

Atomistic Growth Mechanisms and Property Optimization of 2D Materials

Zhenyu Zhang

International Center for Quantum Design of Functional Materials, University of Science and Technology of China

96 Jinzhai Road, Hefei, Anhui 230026, P. R. China

Email: zhangzy@ustc.edu.cn

The 2D materials family keeps its amazing pace in expanding its family size, with more and more growing and outreaching branches in its family tree. Each member in this family has its uniqueness in both fabrication methods and intriguing properties. Many of the layered materials also share clear commonalities, most notably weak van der Waals (vdW) coupling between the layers. In this talk, we will review some of the latest developments in exploration of the atomistic growth mechanisms of several newcomers to the 2D materials family, including blue phosphorene, grown on metal or semiconductor substrates following a novel half-layer-by-half-layer mode, and tellurene, whose formation mechanism is rooted in the multi-valency nature of Te. We will also present convincing evidence for vdW-induced topological phase transition in certain layered materials, further demonstrating the vital role of the seemingly weak dispersion force in such layered systems.