

# *Chez Pierre*

Presents ...

**Monday, February 10, 2025**

**12:00 pm - 1:00 pm**

**Duboc Room – 4-331**



## **Chez Pierre Seminar**

**Qiong Ma, Boston College**

### **“Topology and Correlations in monolayer TaIrTe<sub>4</sub>”.**

In this talk, I will present our recent experimental studies on the topological and correlated properties of monolayer TaIrTe<sub>4</sub>. First, I will discuss a dual quantum spin Hall (QSH) insulator, arising from the interplay between its single-particle topology and density-tuned correlations. At charge neutrality, monolayer TaIrTe<sub>4</sub> exhibits QSH insulator behavior, characterized by enhanced nonlocal transport and quantized helical edge conductance. Upon introducing electrons from charge neutrality, TaIrTe<sub>4</sub> only shows metallic behavior in a small range of charge densities but quickly goes into a new insulating state. This insulating state could arise from a strong electronic instability near the van Hove singularities, likely leading to a charge density wave. Within this correlated insulating gap, we observe a resurgence of the QSH state. I will also discuss our recent efforts to study this correlated gap using nonlinear Hall responses.