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Magnetic properties of $La_{2/3}Sr_{1/3}MnO_3/Pr_{2/3}Ca_{1/3}MnO_3$ superlattices DARIO NIEBIESKIKWIAT, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL 61801, LUIS HUESO, Department of Materials Science, University of Cambridge, Cambridge CB2 3QZ, UK, MYRON SALAMON, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, IL 61801, NEIL MATHUR, Department of Materials Science, University of Cambridge, Cambridge CB2 3QZ, UK — We present a magnetization study of ferromagnetic/antiferromagnetic (FM/AFM) manganite superlattices, grown by pulsed laser deposition on $SrTiO_3$ substrates. The FM layers are 15-nm-thick $La_{2/3}Sr_{1/3}MnO_3$ (LSMO) sheets and the AFM layers were made of $Pr_{2/3}Ca_{1/3}MnO_3$ (PCMO), with variable thickness t_A between 0 and 7.6 nm. Although all our multilayers exhibit a PM-FM transition of the LSMO layers at $T_C \sim$340K, only for t_A=0 do we observe a FM moment M_0 close to the expected saturation for the 1/3 doping. As soon as the AFM layers are added (t_A= 0.8nm) M_0 decreases, related to the introduction of the FM/AFM interfaces. The lack of exchange bias would indicate that the reduction of the FM moment is due to the appearance of a magnetically dead layer in the LSMO close to the interface with the AFM volume. Upon a further increase of t_A, the FM moment increases again and develops a peak at $t_A \sim$3.5 nm. We explain this behavior in terms of the accommodation of nanometric FM droplets in the PCMO layers.

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