ESRF	**Experiment title:** Study of the influence of the coherence of the beam on the contrast of X-Ray topographs	**Experiment number:** HS-101
Beamline:	**Date of experiment:** from: 26/11/1996 to: 29/11/1996	**Date of report:** 26/02/1997
Shifts:	**Local contact(s):** J. Baruchel	*Received at ESRF:* - 4 MAR. 1997

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Report:

The ESRF facility presents many new features and the contrast of defects in white beam and plane wave topography may look quite different from the one observed at other facilities. This has been theoretically studied by C. Carvalho & Y. Epelboin Acta cryst. **A46, 449-459 (1990).**

This may be observed by changing the crystal to film distance or rotating the crystal 90" around the reciprocal lattice vector: according to Aristov, Polovinka, Afnas'ev & Kohn, Acta Cryst., A36, 1002-1013 (1980) the shape of the fringes, which characterizes the contrast of the defects should change.

The experiments have been made using SiC and quartz crystals. All crystals contain dislocations and other defects which have been previously studied and are well identified. Images were recorded in a Laue setting, either using the full white beam or the plane wave monochromator of the ID19 setting. Up to three topographs were recorded at the same time with crystal to film distance varying from 0.25 m up

to 3 m.

No significant change in the contrast was observed which proves that the contrast is not sensitive to the coherence of the beam and that experiments recorded at ESRF may be interpreted as any other experiment recorded at other synchrotron facilities.

The high collimation of the beam and the use of shorter wavelength creates images of very high quality. The resolution remains good in the images recorded at 3 m and it is satisfactory for most experiments. It shows that large experimental settings may be installed without damaging the quality of the topographs.

New contrasts, not yet explained, have been observed near growth band sectors boundaries in quartz. The use of a shorter wavelength and the high resolution of ID19 setup are probably at the origin of the observed fringes. Other experiments will be needed to understand the origin and the meaning of these features before we will be able to suggest a deformation model.

Some of the studied quartz crystals are piezo-electric devices. Since the machine was running in single mode bunch during a part of our timeshift, we have taken this opportunity to test the feasibility of stroboscopic topography using the equipment previously developed at LURE. Since no synchronization signal was available at ID19, we have used the beam itself as synchronization which is not too satisfactory since the synchronization signal is detected at the same time when the recording of the topograph is started. Anyway the topographs are of good quality and it has been possible to stabilize the phase to study various deformation levels. The resolution is very good. In some cases we have observed interaction fringes between the acoustic waves and the defects which have not been previously observed. Complementary experiments will be needed.