

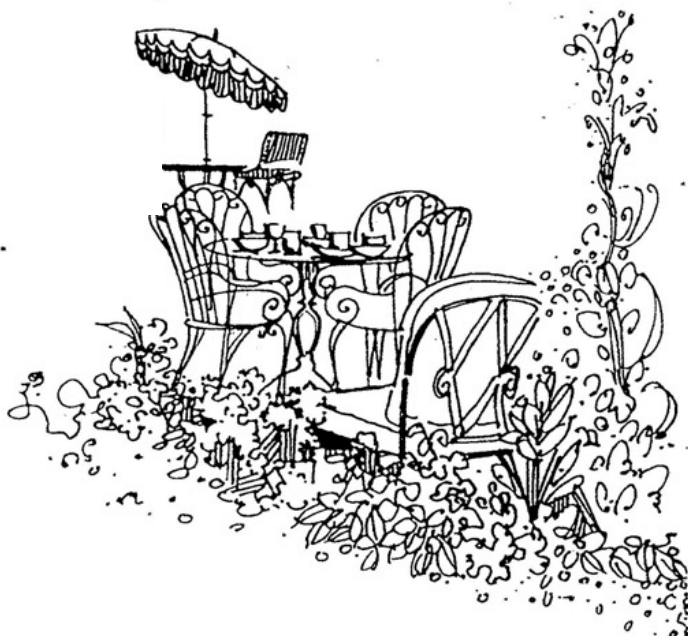
Chez Pierre

Presents ...

Monday, December 1st, 2025

12:00 pm - 1:00 pm

Duboc Room – 4-331



Chez Pierre Seminar

Hongyuan Li, Cornell University

"Imaging electron solids in 2D Van der Waals Heterostructures".

Electrons are expected to crystalize into solids when their Coulomb interaction dominates over kinetic energy, with the Wigner crystal being a prominent example. The investigation of such electron solids has been limited by the stringent requirements for suitable materials and detection methodologies, while the development of novel 2D Van der Waals device and non-invasive real-space imaging capabilities cast new light on this topic. In this talk, I will show that through new scanning tunneling microscopy techniques, we are able to spatially resolve new electron solid phases in 2D Van der Waals Heterostructures. In moiré superlattices, each moiré site simulates a multi-electron artificial atom where Wigner molecules emerge under strong interactions. In the 1D stacking domain wall of bilayer stacks, we studied the evolution of a 1D electron crystal into weakly interacting Luttinger liquid, with the observation of a dimerized crystal in the intermediate region. In pristine 2D atomic layers without extra confinement potential or magnetic field, we investigated the emergence of disordered electron solid and its quantum melting process.