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**Magnetic momentum density, Fermi surface and directional magnetic Compton profiles in $LaSr_2Mn_2O_7$ and $La_{1.2}Sr_{1.8}Mn_2O_7$** P. E. MIJNARENDS, Delft University of Technology and Northeastern U., S. KAPRZYK, Northeastern U. and AGH (Poland), B. BARBIELLINI, A. BANSIL, Northeastern U., YINWAN LI, U. of Illinois Chicago and Argonne Nat. Lab., J.F. MITCHELL, Argonne Nat. Lab., P.A. MONTANO, U. of Illinois Chicago and USDOE — We have carried out first principles, all-electron computations of the magnetic momentum density $\rho_{mag}(\mathbf{p})$ and magnetic Compton profiles (MCPs) for momentum transfer along the [100], [001], and [110] directions in $LaSr_2Mn_2O_7$ and $La_{1.2}Sr_{1.8}Mn_2O_7$ [1]. Parallel measurements of these three MCPs from a single crystal of $La_{1.2}Sr_{1.8}Mn_2O_7$ at 5 K in a magnetic field of 7 T are also reported. Here, we discuss details of the FS-related signatures in the first and higher BZs in the MCPs and show that high resolution magnetic Compton scattering experiments with a momentum resolution of 0.1 a.u. FWHM (full-width-at-half- maximum) or better will be necessary to observe this fine structure. We comment also on the feasibility of using positron annihilation spectroscopy in this connection. Work supported 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 (2004) 207206.

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