Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The Electronic Specific Heat of $Ba_{1-x}K_xFe_2As_2$ from 2K to 380K[1] JAMES STOREY, JOHN LORAM, JOHN COOPER, Cavendish Laboratory, University of Cambridge, Cambridge, UK, ZBIGNIEW BUKOWSKI, JANUSZ KARPINSKI, Laboratory for Solid State Physics, ETH Zurich, Zurich, Switzerland
— Using a differential technique, we have measured the specific heats of polycrystalline $Ba_{1-x}K_xFe_2As_2$ samples with $x = 0$, 0.1 and 0.3, between 2K and 380K and in magnetic fields 0 - 13T. From this data we have determined the electronic specific coefficient $\gamma(\equiv C^{el}/T)$ over the entire range for the three samples. The sample with $x = 0.3$ exhibits a large SC anomaly $\Delta\gamma(T_c) \sim 48$ mJ/mol K^2 at $T_c = 36$K, and we determine the energy gap, condensation energy, superfluid density and coherence length. In the normal state for the $x = 0.3$ sample, $\gamma \sim 45$ mJ/mol K^2 is constant from T_c to 380K. In the parent compound ($x = 0$) there is a large almost first order anomaly at the SDW transition at $T_o = 136$K. The corresponding anomaly for the 0.1 sample at $T_o \sim 135$K is smaller and broader than for $x = 0$. At low T, γ is strongly reduced by the SDW gap for both $x = 0$ and 0.1, but above T_o, γ for all three samples are similar.

[1]This work supported by the Engineering and Physical Sciences Research Council (UK) and the Swiss National Science Foundation pool MaNEP.

James Storey
Cavendish Laboratory, University of Cambridge, Cambridge, UK

Date submitted: 17 Nov 2009 Electronic form version 1.4