

# Epitaxial Growth and Functionalization of 2D Materials & Heterostructures

Yeliang WANG (王业亮)

*Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China*

*E-mail: ylwang@iphy.ac.cn*

The novel properties of graphene honeycomb structure have spurred tremendous interest in investigating other two-dimensional (2D) layered structures beyond graphene for nanodevices. In this talk, I will report the fabrication and properties of novel 2D materials like bulked/flat monolayer antimonene[1,2], semiconducting transition-metal-dichalcogenide monolayer PtSe<sub>2</sub> [3] and its in-plane 1T/1H heterostructure with atom-shape interface [4], as well as superconductor transition-metal-trichalcogenide (HfTe<sub>3</sub>)[5], grown by direct selenization/tellurization of the Pt/Hf substrate. Their application exploring in nanoelectronics and valleytronics will also be introduced. In addition, the stacking heterolayers based on several these kinds of 2D materials, for instance, a superconductor-topological insulator layered heterostructure (with an HfTe<sub>3</sub>/HfTe<sub>5</sub> layered configuration) for Majorana bound states will be briefly presented [6,7]. We expect that these materials will show intriguing physical property and promising potential applications in nanoscale devices.

## References

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