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Hastatic Order in URu_2Si_2 PREMALA CHANDRA, PIERS COLEMAN, Center for Materials Theory, Department of Physics and Astronomy, Rutgers University, REBECCA FLINT, Department of Physics, Massachusetts Institute for Technology — The hidden order that develops below 17.5K in URu_2Si_2 has eluded identification for twenty-five years. Here we show that the recent observation of Ising quasiparticles in URu_2Si_2 suggests a novel "hastatic order" (Latin:*spear)*,with a two-component order parameter describing hybridization between electrons and the Ising $5f^2$ states of the uranium atoms. Hastatic order breaks time-reversal symmetry by mixing states of different Kramers parity; this accounts for the magnetic anomalies observed in torque magnetometry and the pseudo-Goldstone mode observed in neutron scattering. Hastatic order is predicted to induce a basal-plane magnetic moment of order $0.01\mu_B$, a gap to longitudinal spin fluctuations that vanishes continuously at the first-order antiferromagnetic transition and a narrow resonant nematic feature in the scanning tunneling spectra.

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