



Seminar

Imaging gate-tunable strongly-correlated vdW heterostructures

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Time: 3:00 pm, Dec. 21, 2023 (Thursday)

时间: 2023年12月21日 (周四) 下午3:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Recently, engineering van der Waals (vdW) heterostructures has emerged as a versatile tool for creating unconventional electronic and magnetic structures in a wide range of 2D materials, including insulators, semiconductors, metals, superconductors, and magnets. The ability to precisely engineer these artificial vdW materials at the atomic level, comprehend their quantum properties, and eventually exert control over them holds tremendous potential for the development of next-generation technologies. In this talk, I will delve into our latest advancements in the atomic-scale investigation of these emergent 2D quantum materials and their atomic-scale defects with novel quantum states, leveraging on the combined low-temperature scanning tunneling microscopy (STM) and atomic force microscopy (AFM). Furthermore, I will elucidate how the application of vdW technologies to gate-tunable STM can significantly enhance its capabilities, enabling us to probe electronic and magnetic properties and ultimately manipulate electronic correlations within these strongly-correlated 2D systems.

About the speaker

Prof. Dr LU Jiong holds Dean's Chair Professorship, associate professor at Department of Chemistry and Institute for Functional Intelligent Materials at NUS. Dr. Lu received his bachelor's degree from Fudan University (China) in 2007 and Ph.D. degree from National University of Singapore (NUS) in 2011, under the mentorship of Prof Kian Ping Loh. After that, he worked as a postdoc fellow in Graphene Research Centre at NUS, and then in Prof Mike Crommie research group at Department of Physics, UC Berkeley. His current research interests include atomic-scale materials design and investigation of atomic-scale quantum nanoscience in low-dimensional materials towards next-generation solid-state devices and atomically precise catalysis. His group has published more than 120 peer-reviewed papers in top-tier journals including Nature (1), Nature Nanotechnology (4), Nature Materials (2), Nature Electronics (1), Nature Communications, Science Advances, JACS, PRL etc. Two recent publications were selected as JACS Early Career Investigator 2021 virtual collection and JACS Reader's Pick 2022. Dr. Lu is a recipient of JMCA Emerging Investigators 2019, Young Scientist Award (2021), FOS NUS, and Young Researcher Award, NUS (2022).