Novel phase transitions in iridium dichalcogenides

YOON SEOK OH, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University

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$_2$. 