3 OMEGA THERMAL CONDUCTIVITY MEASUREMENT OF $Nd_{0.5}Sr_{0.5}MnO_3$ IN PULSED MAGNET

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The thermal conductivity of a single crystal $Nd_{0.5}Sr_{0.5}MnO_3$ was measured in static and pulsed magnetic fields.[1] The sample has 2 phase transitions; a ferromagnetic phase transition near 260K and an antiferromagnetic/charge ordering phase transition near 170K at zero field as shown in Fig. 1. The AFM transition is a first order phase transition and hysteresis exists depending on whether the sample was heating or cooling. The thermal conductivity of the FM state is larger than AFM due to the increase in the electronic part of thermal conduction.[2] When a pulsed magnetic field up to 50T is applied, the spins in the AFM phase are forced to align and it becomes ferromagnetic. Since the thermal conductivity of the FM state is a few times larger than that of the AFM, in Fig. 2 we see a big step in the thermal conductivity when this field-induced phase transition occurs near 7T.

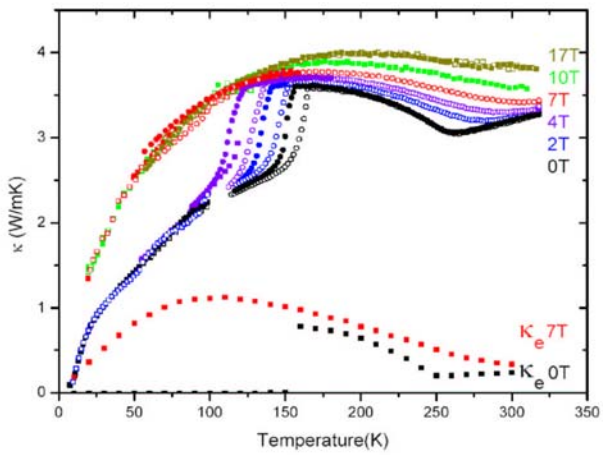

Figure 1. Thermal conductivity of $Nd_{0.5}Sr_{0.5}MnO_3$.

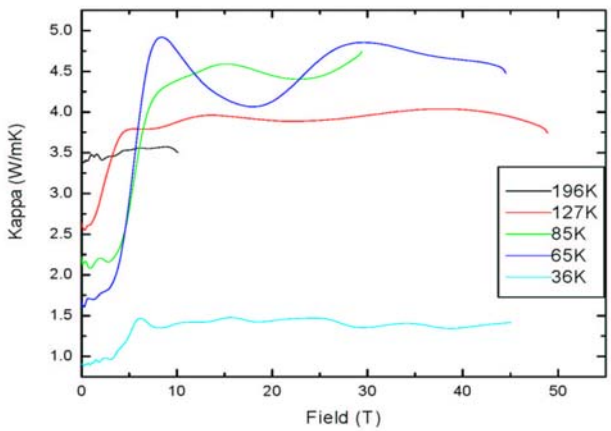

Figure 2. Thermal conductivity of $Nd_{0.5}Sr_{0.5}MnO_3$ in pulsed magnet.

Acknowledgements

This research was performed under the auspices of the NSF, the State of Florida, and DOE.

References

[1] Kim, D., *et al.*, paper in preparation
[2] Tokura, Y., *et al.*, PRL **76** (1996), 3164