Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Extracting d-orbital information from Magnetic Compton experiments in bilayer manganites B. BARBIELLINI, Northeastern U., P.E. MIJNARENDS, Delft University of Technology and Northeastern U., S. KAPRZYK, AGH (Poland) and Northeastern U., A. BANSIL, Northeastern U., YINWAN LI, U. of Illinois Chicago and Argonne National Lab., P.A. MONTANO, U. of Illinois Chicago and USDOE, J. F. MITCHELL, Argonne National Lab. — Magnetic Compton profiles (MCPs) have been measured for the colossal magnetoresistance double layer manganite $La_{1.2}Sr_{1.8}Mn_2O_7$ along various crystallographic directions over a wide range of temperatures and magnetic fields. The experimental results are interpreted via first-principles computations of the magnetic momentum density and the MCPs. The usefulness of the so called $B(\mathbf{r})$ function, obtained by a one-dimensional Fourier transform of the MCP, is emphasized [1]. In particular, the form of $B(\mathbf{r})$ for momentum transfer along the [110] direction is found to contain a prominent dip at around 1 a.u., whose depth is shown to provide a sensitive measure of the population of e_g electrons of $d_{x^2-y^2}$ symmetry in the system. Work supported in part by the USDOE.
[1] Yinwan Li, P. A. Montano, J.F. Mitchell, B. Barbiellini, P. E. Mijnarends, S. Kaprzyk and A. Bansil, Phys. Rev. Lett. **93**, 207206 (2004).

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Date submitted: 01 Dec 2004 Electronic form version 1.4