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Ordered states of URu_2Si_2 under hydrostatic pressure J. R. JEFFRIES, N. P. BUTCH, J. PAGLIONE, M. B. MAPLE, Department of Physics and Institute for Pure and Applied Physical Sciences, University of California, San Diego
— Oriented single crystalline samples of URu_2Si_2 have been synthesized and investigated under nearly hydrostatic pressure via electrical resistivity and ac susceptibility measurements. The heavy fermion compound URu_2Si_2 exhibits three distinct ordered states as a function of temperature and pressure: "hidden order" (HO), in which the order parameter has yet to be determined; antiferromagnetism (AFM), which seemingly develops out of the HO state at $P \leq 15$ kbar; and superconductivity (SC), which exists at ambient pressure. Careful measurements of the HO transition, occurring at $T_{HO} \sim 16.5$ K at ambient pressure, have been performed at several different pressures, yielding a P-T phase diagram for the HO state as a function of pressure. In addition, measurements of the superconducting critical temperature, $T_c \sim 1.4$ K at ambient pressure, and the upper critical field H_{c2} have been performed at low temperatures using a ^{3}He-^{4}He dilution refrigerator, revealing the superconducting H-T-P phase diagram. Possible correlations between the HO, AFM, and SC states will be discussed. This research was supported by the National Nuclear Security Administration under the Stewardship Science Academic Alliances program through DOE Research Grant No. DE-FG52-03NA00068.

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