Poster

Study of the electronic ordering in quantum materials of RbV_3Sb_5 and Ir_2In_8Se

Yu-Hui Liang,[1] Po-Chun Chang,[1] Wei-Tin Chen,[2] Yixi Su,[3] Chin-Shan Lue,[4] Shih-Chang Wen,[5] Chao-Hung Du[1,*]

[1]*Department of Physics, Tamkang University, Taiwan*

[2]*The Center for Condensed Matter Sciences, National Taiwan University, Taiwan*

[3]*Jülich Centre for Neutron Science, Germany*

[4]*Department of Physics, National Cheng Kung University, Taiwan*

[5]*National Synchrotron Radiation Research Centre, Taiwan*

[*]*chd@gms.tku.edu.tw*

Quantum materials have attracted lots of attention in condensed matter physics because of their exotic and fascinating physical properties, such as topological insulators/superconductors, geometrical spin/charge frustrations, or Dirac and Weyl semimetals. It has been demonstrated that the different coupling strengths of electronic ordering with spins, orbital, and lattice are responsible for the occurrence of such exotic physical properties. Using x-ray scattering on a Kagome metal RbV_3Sb_5, we observed an electronic ordering (i.e., a charge-density wave (CDW) state) which shows a weak second order transition with a highly frustrated state in the critical scattering region. The intermetallic compound Ir_2In_8Se is known as a good candidate of Dirac semimetal. Using x-ray scattering, we observed an incommensurate CDW phase with a $q_{CDW}=(0.5\pm\delta\ 0.5\pm\delta\ 0)$ at $T_{CDW}\sim$ 198 K, while a commensurate sublattice appears with a q-vector, q= (0.5 0.5 0). Both modulated sublattices show different transition behavior, i.e., representing different order parameters. We demonstrate that the coupling of both order parameters in the transition region results in an inverse order-disorder transition for the commensurate phase.