Abstract Submitted
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A New Heavy Fermion Compound Yb_3Pt_4[1] MARCUS BENNETT, Stony Brook University, PETER KHALIFAH, DMITRIY SOKOLOV, YIU YUEN, MOOSUNG KIM, CARL HENDERSON, WILLIAM GANNON, MEIGAN ARONSON — We report the synthesis of single crystals of a new binary heavy fermion system, Yb_3Pt_4. Magnetic susceptibility measurements find Yb^{3+} local moment behavior above 150 K. Heat capacity measurements find a large weakly first order anomaly at 2.4 K, and the associated entropy indicates that magnetic order emerges from a doublet ground state. Magnetic field suppresses both the magnitude of the anomaly and the temperature at which the anomaly occurs, mapping out a first order phase line that ends at a tri-critical point, 1.75 T, 1.3 K. A weak cusp in the AC magnetic susceptibility indicates antiferromagnetic ordering. Above 0.2 T, the cusp becomes a step, which increases in height with increasing field indicating ferromagnetic order. The electrical resistivity of Yb_3Pt_4 is that of a good metal, and the quadratic temperature dependence of a Fermi liquid is found throughout the antiferromagnetically ordered state and continues into the high field paramagnetic state. Both the magnitude of the quadratic temperature dependence of the resistivity and of γ are comparable to that found in heavy fermion compounds, indicating substantial quasiparticle mass enhancement. The Sommerfeld-Wilson ratio approaches 30 in the ordered state, suggesting strong ferromagnetic correlations among the quasiparticles.

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