

# Chez Pierre

Presents ...

**Monday, April 24, 2023**

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

**Duboc Room – 4-331**



## **Chez Pierre Seminar**

**Vidya Madhavan, (UIUC)**

### **“Magnetic Field Induced Melting of a Charge Density Wave”.**

UTe<sub>2</sub> is a heavy fermion superconductor with strong evidence for spin-triplet pairing. Recent work from our group has revealed the presence of an intriguing charge density wave (CDW) phase which is sensitive to magnetic fields and disappears close to the superconducting  $H_{c2}$ . A possible explanation for this unique CDW invokes the presence of an intertwined pair-density wave (PDW) which is a density wave of cooper pairs. The PDW scenario suggests that any vortex in the uniform superconducting phase or the PDW phase will result in point defects i.e., vortices in the CDW. In this work we employ scanning tunneling microscopy (STM) to visualize the magnetic field induced melting of this unconventional CDW order. We use the amplitude and phase information present in the Fourier transforms of the CDW to detect the presence of topological defects. We show that the phase around these topological defects winds by  $2\pi$ , corresponding to a vortex or an anti-vortex, while the amplitude goes to zero at the center of the defect. The data show that as the magnetic field increases, the CDW melts by the proliferation of vortex-anti-vortex pairs consistent with the PDW scenario..