Nematicity in a local-moment iron chalcogenide

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Iron-based superconductors appear in the vicinity of a nematic quantum critical point, and a key challenge remains to understand nature of the nematic order, and its interplay with magnetic order and superconductivity. One route towards addressing this question is to look for clues in analogous materials that exhibit similar physics. In semiconducting KFe0.8Ag1.2Te2, an analogue of the prototypical iron pnictide BaFe2As2, we found simultaneous stripe-type magnetic order and nematic order below T_S,N=35 K, with striking similarities between the two systems. Above T_S,N, a sizable spin anisotropy develops under a small strain and increase upon cooling towards T_S,N, indicative of a divergent nematic susceptibility. The magnetic susceptibility of KFe0.8Ag1.2Te2 is well described by the Curie-Weiss law with S~1, indicating it is a local-moment magnet with orbital degeneracy, and suggests the nematic order parameter may involve both spin and orbital degrees of freedom. The similarities between nematic orders in KFe0.8Ag1.2Te2 and BaFe2As2 suggest our findings to be relevant for iron-based superconductors, and establish KFe0.8Ag1.2Te2 as a model system to investigate electronic nematicity in a local-moment setting.