## Charge density wave phases in ultrathin 1T-TaS<sub>2</sub>

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## Abstract

The 1T polymorph of TaS<sub>2</sub> (1T-TaS<sub>2</sub>) has one of the richest phase diagrams among the layered transition metal dichalcogenides: it is metallic at higher temperatures, becomes superconducting under pressure and doping and it was suggested to show Mott insulator behavior. It also has four temperature-dependent charge density wave (CDW) phases with different associated structures. In this talk we address the question of how the transition from bulk to few layers affects the different phases in this material. Specifically, we use variable temperature Raman spectroscopy measurements and show that the existence of the most highly ordered phases depend on having a critical number of stacked 1T-TaS<sub>2</sub> layers. Furthermore, using low temperature scanning tunneling microscopy and spectroscopy, we explore the spatial variation of the electronic properties of the commentate CDW phase at the atomic level. The role that defects play in the formation of this phase will also be discussed.

## Figures

