Center for Dynamics and Control of Materials: *MRSEC Seminar*

Less in different

Tuesday, April 23rd, 10:30 am- 11:30 am

Innovation Center (EER 2.518)

Atomically thin two-dimensional (2D) materials often exhibit novel physical properties vastly different from their bulk counterparts. These properties are governed by the changes in the electronic structure and the lattice symmetry, and are most pronounced in their single-layer limit. Angle-resolved photoemission spectroscopy (ARPES) is a direct tool to investigate the underlying changes in electronic band structure to provide essential information for understanding and controlling such properties. In this talk, I will first introduce our approach to investigate the electronic structures of atomically thin 2D layers, combining bottom-up growth using molecular beam epitaxy (MBE), in situ ARPES, and scanning tunneling microscopy (STM). Then, I will discuss the distinct electronic properties of these 2D films, such as novel charge density wave [1], topological order [2], and 2D magnetism [3].

[1] J. W. Hwang et al. Nat. Commun. 13, 906 (2022); J. W. Hwang et al. Adv. Mater. 34, 2204579 (2022); Y. K. Song et al. Nat. Commun. 14, 1116 (2023).

[2] S. J. Tang et al. Nat. Phys. 13, 683 (2017); C.-Z. Xu et al. Phys. Rev. Lett. 118, 146402 (2017); J. L. Collins et al. Nature 564, 390 (2018).

[3] Y. Zhong et al. Nat. Commun. 14, 5340 (2023).

Sung-Kwan Mo (he/him/his) is a Physicist/ Staff Scientist in the Advanced Light Source at Lawrence Berkeley National Laboratory. His research group focuses on thin film growth and in situ characterization using ARPES. ARPES investigation of electronic structure involves heavy fermion, functional oxides, low-dimensional systems, density wave systems, and other strongly correlated materials.

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