

# Highlights

## RESEARCH AREA 3 - Quantum Science and technologies - 2022

### “Charge and Spin Order Dichotomy in NdNiO<sub>2</sub> Driven by the Capping Layer”

G. Krieger<sup>1</sup>, L. Martinelli<sup>2</sup>, S. Zeng<sup>3</sup>, L. E. Chow<sup>3</sup>, K. Kummer<sup>4</sup>, R. Arpaia<sup>5</sup>, M. Moretti Sala<sup>2</sup>, N. B. Brookes<sup>4</sup>, A. Ariando<sup>3</sup>, N. Viart<sup>1</sup>, M. Salluzzo<sup>6</sup>, G. Ghiringhelli<sup>2,7</sup>, D. Preziosi<sup>1</sup>

<sup>1</sup>Université de Strasbourg, CNRS, IPCMS UMR 7504, F-67034 Strasbourg, France

<sup>2</sup>Dipartimento di Fisica, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy

<sup>3</sup>Department of Physics, Faculty of Science, National University of Singapore, 117551 Singapore, Singapore

<sup>4</sup>ESRF, The European Synchrotron, 71 Avenue des Martyrs, F-38043 Grenoble, France

<sup>5</sup>Quantum Device Physics Laboratory, Department of Microtechnology and Nanoscience, Chalmers University of Technology, SE-41296 Göteborg, Sweden

<sup>6</sup>CNR-SPIN Complesso di Monte S. Angelo, via Cinthia—I-80126 Napoli, Italy

<sup>7</sup>CNR-SPIN, Dipartimento di Fisica, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy

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Superconductivity in infinite-layer nickelates holds exciting analogies with that of cuprates, with similar structures and 3d-electron count. Using resonant inelastic x-ray scattering, we studied electronic and magnetic excitations and charge density correlations in Nd<sub>1-x</sub>Sr<sub>x</sub>NiO<sub>2</sub> thin films with and without an SrTiO<sub>3</sub> capping layer. We observe dispersing magnons only in the capped samples, progressively dampened at higher doping. We detect an elastic resonant scattering peak in the uncapped x=0 compound at wave vector ( $\sim\frac{1}{2},0$ ), remindful of the charge order signal in hole doped cuprates. The peak weakens at x=0.05 and disappears in the superconducting x=0.20 film. The role of the capping on the electronic reconstruction far from the interface remains to be understood.

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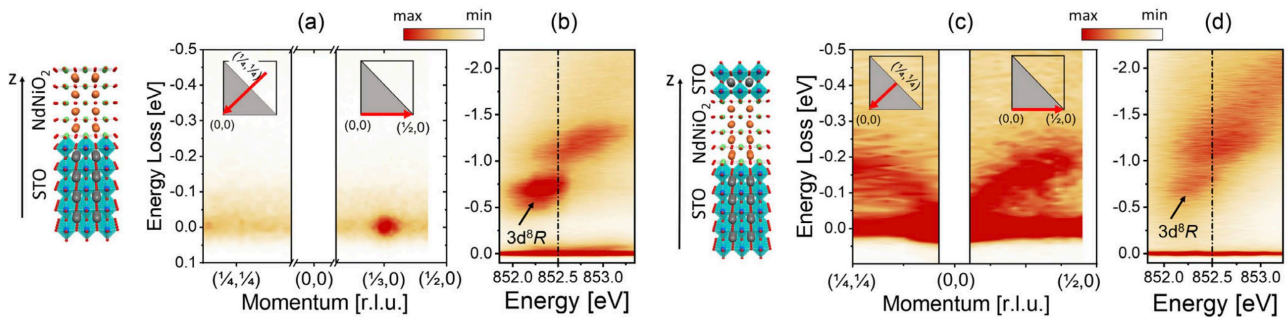


FIG. 1. Summary of the RIXS results for uncapped and STO capped NSNO(0) films. (a),(c) Energy-loss or in-plane-momentum scattering intensity maps along the high symmetry directions indicated in the insets, excited at incident photon energy  $\sim 852.5$  eV (Ni<sup>1+</sup> XAS peak) using  $\pi$  polarization. (b),(d) Energy-loss or excitation-energy maps across the Ni L<sub>3</sub> edge at 10° grazing incidence. Lateral panels show sketches of the structure of both (left) uncapped and (right) capped samples.