



# EINLADUNG zum IFP-SEMINAR

## Investigating thermodynamic properties of correlated electronic phases in graphene

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UC Santa Barbara

Host: Silke Bühler-Paschen

Termin: Mittwoch, 19. Juli 2023, 16:00 Uhr

Ort: TU Wien, Freihausgebäude

Wiedner Hauptstraße 8-10, 1040 Wien

Seminarraum DC rot 07 (roter Bereich, 7. OG)

Oder via ZOOM

<https://tuwien.zoom.us/j/63020566887?pwd=RmYvRmVwOGU5YVBrOHpodWRKaHFWQT09>

*Vor dem Vortrag gibt es ab 15:30 Kaffee und Kekse*

### Abstract:

Strong Coulomb interactions in narrow electronic bands give rise to emergent quantum phenomena that are both exciting in fundamental physics and applications for future quantum electronic devices. Van der Waals(vdW) materials have provided rich platforms for hosting emergent phases such as fractional quantum Hall (FQH) states, charge density waves, superconductivity, and magnetism. My talk will focus on using a chemical potential measurement technique to study thermodynamic quantities in electron-correlated states hosted in graphene heterostructures. I will present two examples: first, in partially filled Landau levels in monolayer graphene, this approach enables us to precisely measure the ground state energy of the FQH liquids and electron solid states; second, by determining magnetic moment and entropy in the narrow electronic bands of twisted bilayer graphene, we discovered an isospin ferromagnetic state that “melts” into an unpolarized Fermi liquid with decreasing temperatures. I will demonstrate that the technique is a powerful tool to uncover novel quantum phases and phase transitions that conventional electronic transport measurements find challenging to identify. Finally, I will discuss future opportunities in exploring exotic states in vdW heterostructures by developing novel device structures and measurement techniques.

### Supported by:

