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Low-lying magnetism in heavy-fermion CeRh2Sn2

Wednesday, 13 July 2011 17:00 (2 hours)

<p>The existence of the ternary intermetallic compound CeRh₂Sn₂ has been known since the crystallographic report of Selsane et al on the CeM₂Sn₂ family of compounds in which M is a d−electron element. The crystal structure is well ordered and the sole magnetic species, Ce, occupies a unique symmetry site in the unit cell. Subsequent studies into these compounds revealed a general trend of magnetic ordering at very low temperatures. CeRh2Sn2 was found to order antiferromagnetic through a peculiar smeared out transition around T_N=0.4 K. Most significantly though was the giant electronic specific heat witnessed in the Sommerfield coefficient C_p(T)/T which was found to develop in this compound even well above the magnetic ordering temperature. The behaviour of this system was explained in the framework of a heavy-electron quasiparticle state forming out of the many-body Kondo interaction between localized magnetic moments of Ce ions and the conduction electrons. This results in an exceedingly high electronic density of states at the Fermi energy EF. In this work we present a detailed study of specific heat, magnetic susceptibility, and electrical resistivity of CeRh₂Sn₂ in order to map the field stability of salient cooperative effects. The magnetic ordering is found to be instable to fields beyond about 0.5 T. At the same time, applied magnetic fields displace the huge 4f-electron entropy towards higher temperatures. Further evidence for the importance of the Kondo effect in CeRh₂Sn₂ will be discussed.

Level (Hons, MSc,
   PhD, other)?

other

Consider for a student
   award (Yes / No)?

No

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

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