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Time-Reversal Symmetry Breaking in Kagome Metals

In quantum materials with multiple degrees of freedom with similar energy scales, intertwined electronic orders with distinct broken symmetries often appear in a strongly coupled fashion. Recently, in a class of kagome superconductors represented by CsV_3Sb_5, experimental reports have suggested rotational symmetry breaking and time reversal symmetry breaking associated with a charge density wave (CDW) order, revealing an exotic nature of this CDW order. In this talk, I will first introduce our recently developed capability of performing angle-resolved photoemission spectroscopy in a tunable magnetic field (magneto-ARPES), then present measurements of magneto-ARPES on CsV_3Sb_5, from which we reveal momentum-selective response of the electronic structure of CsV_3Sb_5 to an external magnetic field, directly providing spectroscopic evidence of time reversal symmetry breaking of the CDW order. Our magneto-ARPES work demonstrates a novel tuning knob for disentangling intertwined orders in the momentum space for quantum materials.