11.1–24 UNUSUAL DISLOCATION CONTRAST ON THE X-RAY TRANSMISSION TOPOGRAPHS OF ELASTICALLY BENT THIN CRYSTALS. By Lehel Zsoldos, Res. Inst. for Technical Physics, Hungarian Acad. Sci., Budapest, POB 76, H-1325, Hungary.

Dislocation images on asymmetric traverse topographs of elastically bent crystals show a very pronounced dynamic contrast, which is more or less different from the usual one, depending on the degree of curvature of the reflecting lattice planes. The characteristic feature of these topographs is the presence of the contrast of the long-range strain field and the almost completely white /low intensity/ image of some of the dislocations. It looks like as if they had no direct image at all, but section topographs have proved the existence of a weak direct image.

Similar observations were reported earlier by Meieran and Blech /J.Appl. Phys. /1972/ 43, 265/. They assumed, however, that this contrast reversal is due to the increased background intensity, which approaches the kinematical limit as the curvature of the reflecting lattice planes increases.

Systematic studies were carried out with the 531 reflexions of MoKα radiation on silicon crystals, which were bent by a thin epitaxial layer of high resistivity silicon. The radii of curvature of the samples were between 30 and 80 m.

It was found that the white contrast is neither an absorption effect /Borrmann-effect/, nor the simple result of the increased background intensity, because

- on topographs obtained by using the same set of lattice planes, the contrast of any dislocation may be either white or dark, depending on the diffraction conditions;
- the effect is present also for $\mu t \approx 0.4$, but similar diffraction contrast will not be observed even for $\mu t = 1.4$, if the crystal is not bent.

It is an another characteristic feature that the contrast is not necessarily reversed by reversing the diffraction vector, but is usually does if only the tangential component of the diffraction vector is reversed. It should also be noted that even a very slight asymmetry may be enough to produce some noticable effect, if the lattice curvature is strong enough. This is observable e.g. on nominally symmetrical topographs of crystals, misoriented by few degrees only.

In the paper to be presented, the empirical rules describing the dislocation contrast for bent crystals will be summarized. and a qualitative interpretation of the results will be given on the basis of the dynamical wave propagation in bent crystals.

11.1–25 A HIGH SPEED X-RAY TOPOGRAPHY CAMERA FOR USE WITH SYNCHROTRON RADIATION AT THE PHOTON FACTORY. By S. Suzuki, M. Ando, H. Kawata, K. Hayakawa, O. Nittono, H. Hashizume, S. Kishino, J. Chikawa and K. Kohra. National Laboratory for High Energy Physics, Oho-machi, Tsukuba-gun, Ibaraki-ken, 305, Japan

A goniometer for X-ray topography has been constructed at the Photon Factory of KEK by the members of "High Speed X-Ray Topography" working group. It was designed for 'in situ' observation of the two different Laue spots by two X-ray TV cameras using SR from a vertical wiggler. Various motions of the goniometer are remotely controlled with an aid of a microcomputer. Commissioning and test experiments were performed through 1982 to 1983 with radiation from a normal bending magnet. Electron energy in the storage ring is 2.5 GeV and the maximum current is 150 mA. Further it's been recently tested with the vertical wiggler beam of 4.5 T and about 150 mA. It works quite satisfactorily. Our apparatus consists of (a) goniometer, (b) real time topography camera, (c) collimator and shutter, (d) radiation shielding hutch, (e) monochromator and (f) computer control system. The Laue topography experiments have been performed under a various sample conditions. Indexing of the diffraction spots can be easily done by comparing the observed Laue pattern with a computer generated one. The wavelength range with an appreciable intensity for topography is 0.3 - 3.5 Angstrom and can be down to 0.1 Angstrom for a normal magnet and a wiggler, respectively. The intensity at the energy of Mo-Kα from the normal magnet is about ten times as intense as that from the most powerful rotating anode X-ray generator.

11.1–26 X-RAY TOPOGRAPHY WITH SYNCHROTRON RADIATION AT THE PHOTON FACTORY. BY M. Ando, S. Suzuki, H. Kawata, T. Ogawa, T. Nakajima and K. Kohra. National Laboratory for High Energy Physics, Oho-machi, Tsukuba-gun, Ibaraki-ken, 305, Japan

X-ray topography experiments have been done using "A High Speed X-Ray Topography Camera" installed at the Photon Factory. The storage ring is operated at the electron energy of 2.5 GeV and the current of 150 mA whose lifetime is longer than 600 min. The XRT goniometer has so far been mostly located at the normal X-ray beam line, while SR from the vertical wiggler is shortly provided during its commissioning at 4.5 T.

1) Normal beam Real time observations have been done for various specimens such as synthetic quartz, web Si, Fe-3% Si, matals and alloys in the wide range of temperature, liq He-2000°C, and wavelength, 0.3-3.5 Angstrom. Setting of the specimen can be quickly performed by looking at the Laue pattern on TV monitor.

2) Wiggler beam Hard X-rays down to 0.1 Angstrom have been detected. The wiggler beam energy covers all possible K edges. This enables us to use any K absorption edge of any kind of specimens. In situ observation of the phase transition of $Gd_2(MoO_4)_3$ crystal is performed near the K edge of Gd (0.25 Å). Further the K absorption edge of Gd of the gadolinium oxy-surfide fluorescent screen was tried to use for higher detection efficiency. Remarkable increase of the video signal was observed at its energy.

All experiments have been done using white radiation up to now. The monochromatic topography experiments are under way.