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Novel phase transitions in iridium dichalcogenides

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5d transition metal oxides has attracted lots of attention because of exotic electronic phase resulted from entanglement of strong spin-orbit coupling and electron correlation in 5d orbital. In this manner, 5d transition metal chalcogenides is another intriguing 5d compound to have a rich variety of strongly correlated electronic states. In fact, recent studies of $IrTe_2$ reported chemical-doping/intercalation (Pd, Pt, Cu, and Rh) induced superconductivity and the unconventional structural modulations below $\sim$260 K. The simple empirical features of $IrTe_2$ resemble the conventional charge density waves (CDW) in the 3d/4d layered chalcogenides (e.g. 1T-TaS_2, and 1T-$TiSe_2$, etc.). But, recent corroborative experimental results indicate that instability of covalency of Ir ions induces the structural phase transition associated with soliton lattice of Te-Te covalent bonding. So far, there exist controversy to identify the exotic phase transition of $IrTe_2$. In this talk, we introduce recent investigations and discuss the phase transition in $IrTe_2$.