ESRF	**Experiment title:** X-RAY CHARACTERIZATION OF SILICON SINGLE CRYSTALS WITH BURIED AMORPHOUS LAYERS	**Experiment number:** HC 228
Beaudine: D5	**Date of experiment:** from: 28 March 1996 to: 29 March 1996	**Date of report:** 2 April 1996
Shifts: 3	**LocaI contact(s):** J. Härtwig and S. Milita	*Received at ESRF:* 3 MAR. 1997

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Report:

Silicon single crystals were implanted with oxygen ions at very high doses from 10^{17} to 1018 cm-2 and 200 keV energy and were subsequently annealed in furnace at 1300 °C for several hours. In this way the formation of a buried SiO_2 amorphous layer and a sufficiently perfect Si cap layer are expected to form in each sample.

Two other sets of silicon samples were implanted with Si^+ and As+ ions at energies of the order of 1 MeV and doses sufficient to produce buried amorphous layers. No annealing was made after these implants to avoid regrowth of the amorphous silicon.

All samples were observed by Laue-case white beam X-ray topography at D5 beamline (the ID19 beamline was not still available at the time of the experiments). The samples were mounted on the goniometer stage present at the beamline and the full size of some square cm2 of the beam was exploited. After alignment of the samples by a TV camera in order to excite properly the maximum number of reflections, KODAK high resolution films were placed behind the samples at a distance of about 20 cm. Both settings of the samples with

their backsides towards source and films were used. In order to reduce properly the high intensity of the beam and hence not to use too short exposure times, a chopper device devised by Baruchel's Group was used. These experiments were preliminary to the ones planned for rocking curve detection on high resolution X-ray diffractometers with laboratory source.

In spite of the efforts made to see in all samples interference effects induced by wave field interaction in the crystalline layers cladding the amorphous regions and/or moire fringes given by the crystalline layers themselves, the experiments did not show such effects. The possible reasons for the lack of these information are due to the fact that the interplanar spacings of the crystalline layers external to the amorphous regions are sufficiently different from one another as a consequence of the residual implantation induced defects. This hypothesis will be checked by rocking curve and diffuse scattering analysis taken by home diffractometers. In the case where they were confirmed, post annealing conditions for oxygen implantation and implant conditions for Si and As ions will be changed.