Manipulation of strongly correlated electrons in monolayer 1T-$NbSe_2$

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Abstract

Monolayer transition metal dichalcogenides can host exotic phenomena such as correlated insulating and charge-density-wave (CDW) phases. Such properties are strongly dependent on the precise atomic arrangements. In this work, we firstly provide experimental evidence of the quantum spin liquid (QSL) state in 1T-$NbSe_2$ via measurements of the Kondo effect in a 1T-1H heterostructure, further supported by measurements for magnetic molecules on 1T-$NbSe_2$ [1]. And then, we concentrate on the phase transition of correlated insulating states under 1D confinement [2]. We find out that the CDW phase of 1T-$NbSe_2$ can survive under both tensile and compressive strains. Moreover, significant strain-induced phase transitions are observed, i.e., tensile (compressive) strains can drive 1T-$NbSe_2$ from an intrinsic correlated insulator into a band insulator (metal). Furthermore, we find that the multiple electronic phases can coexist at the nanoscale [3].

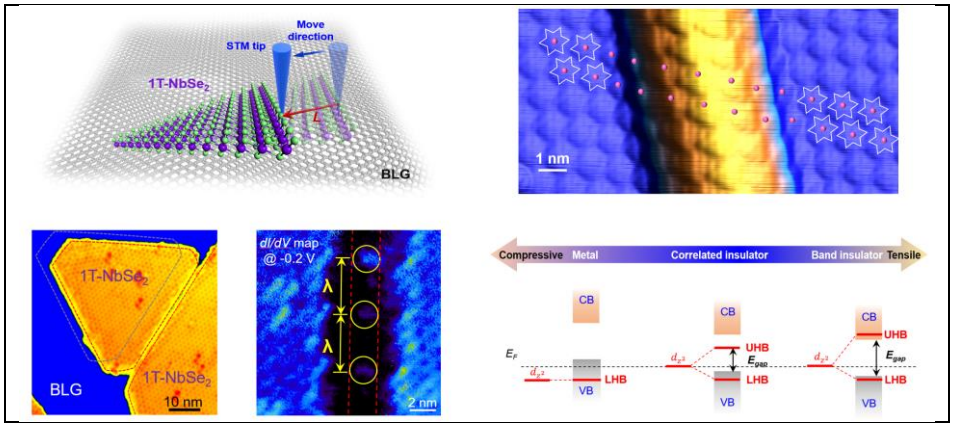

Fig. 1. Construction of nanostructures and manipulation of correlated electrons in monolayer 1T-$NbSe_2$.

Bibliography

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