The Conference of Condensed Matter Physics 2024

Title of the Presentation: Emergent magnetism in twist 2D magnets

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Short Biography:

Dr. Hongchao Xie received his Ph.D. in Physics from the Pennsylvania State University and was a visiting Ph.D. student at Cornell University, both under supervision of Prof. Kin Fai Mak and Prof. Jie Shan. He was a postdoctoral research fellow at University of Michigan, Ann Arbor, collaborating with Prof. Liuyan Zhao. His research interests lie in novel magnetic states within 2D artificial quantum structures and their device applications.

Abstract:

Manipulating spin degree of freedom (DoF) is essential in addressing outstanding questions in both fundamental research in magnetism and technical revolutions for modern electronics. The recent discovery of two-dimensional (2D) magnetic crystals offers a new avenue to explore the control of spin DoF using a variety of external stimuli. One key knowledge learnt is that the stacking symmetry between adjacent layers determines the interlayer magnetic coupling in naturally exfoliated 2D magnets. This naturally stimulates the interest and quest of engineering 2D magnetism using lattice DoF in the periodically modulated manners. In this talk, I will focus on our recent effort and progresses on moiré engineering of 2D magnetism by twisting two layered antiferromagnets [1,2]. Our results demonstrate the unprecedented opportunities of designing spin textures at the moiré length scale.

[1]H. Xie et al., Nat. Phys. 18, 30-36 (2022).
[2]H. Xie et al., Nat. Phys. 19, 1150-1155 (2023).

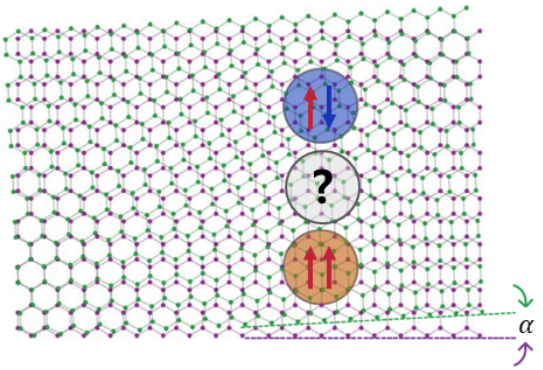

Fig. 1. Magnetic domains competed within a moiré supercell.