

Interplay of Kondo effect and RKKY interaction in CePdIn_{1-x}Sn_x

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In this contribution we report occurrence of disorder-driven local quantum criticality (LQC) in CePdIn_{1-x}S_x compounds. Quantum-criticality in frustrated magnetic systems is an emerging topic in current solid state physics. Recent studies revealed the frustration changes the picture of typical quantum criticality, introducing quantum critical phase being expanded over some range of tuning parameter [1]. Our approach involves the substitution of tin as the p-electron substitution in the CePdIn_{1-x}S_x and the hydrogen sorption.

Intriguing properties of CePdIn_{1-x}S_x compounds like valence fluctuations, quantum phase transitions and heavy fermion behaviour results from the competition between the RKKY indirect magnetic exchange and the Kondo screening [2,3]. They are responsible for establishing long-range magnetic order and Fermi liquid state (FL), respectively.

It seems that in case of CePdIn_{1-x}S_x, no typical quantum critical point (QCP) or phase (CQPh) is approached with total suppression of magnetic ordering. There is a strong premise to conclude that local disorder may be an origin of observed twofold nature of Ce 4f states showing nFL behavior and magnetic ordering simultaneously. The above conclusions were drawn from a set of complementary studies including neutron diffraction, specific heat and transport measurements carried out at sub-Kelvin range.

References:

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