



IFMP Seminar

Date Monday, May 18, 2026, at 14:50

REC/C213

Zoom: 633 2801 2201, Passcode: IFMP2025-6

Speaker **Olena Fedchenko**

Goethe Universität Frankfurt

Title **Photoelectron Spectroscopy of Electronically Correlated Materials: Chirality in the Kagome Metal CsV₃Sb₅**

Abstract Kagome metals AV₃Sb₅ (where A = Cs, K, Rb) have a complex electronic structure comprising flat bands, Dirac crossings and van Hove singularities. These features can lead to unconventional charge-density-wave (CDW) order, superconductivity and topological phenomena. In CsV₃Sb₅, the CDW transition has been associated with time-reversal symmetry breaking, orbital magnetism, and chirality. This talk summarises x-ray photoelectron diffraction (XPD) and angle-resolved photoemission spectroscopy (ARPES) studies of this system using circularly polarised photons.

XPD reveals a loss of mirror symmetry and the formation of a locally chiral atomic structure in the CDW phase. Complementary ARPES measurements reveal pronounced nontrivial magnetic circular dichroism in the valence-band electronic structure, suggesting the presence of electronic chirality and time-reversal symmetry breaking. Partially substituting V atoms with isoelectronic Nb atoms results in band broadening and increased gap opening at the Dirac-like crossings due to the resulting chemical pressure. Isoelectronic Nb substitution also results in stronger coupling of orbital magnetic moments to three van Hove singularities near the Fermi level at the *M* points. This enhances the magnetic circular dichroism (MCD) signal compared to pristine CsV₃Sb₅ and confirms the predicted coupling of orbital magnetic moments to three van Hove singularities near the Fermi level at the *M* points.

Host: D. Inosov