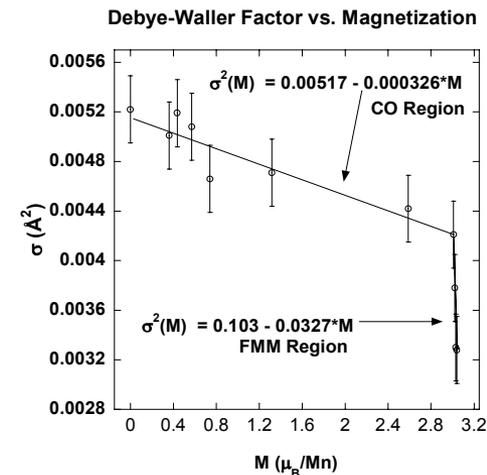


Acquisition of a Superconducting Magnet for Magnetostructural and Magnetoelectronic Research and Education

T. A. Tyson (NJIT), J. Budnick, M. Croft, C.-C. Kao and V. G. Harris, DMR-0083189

A custom 10 T split coil horizontal field superconducting magnet was acquired from Oxford Instruments. The system (top left) became operational in November 2002 and is now available for XAFS and MCD measurements in field. The 10 T horizontal-field split-coil magnet (with optical access) will be a resource available to users of the National Synchrotron Light Source at Brookhaven National Laboratory. The first x-ray absorption experiment conducted on the melting of the charge ordered state in $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ revealed an abrupt transition between the charge ordered and metallic state with a narrow mixed phase region (lower left) not observable by standard bulk measurements. (Submitted to Phys. Rev. B)



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Education:

Graduate students have been involved in the first experiments conducted with this instrument. Students are learning much about vacuum systems, cryogenics and superconducting magnet control in addition to basic solid state physics. This instrument is a unique tool which will be used to train graduate and undergraduate students in hard and soft x-ray spectroscopy as well as magneto-optics.

Outreach:

An undergraduate course in magnetic materials is being developed. The magnet will be utilized to teach students about advanced x-ray spectroscopic characterization, magneto-structural and magneto-optical phenomena.