Chez Pierre

Presents ...

Monday, November 23rd 2026
12:00 pm - 1: 00 pm
Duboc room - 4-331



Chez Pierre Seminar

Nurit Avraham, Weizmann Institute of Science

” Imaging intervalley coherence and electronic instabilities in trilayer graphen”.

Multilayer graphene provides a remarkably tunable platform for exploring correlated electronic phases, where interactions, symmetry breaking, and subtle changes in the underlying band structure can give rise to a rich variety of electronic states. In this talk, I will present our recent scanning tunneling microscopy (STM) and spectroscopy studies of both rhombohedral (ABC) and Bernal (ABA) trilayer graphene, focusing on how STM can be used to directly visualize correlated states and probe their microscopic origin.

In rhombohedral trilayer graphene, we directly image intervalley coherent (IVC) order and follow its emergence across a sequence of symmetry-broken phases. Combining real-space imaging with quasiparticle interference allows us to reconstruct the underlying electronic structure of the IVC state and connect its ordering to the evolution of the Fermi surface. I will also discuss how lattice deformation provides an intrinsic route for tuning the electronic structure of multilayer graphene. In particular, strain-induced pseudo-electric fields can strongly reconstruct the bands, generating ultra-flat dispersions and enhancing interaction-driven phenomena.

Finally, I will present our recent work in Bernal trilayer graphene, where we show how the electrostatic gating effect of the STM tip can be harnessed to extract thermodynamic information directly from tunneling spectroscopy. This provides a new way to explore Stoner instabilities locally, simultaneously accessing their excitation spectrum and thermodynamic evolution. More broadly, this approach extends STM beyond conventional spectroscopy, opening a route to probing the microscopic evolution of interaction-driven phase transitions.