Chemical Potential of Bilayer Graphene in the Fractional Quantum Hall Regime

Alexandre Assouline*[1], Taige Wang , Haoxin Zhou , Liam Cohen , Fangyuan Yang , Takashi Taniguchi , Kenji Watanabe , Roger Mong , Michael Zaletel , and Andrea Young†[2]

[1]Institut Néel – CNRS – Institut NEEL, 25 rue des Martyrs, BP 166,38042 Grenoble cedex 9, France
[2]University of California, Santa Barbara – États-Unis

Résumé

Non-Abelian states of matter retain memory of the order in which their quasiparticles are exchanged, presenting an intriguing possibility for condensed matter physics. While some fractional quantum Hall states are expected to host non-Abelian quasiparticles, they have been notoriously difficult to probe due to the narrow energy range over which they are realized. Here, we report the quantitative determination of fractional quantum Hall energy gaps in bilayer graphene using both thermally activated transport and direct measurement of the chemical potential. Our results establish bilayer graphene as a robust platform for probing the non-Abelian anyons expected to arise as the elementary excitations of even-denominator fractional quantum Hall states.

*Intervenant
†Auteur correspondant: afy2003@ucsb.edu