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Interplay between intrinsic and stacking-fault magnetic domains in bi-layered manganites M.A. HOSSAIN, MARK H. BURKHARDT, S. SARKAR, SIMES, SLAC National Accelerator Laboratory, Menlo Park, California 94025, USA, H. OHLDAG, Stanford Synchrotron Radiation Lightsource, Menlo Park, California 94025, USA, Y.-D. CHUANG, A. SCHOLL, A.T. YOUNG, A. DORAN, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California 94720, USA, D.S. DESSAU, Department of Physics, University of Colorado, Boulder, Colorado 80309, USA, H. ZHENG, J.F. MITCHELL, Materials Science Division, Argonne National Laboratory, Argonne, Illinois 60439, USA, H.A. DÜRR, SIMES, SLAC National Accelerator Laboratory, Menlo Park, California 94025, USA, J. STÖHR, Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, California 94025, USA — We present a low temperature x-ray photoemission electron microscopy study of the bi-layered manganite compound $La_{1.2}Sr_{1.8}Mn_2O_7$ (BL-LSMO) to investigate the influence of stacking faults, which are structurally and magnetically different from the bi-layered host [1]. In BL-LSMO, small magnetic moment persists to $T^* = 300$ K, well above the Curie temperature of 120 K (T_C). Our magnetic images show that 3D stacking faults are responsible for the T^* transition. Furthermore, close to T_C, stacking faults are well coupled to the bi-layered host with latter magnetic domains controlling the spin direction of the stacking faults. Contrary to recent reports, we find that stacking faults do not seed magnetic domains in the host via an exchange spring mechanism and the intrinsic T_C of the BL-LSMO is not lower than 120 K. [1] Appl. Phys. Lett. 101, 132402 (2012)

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