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Electronic correlations in hole- and electron-doped Fe-based superconductors FREDERIC HARDY, ANNA BOEHMER, PETER SCHWEISS, THOMAS WOLF, ROLF HEID, ROBERT EDER, IFP, Karlsruhe Institute of Technology, ROBERT A. FISHER, Lawrence Berkeley National Laboratory, CHRISTOPH MEINGAST, IFP, Karlsruhe Institute of Technology — High-temperature superconductivity in the cuprates occurs at the crossover from a highly-correlated Mott insulating state to a weaker correlated Fermi liquid as a function of hole doping. The iron pnictides were initially thought to be fairly weakly correlated. However, we have recently shown using transport and thermodynamic measurements that KFe_2As_2 is strongly correlated. Both the Sommerfeld coefficient and the Pauli susceptibility are strongly enhanced with respect to their bare DFT values. These correlations are even further enhanced in $RbFe_2As_2$ and $CsFe_2As_2$. The temperature dependence of both the susceptibility and the thermal expansion provides strong experimental evidence for the existence of a coherence-incoherence crossover; similar to what is found in heavy-fermion compounds. Whereas the correlations in the cuprates result from a large value of the Hubbard U, recent works have stressed the particular relevance of Hund's coupling in the pnictides. Our data may be interpreted in terms of a close proximity of KFe_2As_2 to an orbital-selective Mott transition. We now have good thermodynamic data covering both the hole and electron sides of the $BaFe_2As_2$ system and we will discuss how these correlations are modified by doping.

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