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Influence of structural asymmetries on $LaNiO_3$-$LaMnO_3$ interfaces MARTA GIBERT, University of Geneva, MICHEL VIRET, CEA Saclay, PAVLO ZUBKO, UCL London, SARA CATALANO, University of Geneva, CINTHIA PIAMONTEZE, SLS-PSI, NICOLAS JAOUEN, SOLEIL, JEAN-MARC TONNERRE, CNRS, Instiut Neel, ALMUDENA TORRES-PARDO, Complutense University of Madrid, ALEX GLOTER, ODILE STEPHAN, University of Paris-Sud, JEAN-MARC TRISCONE, University of Geneva — Complex electronic reconstruction at interfaces between transition metal oxides play a key role on the emergence of novel functionalities in these materials. In this context, we reported on the observation of exchange bias in superlattices composed of nominally paramagnetic metallic $LaNiO_3$ and semiconducting ferromagnetic $LaMnO_3$ ultrathin layers [1], which exemplifies how interface engineering can induce a magnetic structure in $LaNiO_3$. Here, we investigate the properties of $LaNiO_3$-$LaMnO_3$ bilayers, i.e. $SrTiO_3$//8u.c.$LaNiO_3$/8u.c.$LaMnO_3$. TEM images have shown that the interface $LaNiO_3$/$LaMnO_3$ is sharper than the $LaMnO_3$/$LaNiO_3$ one, which displays two monolayers intermixing. This structural asymmetry results into very distinct properties: enhanced conductivity and extremely reduced magnetization is observed for the "sharp interface" samples in contrast to the rough ones. State-of-the-art synchrotron techniques reveal differences in interfacial charge transfer and induced magnetic moments in the Ni atoms, and allow us to reproduce the magnetic profile of each LMO layer. The role of orbital occupation will also be explored.

[1] Gibert et al., Nat. Mater .11, 195 (2012).

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