Abstract Submitted
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Metamagnetism in the electron-doped chemical substitution series $\mathbf{URu_2Si_{2-x}P_x}$.[1] MARK WARTENBE, Florida State Univ, ANDREW GALLAGHER , KUAN-WEN CHEN , NHMFL, FSU, ROSS MCDONALD, NHMFL, LANL, GREG BOEBINGER, RYAN BAUMBACH, NHMFL, FSU — The heavy fermion intermetallic URu_2Si_2 exhibits a rich variety of phenomena, including a transition into an unknown broken symmetry state (hidden-order) below the temperature $T_0 = 17.5$ K, deviations from Fermi liquid behavior, and unconventional superconductivity below $T_c = 1.4$ K. The substitution series $URu_2Si_{2-x}P_x$ was recently synthesized for the first time, where Si $\rightarrow$ P substitution simultaneously induces a small chemical pressure and causes electronic tuning, resulting in a $T-x$ phase diagram that includes hidden order (x <0.03), a no-order Kondo lattice (0.03 $<x<$0.26), and antiferromagnetism (0.26 $<x<$0.5). We report magnetoresistance and magnetization studies in pulsed magnetic fields up to $H = 65$ T that reveal breakdown of the Kondo lattice and several high field ordered states, which vary with x. We discuss these results in terms of their relationship to the suppression of hidden order towards zero temperature and the breakdown of the Kondo lattice in high magnetic fields, and compare related metamagnetic correlated electron materials.

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