



	<b>Experiment title:</b> <i>On the coexistence of charge density wave and superconductivity in 2H-NbSe<sub>2</sub>: a coherent diffraction study</i>	<b>Experiment number:</b> He3390
<b>Beamline :</b> ID01	<b>Date of experiment:</b> from: 10/2/11 to: 16/2/11	<b>Date of report:</b> 2/9/11
<b>Shifts:</b> 16	<b>Local contact(s):</b> V. Jacques	<i>Received at ESRF:</i>
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## Report:

The goal of this experiment was to measure speckle patterns at the 2kF charge density wave in 2H-NbSe<sub>2</sub> through the superconducting transition ( $T_c=7.2K$ ).

This experiment has completely failed because mainly of two reasons.

### 1. The mechanical stability of He gas flow cryostat

To increase the intensity (the 2kF satellite in 2H-NbSe<sub>2</sub> is weak), we have used the old silicon monochromator instead of the channel cut at 8KeV. For the same purpose, we have worked in the vertical plane, in reflection geometry. For this, the He-flow cryostat was lying horizontally in the old diffractometer ("Microcontrol"). A specific cryostat holder was designed and built by the ID01 staff before the experiment. At room temperature, the setup was stable. Unfortunately, we discovered after some time, that at low temperature, the cold finger *located inside the cryostat*, and not visible from outside, was slightly moving for every move of the diffractometer. A nightmare...

We have finally tried to fixe the cold finger by a ceramic piece. This was not ideal but was good enough to find Bragg peaks and a satellite, at the end of the week end.

In addition, the thermocouples did not respond any more (the lecture of the temperature was crucial for this experiment). We had to change two times the thermocouple located at the end of the cold finger (without any help during the week end, it took us some times to find thermocouples at another beamline).

### 2. the non reproducibile mouve of the z stage of the old diffractometer

Once we got the satellite, we try to reach the best place on the sample to optimise the intensity. Unfortunately, we quickly realized that the z stage of the Huber tower could not go up anymore and remains blocked at a given position.

Since then, after discussions with the id01 staff, the next seting will be the following:

We will work with the cryostat vertical, in the horizontal plane. A new cryostat holder has been designed. The use of the new diffractometer will allow us to precisely move the sample in front of the beam (in a reproducible way).