Tunable broken-symmetry orders and quantum Hall edge channels in graphene (online talk)

Benjamin Sacépé*[1]

[1]Université Grenoble Alpes, CNRS, Grenoble INP, Institut Néel – Institut Néel, CNRS, Univ. Grenoble Alpes – 38000 Grenoble, France, France

Abstract

The zeroth Landau level of graphene under a magnetic field is a particularly interesting strongly interacting flat band because interelectron interactions are predicted to induce a rich variety of broken-symmetry states with distinct topological and lattice-scale orders. Evidence for these states comes mainly from indirect transport experiments that suggest that broken-symmetry states are tunable by boosting the Zeeman energy or by dielectric screening of the Coulomb interaction. In this talk, I will describe three distinct broken-symmetry phases in graphene that we have identified in transport and imaged using scanning tunneling spectroscopy (1). I will also discuss the real-space structure of quantum Hall edge states that we found to be free of electrostatic reconstruction (2).
(1) A. Coissard et al. Nature 605, 51 (2022)
(2) A. Coissard et al. Science Adv. **9**, eadf7220 (2023)

*Speaker