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Enhancement of conductivity in ultrathin films of $LaNiO_3$. JENNIFER FOWLIE, MARTA GIBERT, SARA CATALANO, JEAN-MARC TRISCONE, University of Geneva — In order to achieve tailor-made properties in oxide heterostructures it is essential to first fully understand the physics of these materials and their behavior when pushing the 2-D limit. That is the principle goal of this work. $LaNiO_3$ (LNO), a metal in bulk, has previously been found to be insulating in ultrathin form and this behavior was attributed to the onset of weak, and then strong, localization. A key feature of ultrathin films is that a significant portion of the sample is under the influence of the two "boundaries", these are the interfaces with the substrate and with the vacuum respectively. The effects of both of these boundaries have been studied previously by changing substrate material and with the addition of an encapsulating layer. In this work we show that, for LNO grown on $LaAlO_3$ (001) substrates, there is an enhancement of conductivity that occurs on the verge of the ultrathin regime (less than 10 unit cells) and we hypothesize that this stems from a structural distortion imposed at the substrate-film interface.

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