

Abstract Submitted
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Broken Rotational Symmetry in the Hidden Order Phase of URu₂Si₂ T. SHIBAUCHI, R. OKAZAKI, H.J. SHI, Department of Physics, Kyoto University, Y. HAGA, T.D. MATSUDA, E. YAMAMOTO, JAEA, Y. ONUKI, JAEA and Osaka University, H. IKEDA, Y. MATSUDA, Department of Physics, Kyoto University — The nature of the so-called ‘hidden order’ phase transition at $T_h = 17.5$ K in the heavy fermion compound URu₂Si₂ has posed a long-standing mystery, because despite 25 years of study it remains unidentified what symmetry is broken in this ordered phase. We report the emergence of an in-plane anisotropy of the magnetic susceptibility below T_h , which breaks four-fold rotational symmetry in tetragonal URu₂Si₂. Two-fold oscillations in the magnetic torque, which is measured in magnetic fields rotating precisely within the *ab* plane, are sensitively detected in small pure crystals for the first time. The amplitude of the two-fold oscillations onsets precisely at T_h , indicating its close link to an order parameter of the hidden order phase. Our findings uncover that the hidden order phase is an electronic ‘nematic’ phase, a translationally invariant metallic phase with spontaneous breaking of rotational symmetry.

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