantized spin Chern number. The SC phase emerges at very weak interaction and grows stronger at intermediate interaction strengths ( $U$ ) for a wide range of hole doping. We also discuss theoretical insights into the emergence of topological superconductivity from doping topological Chern bands or chiral spin liquid states of Moiré materials.