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## Structural and electronic correlation in hole-doped $\text{Pr}_{2-x}\text{Sr}_x\text{NiO}_{4+d}$

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Co-doped  $\text{Pr}_{2-x}\text{Sr}_x\text{NiO}_{4+d}$  is one of the exotic family members belonging to the nicketes for many different reasons. Like h-Tc cuprates and cobaltates superconductors, this family of nicketes also shows very complicated incommensurability (epsilon) of charge and spin ordering which can be explained via dis-commensuration/mixing of stripe and checkerboard ordered phases. In addition to that, the high oxygen mobility, which has been explained in this compound via phonon assisted diffusion mechanism, give rise to intriguing complexity as the interstitial oxygen gets ordered on a very long range scale giving O-supercell volume of approximately  $(70.000 \text{ Angstrom}^3)$ . A series of compounds including pure sr-doped  $\text{Pr}_{1.5}\text{Sr}_{0.5}\text{NiO}_4$ , co-doped  $\text{Pr}_{1.875}\text{Sr}_{0.125}\text{NiO}_{4+d}$  and oxygen doped  $\text{Pr}_2\text{NiO}_{4.25}$  have been investigated by synchrotron and neutron scattering. The preliminary findings show in all cases different incommensurability though the nominal hole concentration ( $n_h=x+2d$ ) is expected to be the same. The oxygen containing samples show in-plane incommensurate modulation with vector  $\sim q(0.521, 0.805, 0)$  with satellites detected upto 4th order. We will discuss  $\text{Pr}_{2-x}\text{Sr}_x\text{NiO}_{4+d}$  a perfect model system to show the effect of oxygen ordering on the charge and spin correlations and their related excitations.

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