

## MS24-P02 | OXYGEN ORDER CORRELATION TO THE INCOMMENSURATELY MODULATED MAGNETIC STRIPES AND THEIR INTERACTION IN 214-TYPE $\text{Pr}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$

Maity, Avishek (IPC, University of Goettingen, Goettingen, GER); Dutta, Rajesh (IFK, RWTH Aachen University, Aachen, GER); Masicano, Anna (ICGM, University of Montpellier, Montpellier, FRA); Ceretti, Monica (ICGM, University of Montpellier, Montpellier, FRA); Bossak, Alexie (The European Synchrotron-ESRF, Grenoble, FRA); Paulus, Werner (ICGM, University of Montpellier, Montpellier, FRA)

Magnetic stripes in 214-type nickelates  $\text{La}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$  have been investigated intensively in last two decades as several theoretical and experimental studies suggest strong spin fluctuation in between the stripes give rise to the unconventional superconductivity in the isostructural high- $T_c$  cuprates. Though no superconductivity has been found in  $\text{La}_{2-x}\text{Sr}_x\text{NiO}_{4+\delta}$ , much of the attention has been given to the understanding of exotic quantum phenomena at low temperature of magnetically ordered  $\text{Ni}^{2+}$  ions for different hole concentrations mostly obtained by Sr-doping [1]. What still remains poorly investigated is the electronically equivalent O-doped compounds where the interstitial oxygen ( $\text{O}_{\text{int}}$ ) gets ordered in a very long range even at RT. To study the effect of  $\text{O}_{\text{int}}$  ordering we have chosen  $\text{Pr}_2\text{NiO}_{4+\delta}$  to be the perfect model system as it accommodates very large amount of  $\text{O}_{\text{int}}$  ( $0 < \delta < 0.25$ ) [2] compared to the others. From several synchrotron and neutron scattering measurements on a series of O-doped and O/Sr co-doped compounds, our study suggests that the RT-oxygen ordering plays a critical role to influence the discommensuration [3] of the magnetic stripes leading to a mix checker board and stripe ordering occurring at low temperature. Depending on the oxygen order modulation for different O-doping concentration we find the underlying spin-microstructure gets modified and hence their exchange interaction.

[1] Freeman et. al. PRB 71, 174412 (2009).

[2] Ceretti et. al. Inorg. Chem., 57, 4657–4666 (2018).

[3] Kajimoto et. al. Phys. Rev. B 67, 014511 (2003).