

Abstract Submitted
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Absence of a static in-plane magnetic moment in the ‘hidden-order’ phase of URu₂Si₂¹ PINAKI DAS, R.E. BAUMBACH, E.D. BAUER, M. JANOSCHEK, Los Alamos Natl Lab, NM, USA, K. HUANG, M.B. MAPLE, University of California, San Diego, CA, USA, Y. ZHAO, J.S. HELTON, J.W. LYNN, NIST Centre for Neutron Research, MD, USA — We have carried out a careful magnetic neutron scattering study of the heavy fermion compound URu₂Si₂ to probe the possible existence of a small magnetic moment parallel to the tetragonal basal plane in the ‘hidden-order’ phase. This small in-plane component of the magnetic moment S_{\parallel} on the uranium sites has been postulated by two recent models (rank-5 super-spin/hastatic order) aiming to explain the hidden-order phase, in addition to the well-known out-of-plane component $S_{\perp} \approx 0.01 - 0.04 \mu_B/\text{U}$. S_{\parallel} and S_{\perp} components were separated by using the fact that only the components of the magnetic structure that are perpendicular to the scattering vector Q contribute to the magnetic neutron scattering. We find no evidence for an in-plane magnetic moment S_{\parallel} . Based on the statistics of our measurement, we establish that the upper experimental limit for the size of any possible in-plane component is $S_{\parallel}^{max} \approx 1 \times 10^{-3} \mu_B/\text{U}$. Analysis of diffuse neutron scattering shows no presence of short-range magnetic correlations within the measured limit.

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