

Abstract Submitted
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Magnetic property and phase diagram of single-crystalline over-doped $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ YU LI, CHENGLIN ZHANG, PENGCHENG DAI, Department of Physics and Astronomy, The University of Tennessee, Knoxville — Sizable single-crystalline samples of hole-doped $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ with $x > 0.4$ have been grown and characterized via magnetic measurements. T_c of our samples decreases from that of optimal doping as doping rate of K increases. Sharp transitions in $M(T)$ curves indicate high quality of our sizable crystals which has never succeeded in over-doped region due to extreme nonhomogeneous property of this kind of material. With increasing K content, electron Fermi surface diminishing and nesting between hole FS and electron FS disappearing consequently, it is predicted that there exists a transition from s-wave superconducting state to d-wave yet without sufficient experimental evidences. Our results made it possible to further study on the hole-overdoped $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ series and provide a significant platform to test and verify these current theories and understand the underlying pairing mechanism in iron-based superconductors.

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