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**Polarized**

**transmission EXAFS study of single crystal  $\text{La}_{2-2x}\text{Sr}_{1+2x}\text{Mn}_2\text{O}_7$  as a function of temperature** JESSE GUZMAN, G. KURCZVEIL, L. DOWNWARD, F. BRIDGES, UC Santa Cruz, J. MITCHELL, H. ZHENG, Argonne National Lab. — The temperature dependence (3-300K) of the bilayer Colossal Magneto Resistive (CMR) manganites  $\text{La}_{2-2x}\text{Sr}_{1+2x}\text{Mn}_2\text{O}_7$ ,  $x=0.34$  and  $0.36$ , was studied using polarized, transmission EXAFS through a thin single crystal, with the x-rays polarization parallel to the c-axis or in the ab-plane. To eliminate Bragg diffraction effects from the single crystal, a 2D sample oscillator setup was used; the results of using this oscillator will be discussed. The data analysis shows a sharp increase in the width  $\sigma$  of the pair distribution function (PDF) for the Mn-O peak near the ferromagnetic transition temperature  $T_c$ . This sharp increase in  $\sigma^2$  corresponds to a Jahn-Teller-like distortion as the temperature goes through  $T_c$ . Furthermore, a plot of the reduction in  $\sigma^2$ ,  $\Delta(\sigma^2)$ , vs. sample magnetization  $M$  shows a linear dependence with a large change in slope at  $M/M_o \sim 2x$ , which is consistent with the recently proposed dimeron model proposed by Downward, et al. with regards to the LCMO system. Furthermore, there is some evidence for an increase in disorder below 75K which has not been discussed previously. Finally, another weaker step in  $\sigma^2$  at  $T^* \sim 250\text{K}$ , well above  $T_c$  can be seen, which is comparable to a  $T^*$  in recent neutron scattering experiments, proposed to be a spin-liquid/spin-glass phase transition. Support: NSF DMR0301971.

Jesse Guzman  
UC Santa Cruz

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