Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Exchange Bias in $LaNiO_3$-based heterostructures MARTA GIBERT, RAOUL SCHERWITZL, PAVLO ZUBKO, DPMC, University of Geneva, JORGE IÑIGUEZ, ICMAB-CSIC, JEAN-MARC TRISCONE, DPMC, University of Geneva — The wide spectrum of exotic properties exhibited by transition-metal based oxides is triggered by the interplay between the spin, charge, orbital and lattice degrees of freedom. In this context, interface engineering in complex oxide heterostructures enables not only further tuning of the exceptional properties of these materials, but also gives access to hidden phases and emergent physical phenomena. Here, we show how interface engineering can induce a complex magnetic structure in a non-magnetic material. We specifically show that exchange bias phenomenon can unexpectedly emerge in (111)-oriented heterostructures involving materials a priori non-candidates for the development of such behavior, namely paramagnetic $LaNiO_3$ (LNO) and ferromagnetic $LaMnO_3$ (LMO). The observation of the exchange bias in LNO/LMO superlattices not only implies the development of interface-induced magnetism in the paramagnetic LNO layers, but also provides us with a very subtle tool for probing the interfacial coupling between the LNO and the LMO layers. First-principles calculations indicate that this interfacial interaction may give rise to an unusual spin order resembling a spin density wave within the LNO layers. Other possible magnetic orders are also discussed.

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Date submitted: 15 Nov 2011 Electronic form version 1.4