

SEMINAR: Novel probes for the cascades in magic angle twisted bilayer graphene

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January 15, 2025

15:00 to 16:00

Seminar Room

Magic Angle Twisted Bilayer Graphene (TBG), two graphene layers with a relative twist angle $\sim 1^\circ$, features very flat bands close to the Fermi level, which are highly susceptible to the effects of the electronic interactions. A plethora of correlated phenomena appear as a function of doping, temperature and magnetic field. The so-called cascades, a series of asymmetric resets in the Scanning Tunneling Microscope (STM) Spectrum and the inverse compressibility of Twisted Bilayer Graphene (TBG) around integer fillings [1], remain up to tens of Kelvin and constitute the most resilient correlated phenomena in TBG together with the resistive states as a function of doping.

After introducing the phenomenology of the cascades, I will first show that the cascade signatures in STM, compressibility and transport experiments can be explained, within a heavy fermion description, in terms of the formation of local moments and heavy quasiparticles in the normal state [2,3], i.e. without the need to invoke symmetry breaking which experimentally has been unambiguously detected only below a few Kelvin. I will then introduce novel ways to probe the cascade phenomena, such as optical probes [3] and the Atomic-SET and discuss the angle dependence of this phenomenon.

Hosted by: Prof. Dr. Carmen Rubio-Verdu