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Interface effects in modulation-doped manganite superlattices
MARIA E. GOMEZ, G. CAMPILLO, P. PRIETO, Excellence Center for Novel Materials. Universidad del Valle, A.A. 25360 Cali, Colombia, A. HOFFMANN, Argonne National Laboratory, Materials Science Division, Argonne, Illinois 60439, A. BERGER, Hitachi Global Storage Technologies, San Jose Research Center, San Jose, CA, J. GUIMPEL, N. HABERKORN, A. CONDO, Centro Atómico de Bariloche Instituto Balseiro 8400 Bariloche, Argentina — Epitaxial superlattices of antiferromagnetic $La_{1/3}Ca_{2/3}MnO_3$ and ferromagnetic $La_{2/3}Ca_{1/3}MnO_3$ were grown using a high-pressure sputtering technique. Structural analysis was performed by simulation of X-ray diffraction data using the SUPREX program and Transmission Electron Microscopy. Both techniques confirmed interfacial roughness in the range of one unit cell. Magnetization measurements showed that magnetization depth profile is incommensurate with the doping profile, such that the ferromagnetic order extends into the antiferromagnetically doped region beyond the chemical doping interface. Thermal demagnetization in the low temperature range obtained from the temperature dependence of the saturation magnetization shows an α=5/2 power law dependence, independent of the ferromagnetic layer thickness. The $T^{5/2}$term is associated with long-wave length spin waves, and corresponds to the anharmonic second-order expansion of the magnetization. This work was supported by COLCIENCIAS contract 043-2005, and U.S. DOE-BES under contract W-31-109-ENG-38.

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