Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Thermal conductivity of the iron-based superconductor FeSe : Nodeless gap with strong two-band character PATRICK BOURGEOIS-HOPE, SVEN BADOUX, NICOLAS DOIRON-LEYRAUD, LOUIS TAILLEFER, University of Sherbrooke, Sherbrooke, Canada, SHUN CHI, RUIXING LIANG, WALTER HARDY, DOUG BONN, University of British Columbia, Vancouver, Canada — The thermal conductivity κ of the iron-based superconductor FeSe was measured at temperatures down to 50 mK in magnetic fields up to 17 T. In zero magnetic field, the residual linear term in the $T = 0$ limit, κ_0/T, is vanishingly small. Application of a magnetic field H causes no increase in κ_0/T initially. Those two facts show that there are no zero-energy quasiparticles that carry heat and therefore no nodes in the superconducting gap of FeSe. The full field dependence of κ_0/T has the classic shape of a two-band superconductor, such as MgB_2. It rises initially with a characteristic field $H^\star \simeq H_{c2}/25$, and then more slowly up to $H_{c2} = 14$ T. We interpret this in terms of a small gap $\Delta_A \simeq \Delta_0/5$ on some part of the Fermi surface, with a large gap $\Delta_B = \Delta_0$ in the region that controls H_{c2}.

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Date submitted: 02 Nov 2015 Electronic form version 1.4