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del of the layer structure is feasible. For nearly periodic systems the procedure is simple enough to be performed automatically.
This is demonstrated for several Bragg reflectors on 001 oriented GaAs substrates. Satellites up to more than the 20th order are well fitted by the automatic procedure.

PS-13.02.22 THE BRAGG-CASE DIFFRACTION PATTERNS OF ION-IMPLANTED LAYERS.

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4-5 MeV α-particles implanted layer in silicon were studied using double-crystal method. In actual case most of the implanted ions is expected to be concentrated in a thin layer situated at the depth of several microns under the surface. The rocking curves of the layers exhibited distinct subsidiary maxima and the topographs contained systems of fringes.

In order to explain the results we discussed theoretical diffraction patterns obtained both with plane-wave approximation and by numerical integration of Takagi equations. In the last case we took into account the continuous distribution of the ions and related strains. In both cases we studied the influence of different phase shift introduced by the destroyed layer.

On the base of theoretical models we proved that the fringe systems observed in the topographs are due to the variation of the thickness of the destroyed layer, while the formation of the subsidiary maxima in the curves is connected with the thickness of the shot-through layer. The destroyed layer introduce additional phase factor multiplying the whole system of subsidiary maxima with reciprocal phases on the two sides of the rocking curve.

The important feature of the experimental rocking curves consisting in the location of the most maxima on low angle side and the increase of their period with lower angles was obtained assuming the strain gradient in the shot-through layer. It may be expected that the strain gradient causes the curvature of the trajectories and subsequent diminishing of the subsidiary maxima period. This effect should be stronger close to the main peak.

PS-13.02.23 STROBOSCOPIC OPTICAL IMAGING OF SURFACE ACOUSTIC WAVES.

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Surface acoustic waves (SAW) were already investigated by X-ray stroboscopic topography using synchrotron radiation from the storage ring. The dominating origin of the contrast observed in stroboscopic SAW topography is the focusing of reflected X-rays by traveling acoustic wave troughs and defocusing by wave crest, thus forming the orientation contrast . The contrast was studied by ray tracing calculations with approximating the Bragg reflection by a simple mirror reflection from a corrugated surface (Cerva & Graeff, phys. stst. sol. (a) **82**, 35 (1984)). However, this model is not restricted to X-ray reflection, but holds for visible light as well. The visible part of synchrotron radiation from DORIS was used to illuminate a $LiNbO_3$ crystal surface. Surface acoustic waves were excited at 35.4 MHz with 10 V applied to an interdigital transducer deposited on the crystal surface. With the Rayleight wavelength $\Lambda = 100\ \mu m$ and wave amplitude $a_t = 0.9$ nm, the focal distance was $D_F \sim 10$ cm. The image was observed by two ways; either using the lunette and then putting the real image created behind the eyepiece into the microscope to take the picture or directly applying a simple microscope above the sample with the possibility to shift it up and down, to coincide the focal point of the corrugated surface of the sample and the focal point of the objective of the microscope. The pictures were taken using the lunette-microscope combination. In principle, the simplest and the most elegant way to take the picture would be to put the camera without any optical system directly on the path of the reflected beam at the focal plane of waved crystal surface. Using the microscope adjusted above the sample it was possible to observe two real images created at the distances 10 and 20 cm corresponding to the D_F and $2D_F$ and one virtual image at the distance of D_F below the surface.

PS-13.02.24 SYNCHROTRON X-RAY TOPOGRAPHY STUDIES OF TWINNING IN NdP_5O_{14} SINGLE CRYSTALS.

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An investigation of twin structures of NdP_5O_{14} (NPP) single crystals in monoclinic phase has been undertaken using white-beam synchrotron X-ray topography. The so called a-type domain walls along a-axis related to the (001) twin plane are clearly present in the topographs. The angular shifts that arise from the twins are directly measured using different diffraction topographs taken with different diffraction vectors. From the shifts in the topographs, the twin and matrix regions in the NPP crystal can be easily distinguished. With the measurements of shifts in different topographs, the monoclinic distortion angle δ (δ=β-90°) is calculated which is in good agreement with the unit cell parameters. On the other hand, from the parameters and the twinning configurations of NPP, we have simulated the Laue patterns which are well consistent with the experimental results. With these results, the twin structure in NPP is discussed. The changes of angular shifts with a small shear force applied along the [001] direction are revealed and discussed.

PS-13.02.25 SYNCHROTRON RADIATION TOPOGRAPHY STUDIES OF PLANAR DEFECTS IN POTASSIUM NIOBATE TANTALATE.

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The Fe-doped flux-grown $KTa_{1-x}Nb_xO_3$(KTN) with composition on the margin of the cubic phase zone has been studied by white-beam synchrotron X-ray topography. It is shown that growth bands in flux-grown KTN are primary planar defects which lie along the [010] growth direction. A set of [100] oriented planar defects in contrast is revealed by tuning the synchrotron radiation, and the contrast reversal of the planar defects is displayed in antiparallel reflections. The intense anomaly in contrast is interpreted in terms of anomalous scattering associated with antiparallel domains. The origins of the dominant formation of the 180°C domains are discussed.

