Contribution ID: **28** Type: **Invited talk (by invitation only)**

Coulomb blockade in superconducting graphene

Tuesday 6 January 2026 10:50 (35 minutes)

Superconductivity in graphene can arise when 2,3 or 4 layers are twisted with respect to each other at the so-called magic angle. We experimentally demonstrate Josephson Junctions and SQUIDS that behave like devices fabricated from conventional superconductors and insulators. We also observe time-resolved vortex trapping and detect quantum tunneling of vortices at low temperatures. For samples with nano-fabricated gates we can confine carriers in regimes that are superconducting (or normaler conducting) and are separated by insulating barriers to leads with are normal conducting (or superconducting). This way we build a Cooper pair box that can be tuned to a standard single electron transistors by applying magnetic fields.
This work was done in collaboration with Marta Perego, Alexandra Mestre Tora, Artem Denisov, Clara Galante, Elias Portoles and Thomas Ihn.

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Session Classification: Tuesday Morning Session II, Chair A. Imamoglu

Track Classification: Categories: van der Waals experimental