Condensed Matter Physics Seminar Series

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 twistronics and motivated new research into tunable unconventional quantum phases. The research is driven 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.

Dr. Maximenko received a Ph.D. in Physics from the University of IL at Urbana-Champaign (2020) and both M.S. and B.S. in Physics and Applied Math from Moscow Institute of Physics and Technology. After PhD, Yulia worked with Joseph Stroscio at the National Institute of Standards and Technology as a postdoctoral researcher using a state-of-the-art mK transport and probe microscopy instrument. As an assistant professor at Colorado State University, Dr. Maximenko focuses on scanning probe microscopy, molecular beam epitaxy, and device nanofabrication, which are used to create exotic solid-state platforms and investigate the emergent quantum phases with atomic resolution at low temperatures.

Friday, April 19th at 4:00PM
4-330 PAB