Tellurium is one of the special elemental materials which have 1D helical atomic structures and formed by van der Waals force between helical atomic chains. 2D tellurium films can be synthesized in a liquid solution. In this talk, we will report on the fundamental studies of this new 2D material at atomic scale in terms of its electrical, optical, thermal and mechanical properties. The helical atomic structure offers strong anisotropic properties of this 1D van der Waals material. The band-structure of this 2D material also offers some excellent material properties such as a high value of thermoelectric figure-of-merit $ZT$ and high carrier mobilities for both electrons and holes. Magneto-transport properties, such as SdH oscillations and QHE in 2D tellurium, were reported before. More interestingly, topological non-trivial properties are also unveiled in magneto-transport under 45 Tesla at tens of mK temperatures. The work is in close collaborations with Prof. Wenzhuo Wu at Purdue University.

References


Figures

Figure 1: An illustration of atomic structure of 1D van der Waals material Te and TEM image of such material in 2D atomically thin form.