

Abstract Submitted to the  
3rd Conference on Concepts in Electron Correlation  
30 September - 5 October, 2005  
Hvar, Croatia

## Neutron Scattering on Manganites

F.Weber<sup>1</sup>, N.Aliouane<sup>2</sup>, D.Argyriou<sup>2</sup>, [<sup>3</sup>

<sup>1</sup> *Institut fr Festkrperphysik, Forschungszentrum Karlsruhe, Postbox 3640, D-76127 Karlsruhe, Germany*

<sup>2</sup> *Hahn-Meitner Institut, BENSC SF2, D-14109 Berlin (Germany)*

<sup>3</sup> *Laboratoire Lon Brillouin, Cea Saclay, F-91191 Gif sur Yvette, France*

The interest in explaining the colossal magneto resistance (CMR) in the manganites has led to many experiments in a wide range of investigation methods. We report neutron scattering studies of the cubic Sr doped manganite  $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$  and the bilayer manganite  $\text{La}_{1.2}\text{Sr}_{1.8}\text{Mn}_2\text{O}_7$ . As the CMR effect in Ca doped manganites is well explained by a polaronic picture<sup>1</sup> until now there are no hints for a polaronic structure or even uncorrelated polarons in the cubic Sr doped system. We have investigated  $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$  in the search for temperature dependent quasi-elastic scattering arising from dynamic polarons forming near the transition temperature. In the double-layered manganite,  $\text{La}_{1.2}\text{Sr}_{1.8}\text{Mn}_2\text{O}_7$ , polaronic order is observed<sup>2</sup>. We investigated phonon dispersions focusing on the planar Mn-O bond stretching and bond bending modes in the (1,0,0) direction whose counterparts in the cubic system shows an unusually steep dispersion. Also studied were the temperature dependences across the ferromagnetic transition temperature.

<sup>1</sup> Adams, Phys.Rev.Letters 85, 3954, 2000

<sup>2</sup> Argyriou et al., Phys.Rev.Letters 89, 36401, 2002

*Keywords* : Manganites, Neutron Scattering