Probing mono- and few-layer 1T-$TaSe_2$ with ARPES

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Physical properties can change significantly when bulk materials are thinned down to a few atomic layers. Here, we study the intriguing example of the metallic charge density wave system 1T-$TaSe_2$. Previous transport experiments on 1T-$TaSe_2$ found a metal to insulator transition at a thickness of 5 layers [1]. Monolayer 1T-$TaSe_2$ was proposed to be a Mott insulator and is a candidate quantum spin liquid [2]. We perform Angle resolved photoelectron spectroscopy (ARPES) measurements on ultra clean exfoliated few-layer 1T-$TaSe_2$, encapsulated with graphene (Figure 1(a) and (b)), to study this intriguing phase of matter.

References

[1] Tian, N., et al., National Science Review (2023) : nwad144.
[2] Chen, Y., et al., Nat. Phys. 16, 218-224 (2020).

Figures

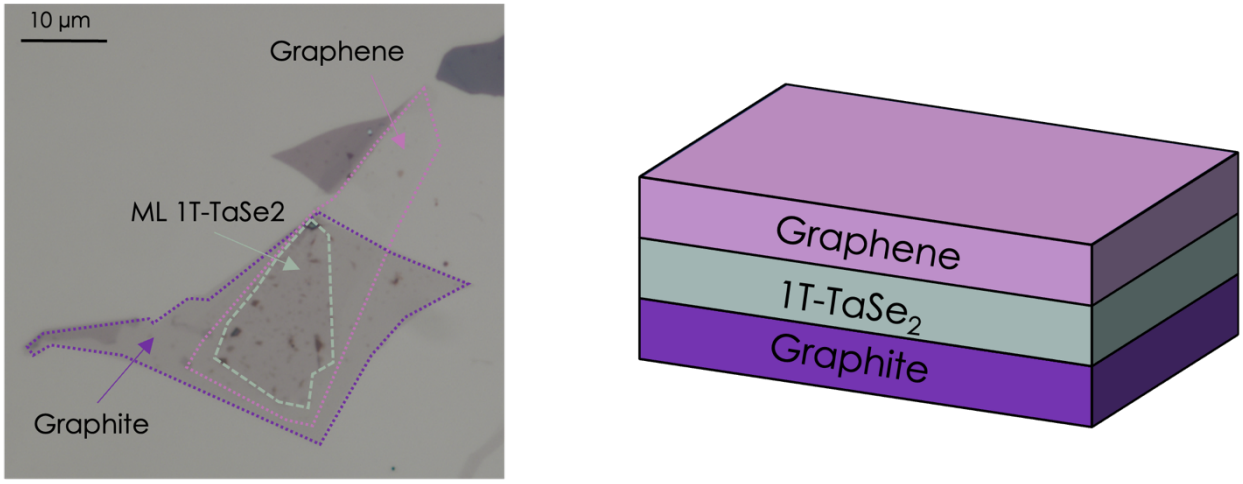

Figure 1: (a) Monolayer (ML) 1T-$TaSe_2$ on a bottom graphite flake and encapsulated with graphene on top. (b) An illustration of the sample design.