

Abstract Submitted  
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**Specific Heat To  $H_{c2}$ : Evidence for Nodes or Deep Minima in the Superconducting Gap of Under- and Overdoped  $\text{BaFe}_{2-x}\text{Co}_x\text{As}_2$** <sup>1</sup> G.R. STEWART, J.S. KIM, Department of Physics, Univ. Florida, Gainesville, FL, K. GOFRYK, F. RONNING, Los Alamos National Laboratory, Los Alamos, NM, A.S. SEFAT, Oak Ridge National Laboratory, Oak Ridge, TN, K.Y. CHOI, K.H. KIM, Department of Physics and Astronomy, Seoul National Univ., Seoul, South Korea — Low temperature specific heat,  $C$ , in magnetic fields up to  $H_{c2}$  is reported for  $\text{BaFe}_{1.91}\text{Co}_{0.09}\text{As}_2$  (underdoped,  $H_{c2} \approx 16$  T,  $T_c = 8$  K),  $\text{BaFe}_{1.79}\text{Co}_{0.21}\text{As}_2$  (overdoped,  $H_{c2} \approx 27$  T,  $T_c = 17$  K), and - for comparison -  $\text{BaFe}_{1.95}\text{Ni}_{0.05}\text{As}_2$ , which should have properties similar to the underdoped Co-sample. Previous measurements of thermal conductivity (as a function of temperature and field) and penetration depth on comparable composition samples gave some disagreement as to whether there was fully gapped/nodal behavior in the under-/overdoped materials respectively. The present work shows that the measured behavior of the specific heat  $\gamma$  ( $\propto C/T$  as  $T \rightarrow 0$ , i. e. a measure of the electronic density of states at the Fermi energy) as a function of field obeys  $\gamma \approx H^{0.6 \pm 0.1}$ , similar to the Volovik effect for nodal superconductors, over the entire field range for both under- and overdoped Co samples as well as for the underdoped Ni sample. By comparison to theory, the possibility of two bands, one with line nodes and one fully gapped, being present in these materials is discussed.

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