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Thermal and electronic transport studies of the Kondo energy scale in the heavy-fermion system CeCu5-xAlx

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

<p>The binary compound CeCu₅ is an archetypal heavy-fermion Kondo lattice with an antiferromagnetic ground state. Strong hybridization effects between the localized 4f-electron moment and conduction electrons result in incoherent spin scattering in the electronic transport at high temperatures, but with an effective magnetic moment nearly equal to that of the free-ion Ce₃₊ state. Long-range magnetic ordering at T_N = 3.9 K and the Kondo temperature T_K=2.2 K are of similar energy scales, making this system ideally suited to studies of competing magnetic interactions in the strongly correlated electron class of systems. In this work we synthesized a series of pseudo-binary compounds CeCu_{5-x}Al_x. The dilution of Cu by Al results in augmenting the electronic density of states close to the Fermi energy, which is also the location of the magnetic and hybridized 4f electron levels resonance. Our studies of the temperature and magnetic field dependencies of thermoelectric power and electrical resistivity in the CeCu_{5-x}Al_x series of compounds will be discussed in terms of comparitive calculations of the Kondo energy scale from data of magnetoresistivity (the single-ion Bethe Ansatz theory) and from the thermoelectric power (phenomenological description in presence of intermediate valency) by means of two different theoretical models.

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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