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Competition between itinerant ferromagnetism and spin-density wave antiferromagnetism in FeGa YAN WU, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, 70803, HUIBO CAO, Quantum Condensed Matter Division, Oak Ridge National Laboratory, Oak Ridge, 37831, GREGORY MCCANDLES, JULIA CHAN, Department of Chemistry, The University of Texas at Dallas, Richardson, 75080, AMAR KARKI, RONGYING JIN, JOHN DITUSA, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, 70803 — The metallic magnetFeGadisplays a rich magnetic behavior that includes transitions between a FM ground state to a AFM intermediate state at 68 K and back to a FM state at 360 K. The phase transition at 360 K is accompanied by a discontinuous hysteretic change in the electrical resistivity. In addition, the application of moderate magnetic fields cause a sharp transformation from the AFM to FM state with a critical Hthat grows dramatically with T.To explore the cause of this unusual competition of magnetic states, we investigated the magnetic structure of FeGavia extensive single crystal neutron diffraction measurements. These measurements revealed a FM ordering with magnetic moments lying along the crystallographic c-axis both below 68 K and above 360 K as well as incommensurate spin density wave order between these temperatures. Our refinement of the diffraction data has uncovered the existence of a small non-coplanar moment which may be the origin of our previously discovered topological Hall Effect.

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