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Detecting and quantifying orbital magnetism in moiré quantum matter

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Newly discovered properties of magic angle graphene and other systems from the same family propelled the field of twistrionics and motivated new research into tunable unconventional quantum phases. The research is driven in part by the search for robust quantum anomalous Hall insulators, topological superconductivity, correlated electronic states, and fractional statistics and by the prospect of quantum simulation in solid state. Scanning tunneling microscopy (STM) has proved crucial for the progress of the moiré physics research. Through high-resolution magnetic-field scanning tunneling spectroscopy, we demonstrate the importance of the fine details of quantum geometry in moiré quantum matter. Specifically, I will report on the detection of the orbital magnetic moment and the emergent anomalously large orbital magnetic susceptibility in twisted double bilayer graphene.

Keyword-1

twisted graphene

Keyword-2

scanning tunneling microscopy

Keyword-3

orbital magnetism

Primary authors: MAXIMENKO, Yulia (Colorado State University); Dr SLOT, Marlou (NIST)

Co-authors: Dr HANEY, Paul (NIST); KIM, Sungmin (NIST); Dr ZHITENEV, Nikolai (NIST); Prof. GHAHARI KEMARI, Fereshche (GMU); Dr STROSCIO, Joseph (NIST)

Presenter: MAXIMENKO, Yulia (Colorado State University)

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