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Scanning Tunneling Microscopy and Spectroscopy of the commensurate charge density wave phase of 1T-TaS₂ ADINA LUICAN-MAYER, ANDREW DILULLO, YANG LI, SAW WAI-HLA, Argonne National Laboratory — The 1T polymorph of TaS₂, 1T-TaS₂, has one of the richest phase diagrams among the transition metal dichalcogenides: It is metallic at higher temperatures; it has four temperature-dependent charge density wave (CDW) phases with different structures; at low temperatures it shows Mott insulator behavior and under pressure and doping it becomes superconducting. In this talk we focus on the low temperature commensurate charge density wave phase. Using scanning tunneling microscopy and spectroscopy, we explore the spatial variation of the electronic properties of the commensurate CDW phase at the atomic level. The role that defects play in the formation of this phase will also be discussed.

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