Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Unexpected high conductivity at emerging twin boundaries in LSMO thin films BENJAMIN MARTINEZ, LUIS GARZON, LUIS PENA, REGINA GALCERAN, ZORICA KONSTANTINOVIC, ALBERTO POMAR, BERNAT BOZZO, FELIP SANDIUMENGE, LLUIS BALCELLS, CARMEN OCAL, ICMAB-CSIC. Campus de Bellaterra, Bellaterra 08193. SPAIN, NANOSTRUCTURED MAGNETIC MATERIALS COLLABORATION, SCANNING FORCE MICROSCOPY COLLABORATION — Transport properties of high quality $La_{2/3}Sr_{2/3}MnO_3$ (LSMO) thin films are studied by using Conducting Scanning Force Microscopy (C-SFM) measurements. Current images were acquired in a non-invasive manner by using the contact operation mode at the lowest possible applied load needed. LSMO thin film surface consists of one unit cell steps separating atomically flat terraces, with a low surface roughness on the terraces reproducing the STO substrate morphology. The existence of twin boundaries within the film is evidenced by conducting scanning force microscopy data. I(V) characteristics curves obtained at specific surface points indicate an important enhancement of the electronic response at the twin boundaries locations as compared to that measured on the twin surface. The absolute values of the measured current for a given voltage may differ by up to nearly one order of magnitude depending on whether the tip contacts the location where the twin boundary emerges at the surface or it is placed on a region on top of one of the twin crystallites. The origin of this large difference is not clear yet, but preliminary analysis seems to indicate that an increase in the density of states (DOS) at the boundaries might have an important contribution.

Benjamin Martinez
ICMAB-CSIC. Campus de Bellaterra, Bellaterra 08193. SPAIN

Date submitted: 29 Nov 2011 Electronic form version 1.4