

**Experiment title:**Resonant soft x-ray scattering on stripes in
 $\text{La}_{2-x}\text{Sr}_x\text{NiO}_4$ **Experiment****number:**

HE-1430

Beamline:

ID8

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Shifts:

18

Local contact(s):

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*ESRF***Report:**

The aim of the experiment was to do spectroscopically-resolved x-ray scattering on the superstructure observed by neutron and conventional x-ray scattering in Sr-doped La_2NiO_4 and assigned to charge-order. Resonant scattering at the Ni $L_{2,3}$ and La $M_{4,5}$ resonances should provide detailed information about the character of the observed superstructure.

For the experiment a single crystal of $\text{La}_{1.8}\text{Sr}_{0.2}\text{NiO}_4$ was grown, oriented and polished in the lab in Cologne. Unfortunately no superstructure peak could be observed during the experiment. We repeated the experiment a few weeks later with the same sample at BESSY and found successfully the superstructure peak for temperatures below 120 K. Apparently the sample temperature during our experiment at the ESRF was higher than that. In Grenoble we could not verify the sample temperature, because a temperature sensor was lacking. It was told to us that the sample temperature should be between 100 and 110 K from an earlier calibration measurement. The mechanism that locks the sample holder in the sample stage, however, did not work properly, resulting in the sample holder just sitting loosely in the stage with poor thermal contact. In addition to that, depending on the sample angle, the copper braids that couple the sample stage to the cryostat touched the diffractometer or, worse, one of the motors of the sample stage creating a serious heat leak. It is therefore very likely that the sample temperature was much higher than expected and too high for our experiment.

During our experiment we could localize a few more problems with the diffractometer that should be improved. The beam-line team is informed about the details.

