Soft X-ray Magnetic Circular Dichroism Study of $La_{1-x}Sr_xMnO_3$	U4B

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Soft x-ray magnetic circular dichroism (SXMCD) measurements have been performed on the O K- and Mn L-absorption edges of $La_{1-x}Sr_xMnO_3$ single crystals in their ferromagnetic regime (see Fig. 1 and 2). This has been done using a recently developed experimental technique for magnetizing the samples offering the possibility to get high-accuracy SXMCD effect measurements on bulk specimen.

The very strong doping-induced O K-edge prepeak intensity as shown in Fig. 1 is proof of an enhanced O2p hole component of the doped holes. The orbital magnetic moment of this O2p component determined with the SXMCD difference spectra in Fig. 1 suggests a large spin moment on the O sites ferromagnetically coupled to the Mn moments. The shape of the Mn L SXMCD difference spectrum in Fig. 2 shows fine structures which are consistent with crystal field multiplet calculations assuming a local lattice distortion of the MnO_6 octahedra even in the low-temperature metallic phase.

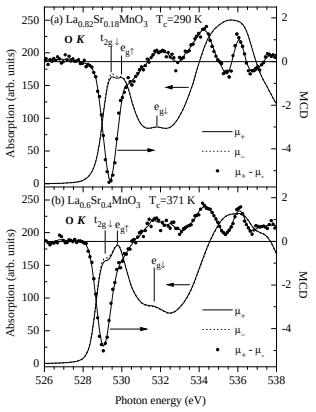

Figure 1. O K soft x-ray magnetic circular
dichroism spectra (a) $La_{0.82}Sr_{0.18}MnO_3$ and (b) $La_{0.6}Sr_{0.4}MnO_3$; solid (dotted) lines: spectra taken with the spin of the incident photons parallel (antiparallel) to the spin of the Mn3d majority electrons. Solid circles: SXMCD difference spectra resulting from the above data. The thin solid lines guides to the eye.

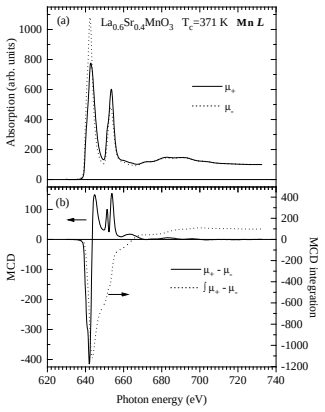

Figure 2. (a) Mn L SXMCD spectra of $La_{0.6}Sr_{0.4}MnO_3$; solid (dotted) lines: spectra taken with the spin of the incident photons parallel (antiparallel) to the spin of the Mn3d majority electrons. (b) Solid line: SXMCD difference spectrum resulting from the above data after correction for the finite degree of circular polarization of 88%; dotted line: integrated difference spectrum.