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Low temperature penetration depth of Fe-based superconductors JAMES DAY, BRAD RAMSHAW, JAKE BOBOWSKI, PINDER DOSANJH, DOUG BONN, WALTER HARDY, Department of Physics and Astronomy, University of British Columbia — The recent discovery of superconductivity in layered iron-based pnictide compounds has generated levels of excitement comparable to the early days of the copper-based oxides. While connections may be drawn between the cuprates and the pnictides, there exist important differences between the two materials. We report high-precision microwave measurements of the penetration depth in single crystals of the hole-doped iron-based superconductor $Ba_{1-x}K_xFe_2As_2$. Using cavity perturbation techniques in conjunction with ac susceptometry, we find that the low temperature penetration depth does not fit well to a simple s-wave model. Furthermore, our initial results suggest that the temperature dependence of the superfluid density is consistent with a gap with nodes plus the presence of scattering.

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