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Field dependence of the zero energy density of states of an anisotropic $s_\pm$ superconductor YAN WANG, PETER HIRSCHFELD, Department of Physics, University of Florida, Gainesville, FL 32611, USA, SIEGFRIED GRASER, EKM, Institute of Physics, University of Augsburg, 86135 Augsburg, Germany — The pairing symmetry in iron-based superconductors (SC) is generally believed to be an $s_\pm$-wave state. Although ARPES suggests a mainly isotropic gap on all Fermi surface sheets, different thermodynamic and transport measurements are still inconclusive about the existence and orientation of gap nodes. Specific heat measurements in a magnetic field showing a square root like dependence of the Sommerfeld coefficient $\gamma(B)$ have been reported, contradicting the linear behavior expected for a fully gapped system. For a d-wave SC, $\gamma(B) \propto \sqrt{B}$ is well-known as Volovik effect. For a fully gapped $s_\pm$-wave SC with $\Delta_+ \neq \Delta_-$, a similar concave field dependence is expected. To distinguish these two effects we apply a two-band model using the Riccati parametrization of the Eilenberger equation to study the density of states around a single vortex and compare it with self-consistent calculations in the vortex lattice. Different models for the momentum dependence of the gap on each band relevant to the iron-based SC, ranging from isotropic to strongly anisotropic and nodal gaps are investigated. Partial support was provided by DOE DE-FG02-05ER46236 (PJH).

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