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**Evolution of electronic structure in highly charge doped MoS2 compounds**[1] MOHAMMED BIN SUBHAN, Univ Coll London, MATTHEW WATSON, Diamond Light Source, ZHONGKAI LIU, ShanghaiTech University, ANDREW WALTERS, MORITZ HOESCH, Diamond Light Source, CHRIS HOWARD, Univ Coll London, DIAMOND I05 BEAMLINE COLLABORATION — Transition-metal dichalcogenides (TMDCs) are a group of layered materials that exhibit a rich array of electronic ground states including semiconductivity, metallicity, superconductivity and charge density waves. In recent years, 2D TMDCs have attracted considerable attention due to their unique properties and potential applications in optoelectronics. It has been shown that the charge carrier density in few layer MoS2 can be tunably increased via electrostatic gating. At high levels of doping, MoS2 exhibits superconductivity with a dome-like dependence of Tc on doping analogous to that found in the cuprate superconductors. High doping can also be achieved via intercalation of alkali metals in bulk MoS2. The origin of this superconductivity is not yet fully understood with predictions ranging from exotic pairing mechanisms in bulk systems to Ising superconductivity in single layers. Despite these interesting properties, there has been limited research to date on the electronic structure of these doped compounds. Here we present our work on alkali metal intercalated MoS2 using the low temperature metal ammonia solution method. Using X-ray diffraction, Raman spectroscopy and ARPES measurements we will discuss the physical and electronic structure of these materials.

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