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Electric-Field Control of the Metal-Insulator Transition in Nickelate Thin Films RAOUL SCHERWITZL, PAVLO ZUBKO, University of Geneva, IGNACIO GUTIERREZ-LEZAMA, SHIMPEI ONO, ALBERTO MORPURGO, University of Geneva, GUSTAU CATALAN, CIN2, JEAN-MARC TRISCONE, University of Geneva — The rare-earth perovskite nickelates ($RNiO_3$) are a fascinating family of compounds displaying a sharp temperature-driven metal-insulator (MI) transition with resistance changes of several orders of magnitude. From a fundamental point of view, these materials present an ideal system to study MI transitions since, in contrast to most oxides, a complete evolution from itinerant to localized behavior can be achieved without doping. From a technological point of view, the nickelates are just as exciting, as the large changes and thermal hysteresis in resistance may find uses in various electronic applications, particularly if the MI transition could be tuned using an electric field. We discuss the electric field control of the MI transition in $NdNiO_3$. The electric double layer technique was used in order to obtain very large charge carrier density modulations (exceeding 10^{15} cm^{-2}), enabling us to reversibly tune the transition temperature by more than 50 K and to achieve electro-conductivities as high as 60000% [1].

[1] R. Scherwitzl *et al.*, Adv. Mater., doi: 10.1002/adma.201003241 (2010)

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