

Abstract Submitted  
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**Multiband, paramagnetic effects and vortices in  $\text{KFe}_2\text{As}_2$** <sup>1</sup> FREDERIC HARDY, Karlsruher Institut fuer Technologie, IFP, 76021 Karlsruhe, Germany, DAI AOKI, CEA Grenoble, SPSMS-INAC, 38054 Grenoble, France, ROBERT EDER, Karlsruher Institut fuer Technologie, IFP, 76021 Karlsruhe, Germany, ILYA VEKHTER, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803, USA, PHILIPP BURGER, ANNA BOEHMER, Karlsruher Institut fuer Technologie, IFP, 76021 Karlsruhe, Germany, ROBERT FISHER, Lawrence Berkeley National Laboratory, University of California, Berkeley, CA 94720, USA, THOMAS WOLF, CHRISTOPH MEINGAST, Karlsruher Institut fuer Technologie, IFP, 76021 Karlsruhe, Germany — We study the normal- and superconducting-state properties of the iron pnictide superconductor  $\text{KFe}_2\text{As}_2$  using heat-capacity, thermal-expansion and magnetization measurements. In the normal state, our data show strong evidence of the existence of strong local fluctuations and of the coherence-incoherence crossover predicted by theory. In zero field, for  $T < T_c$ , the temperature dependence of the heat capacity provides evidence for the existence of extremely small energy gaps. The (H,T) phase diagram is also determined down to 80 mK using calorimetric measurements. We reveal the existence of strong paramagnetic effects for field parallel to the  $\text{Fe}_2\text{As}_2$  planes. We discuss the symmetry of the order parameter and the interplay between multiband, paramagnetic and orbital effects.

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