

Abstract Submitted
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Iron pnictides as a model system for heavy fermion behavior: influence of conduction-electron magnetic ordering on Kondo effect JIANHUI DAI, Zhejiang University, QIMIAO SI, Rice University, JIAN-XIN ZHU, LANL — The rare-earth iron pnictides exhibit a number of magnetic ground states besides the unconventional superconductivity. With CeOFeP [1] and CeOFeAs [2] in mind as prototypes, we derive an extended Anderson lattice model which incorporates the hybridizations of the pnictogen 4p (or 3p)- orbitals with both the iron 3d-orbitals and rare earth 4f-orbitals[3]. We show a new type of Kondo lattice physics: Kondo screening of the f-moments are suppressed by the antiferromagnetic ordering of the d-electrons. Inside the d- electron AF state (as in CeOFeAs), the f-moments are dominantly coupled by superexchange with competing components. The resulting magnetic frustration in general favors a helical order. The regime where d-electrons are paramagnetic (including CeOFeP) features the usual RKKY vs. Kondo competition. The implications of our results for heavy fermion physics in general are discussed.

[1] E.M. Brüning et al., PRL101, 117206(2008)

[2] G. F. Chen et al., PRL100, 247002(2008). J. Zhao et al., Nat. Mater.(2008)

[3] J. Dai, Q. Si & J-X Zhu, to be published.

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