High Field Heat Capacity of the Cuprate Hg1201, Proposal P01725

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Introduction

The experiments for 2013 focused on the field dependence of the absolute values of the low temperature heat capacity in the cuprate superconductors known as Hg1201 ($HgBa_2CuO_{4+\delta}$). The goal was to explore the effect of field on the low lying electronic excitations of the superconducting state.

Experimental

All experiments took place at the DC field facility in the 35 tesla magnet in Cell 12, using the top loading cryostat. The experimental technique is entirely home-made, but employs user program cabling and probe. The measurement determines the heat capacity of a sample using thermometers that are calibrated at the NHMFL pulsed field facility to ensure high accuracy in any attainable magnetic field.

Results and Discussion

We observed a large change in heat capacity with applied field in several samples. All measurements were a complete success with excellent temperature stability during measurements and superb signal to noise.

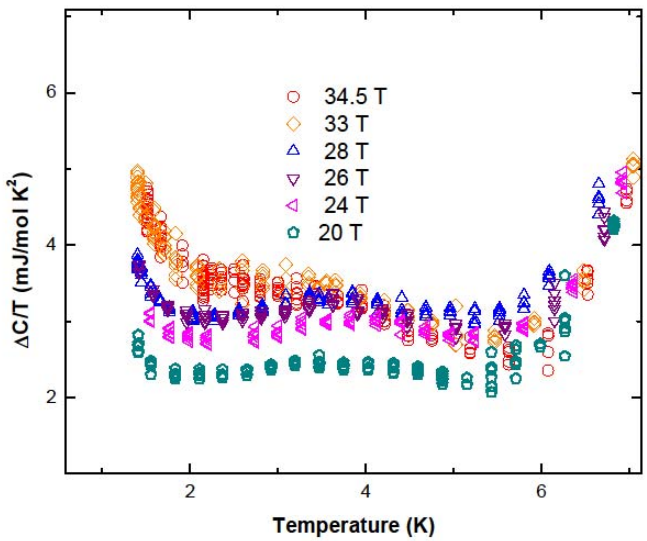

Figure 1 Field induced specific heat capacity divided by temperature versus temperature at various fields

Conclusions

The results merit further study to more broadly understand the physics of these materials.

Acknowledgements

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