Emergence of superconductivity in the local moment antiferromagnetic state of Ce_3PtIn_{11} at ambient pressure

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Similar to the iron pnictides the unconventional superconducting state in heavy Fermion (HF) compounds is ill understood. A central debate concerning the pairing mechanism is the nature of the magnetism and its relationship to superconductivity (SC). The HF family of $Ce_nT_mIn_{3n+2m}$ ($n = 1, 2$; $m = 0, 1, 2$; T = transition metal) materials are predestinated to investigate this question exhibiting both type of scenaries, that is spin density wave (weak coupling) and local moment (strong coupling) induced antiferromagnetic (AFM) ordering together with SC. Here, we report on Ce_3PtIn_{11} which is the only compound within the family showing both superconductivity and magnetic ordering at ambient pressure. In the specific heat, resistivity and ac susceptibility two magnetic transitions are observed; the compound undergoes an incommensurate AFM order below $T_N = 2.1$ K and enters a commensurate AFM state at $T_N = 2$ K. Analysis of the entropy points to local moment antiferromagnetic order. Superconductivity emerges at $T_c = 0.39$ K. Upon applying hydrostatic pressure AFM disappears and a superconducting dome forms with $T_c^{max} = 0.7$ K at 1 GPa.