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Phase diagram of URu_{2-x}Fe_xSi₂ under high magnetic field.¹ S. RAN, I. JEON, N. KANCHANAVATEE, K. HUANG, M. B. MAPLE, University of California, A. GALLAGHER, K. CHEN, D. GRAF, R. BAUMBACH, Florida State University, J. SINGLETON, Los Alamos National Laboratory, University of Oxford — The search for the order parameter of the hidden order (HO) phase in URu₂Si₂ has attracted an enormous amount of attention for the past three decades. Measurements on URu₂Si₂ in high magnetic fields up to 45 T reveal that URu₂Si₂ displays behavior that is consistent with quantum criticality at a field near 35 T, where a cascade of novel quantum phases was found at and around the quantum critical point, suggesting the existence of competing order parameters. Experiments at high pressure reveal that a first order transition from the HO phase to a large moment antiferromagnetic (LMAFM) phase occurs under pressure at a critical pressure P_c. We have recently demonstrated that tuning URu₂Si₂ by substitution of Fe for Ru offers an opportunity to study the HO and LMAFM phases at atmospheric pressure. In this study, we performed transport measurements in high magnetic field on URu_{2-x}Fe_xSi₂ single crystals for various values of x and established the phase diagrams of URu_{2-x}Fe_xSi₂ under high magnetic field.

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