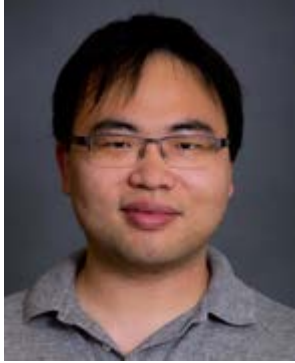


Novel Materials Approach to Condensed Matter Physics



Dr. Jin Hu

Department of Physics and Engineering Physics, Tulane University

The advancement of condensed matter physics has been promoted by the discoveries of new materials. The recent examples include novel functional two-dimensional (2D) materials and topological semimetals. In this presentation, I will show our novel materials approach to condensed matter physics. In the first part of my talk, I will introduce our studies on ternary 2D materials. Ternary materials exhibit much greater tunability due to the additional elemental complexity which extends the parameter space. I will present our discovery of a new ternary 2D material - Nb₃SiTe₆ atomic crystal. Using this material, we have demonstrated the long-predicted suppression of electron-phonon interactions due to quantum confinement of phonons [1]. In the second part, I will talk about our recent work on topological semimetals, an emerging area in condensed matter physics. I will report our recent discovery of two new nodal line semimetals – ZrSiSe and ZrSiTe [2]. We have found signatures of topological fermions from quantum oscillation experiments in these materials, and demonstrated that their atomically thin 2D crystals are accessible via mechanical exfoliation, which provides an excellent platform for investigating low dimensional topological fermions.

References:

[1] J. Hu et al., Nature Physics 11, 471 (2015)

[2] J. Hu et al., PRL 117, 016602 (2016)

Tuesday

February 14

4:00 P.M.

Rm 118 NSH

Refreshments
in Rm 202 NSH
@ 3:30 pm