

Abstract Submitted
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Orbital

and

Pauli limiting effects in heavily doped $\text{Ba}_{0.05}\text{K}_{0.95}\text{Fe}_2\text{As}_2$.¹ S. ZHANG, Y. P. SINGH, X. Y. HUANG, Kent State University, X. J. CHEN, Shanghai Laboratory of High Pressure Science Technology Advanced Research, M. DZERO, C. C. ALMASAN, Kent State University — We investigated the thermodynamic properties of the Fe-based lightly-disordered superconductor $\text{Ba}_{0.05}\text{K}_{0.95}\text{Fe}_2\text{As}_2$ in external magnetic field H applied along the FeAs layers ($H||ab$ planes). The superconducting (SC) transition temperature for this doping level is $T_c = 6.6$ K. Our analysis of the specific heat $C(T,H)$ measured for $T < T_c$ implies a sign change of the superconducting order parameter across different Fermi pockets. We provide experimental evidence for the three components superconducting order parameter. We find that all three components have values which are comparable with the previously reported ones for the stoichiometric compound KFe_2As_2 . Our data for $C(T,H)$ and resistivity $\rho(T, H)$ can be interpreted in favor of the dominant orbital contribution to the pair-breaking mechanism at low fields, while Pauli limiting effect dominates at high fields, giving rise to a gapless superconducting state with only the leading non-zero gap.

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C. C. Almasan
Kent State University

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