Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetization study on Ferro-Antiferromagnetic Superlattices based on Manganites of the type $La_xCa_{1-x}MnO_3$ GLORIA CAMPILLO, AXEL HOFFMANN, Argonne National Laboratory, PEDRO PRIETO, MARIA ELENA GÓMEZ, Universidad del Valle, UNIVERSIDAD DEL VALLE, DEPARTMENT OF PHYSICS, CALI, COLOMBIA TEAM, ARGONNE NATIONAL LABORATORY, MATERIALS SCIENCE DIVISION TEAM — Magnetization measurements were done on a series of $La_{2/3}Ca_{1/3}MnO_3$ ferromagnetic (F) / $La_{1/3}Ca_{2/3}MnO_3$ antiferromagnetic (AF) superlattices, which were prepared with a constant thickness of 3.9 nm for the F layer and thickness of the AF layer was varied in the range $3.9nm \leq t_{AF} \leq 15.6nm$. We observe from magnetothermal zero field cooling (ZFC) and field cooling (FC) curves, a bifurcation temperature T_{bif}, around 180 K identical for all samples. However, the F Curie temperature T_C changes with AF layer thickness. Hysteretic loop measurements after field cooling (FC), from room temperature to 5 K exhibit an exchange bias loop shift, H_{ex}, which persists up to temperatures around the Nel temperature T_N, (150 K) of the AF layer. The temperature parameter T_0, derived from an exponential fit of H_{ex}, increases with t_{AF} up to approximately 32 K, which is well below the blocking temperature $T_B \approx T_N$. This result can be associated with a continuous distribution of T_B caused by inhomogeneities at the interfaces, and suggests that AF/F interface-effects are of critical importance for exchange- biasing in La-Ca-Mn-O based multilayers. This work was supported by COLCIENCIAS project 1106-05-11458 CT-046-2002 and US DOE-BES.

Maria Elena Gómez
Universidad del Valle

Date submitted: 22 Dec 2004 Electronic form version 1.4