The Electronic Specific Heat of High-T_c Superconductors from Differential Calorimetry.

James Storey – University of Cambridge

The electronic specific heat contains a wealth of quantitative information on the electronic spectrum over an energy region ±100meV about the Fermi level, crucial to the understanding of high temperature superconductivity. Differential calorimetry is a very powerful but little used technique whereby the difference in specific heats of two closely related samples is measured. With this technique the electronic specific heat of a material can be determined with greater confidence than is possible by conventional heat capacity measurements.

Over the last few years, the electronic specific heat of the copper-oxide based high-temperature superconductors has been consolidated with data from other techniques, including photoemission and Raman spectroscopy, to reveal the evolution of the electronic structure with doping. Features of the electronic structure such as the pseudogap, Fermi arcs, the van Hove singularity, and their implications for the pairing interaction will be discussed.

More recently we have applied the differential technique to the newly discovered iron-arsenide based superconductors. Results will be presented for polycrystalline samples of $Ba_{1-x}K_xFe_2As_2$.