

# *Chez Pierre*

Presents ...

**Monday, February 28, 2022**

**12:00pm Noon**

**Broadcast via Zoom**



## **Chez Pierre Seminar**

**Andrew Pierce, Harvard University**

### **"Fractional Chern insulators in twisted bilayer graphene"**

The discovery of the fractional quantum Hall effect in 1982 triggered a revolution in condensed matter physics, but many of the most fundamental and technologically useful properties of fractional quantum Hall states remain difficult to access experimentally due to the necessity of a large out-of-plane magnetic field. Alternatively, analogs of fractional quantum Hall states known as fractional Chern insulators can in principle emerge at zero magnetic field in materials with intrinsic topological band structures and strong Coulomb interactions. In this talk I will present local compressibility measurements of topological states in magic-angle twisted bilayer graphene, a material that possesses both prerequisite properties. We find that a modest out-of-plane magnetic field stabilizes fractional Chern insulators within a single intrinsic topological band that we interpret to result from the redistribution of Berry curvature induced by the magnetic field. These observations provide a new avenue toward engineering zero-field fractional Chern insulators and toward coupling superconductors—also native to twisted bilayer graphene—to fractionally charged quasiparticles.