



复旦大学物理系 Colloquium

Time: 14:00, Tuesday, 2026.09.29

Location: C108, Jiangwan Physics Building

范德华异质结中的新奇关联量子物态

王雷 教授

南京大学物理学院

摘要: Precisely controlling the composition and structure of nanoscale building blocks brings us artificial new material systems with completely novel electronic, mechanical, optical properties. Various layered materials such as graphene and TMDs can be primary structures which people have been dreamed to use as single atomic Legos to play with. However, the experimental reality is that these single atomic planes are very fragile and vulnerable to the environment and researchers have been stuck for decades to try to develop a nondestructive assemble method. In this talk, I will review the ‘pick-up transfer’ technique I developed to first make it possible to achieve the layer-by-layer assembling of single atomic planes with ultraclean interfaces. I will show how this technique leads the 2D materials field into the era of high-quality devices and lays the foundation for new research domains namely van der Waals heterostructures and moiré systems. I will present several exotic states of matter revealed in these systems in recent decade. I will also talk about these systems offer us new tuning knobs to directly tune the strongly correlated phases and the associated quantum phase transitions.



报告人简介: Dr. Lei Wang is currently a professor in physics department at Nanjing University in China. Previously he was a Kavli fellow at Cornell University. He earned his Doctoral degree at Columbia University and Bachelor degree at National University of Singapore. Dr. Wang has been conducting research on the electrical transport properties of two-dimensional quantum materials. Dr. Wang invented the van der Waals transfer technique- “the pickup method” -thus made pioneering work in fabricating ultrahigh quality encapsulated 2D material devices and the development of the van der Waals heterostructure research field.