11.X.1 CHARACTERIZATION OF DEFECTS IN X-RAY TOPOGRAPHY USING SIMULATION METHODS. By J.Gronkowski, Institute of Experimental Physics, University of Warsaw, Poland.

The range of materials which can be studied by X-ray diffraction topography has increased significantly within the past few years due to progress in the quality of single crystals. On the other hand, the rapid development of computer hardware and software has reduced to a reasonable value the computing time needed to make a simulation of a topograph (Epelboin and Soyer, Acta Cryst., 1985, A41, 67-72). Thus, it would be possible now to intensify the use of the simulation techniques for the defect characterization. In the present paper possible new application fields of these techniques will be reviewed. Limitations of the method (partly inherent in the X-ray topography itself) will also be discussed (see Epelboin, Mat. Sci. Eng., 1985, 73, 1-43 for an excellent review). The advantages and drawbacks of making simulations in various topographic setups (plane wave and spherical wave, transmission and reflection case, stationary and traverse) will be compared. The future developments of the simulation techniques, especially in conjunction with the progress in synchrotron research will also be highlighted.

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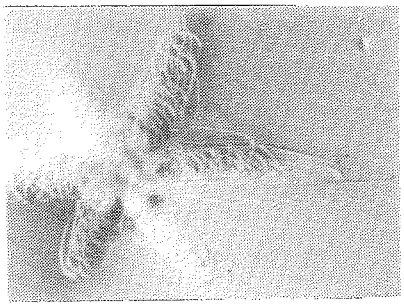

Fig. 1

Dislocation Loops around an Indent on a B type {111} Surface

11.X-2 CHARACTERISATION BY X-RAY TOPOGRAPHY OF PLASTIC DEFORMATION AROUND INDENTS ON INDIUM ANTIMONIDE by M.R. Surowiec* and B.K. Tanner, Department of Physics, Durham University, South Road, Durham. DH1 3LE. England.

The dislocation configurations around microindentations on {111} and {001} surfaces of InSb have been studied by X-ray transmission topography. Both Lang topography and white beam synchrotron radiation topography were used. Marked differences are found between the configurations from indents on (001) and (00$\bar{1}$). Three types of loop were identified; (a) elongated loops on inclined {111} planes, with ½<110> Burgers vector and of screw-B(g) and screw-A(g) character in the long and short wings respectively, (b) near surface 60° prismatic dislocation loops, probably resulting from interactions of the former type, and (c) loops inclined to the specimen surface resulting from interactions between inclined loops on two {111} planes. The asymmetry in the configurations is explained by the different velocities of A(g) and B(g) dislocations; M. Surowiec and B.K. Tanner, Phil Mag. (1987) in press.

Configurations on (111) and ($\bar{1}\bar{1}\bar{1}$) also differ markedly. Glide occurs only on B type {111} planes. Extended loops occur around A surface indents, glide taking place on inclined {111} planes with an extended screw segment parallel to the specimen surface. Around B surface indents, glide occurs predominantly in the plane parallel to the surface (Fig. 1). Direct evidence for the formation of Lomer - Cottrell locks is found and the presence of many quarter loop segments provide evidence to support Alexander's (1979) model of dislocation association.

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11.X-3 INTRODUCTION: THE SIGNIFICANCE OF THE EWALD'S DYNAMICAL THEORY OF DIFFRACTION. By N. Kato, Department of Physics, Faculty of Science and Technology, Meijo University, Nagoya, Japan.

Professor Paul P. Ewald was not only a great scientist but also a great teacher and organizer in our scientific community. Although this microsymposium is to be devoted to his scientific achievements, one can not withstand citing his Editorial Preface to Acta Cryst. (1948, 1, 1-2), which is indeed a historical document of IUCr. It shows clearly his foresightedness to crystallography and other sciences.

His greatness, however, is the synonym of our difficulty in organizing this symposium. What can be presented here would be merely an aspect of "elephant" figured out by a blind. It is hoped, therefore, for participants to build up the true image through other addresses and mutual conversations during the Congress.

The Ewald's theory: He started his scientific carrier in 1910 under A. Sommerfeld. His reminiscence is recorded in his article "The Origin of the Dynamical Theory of X-ray Diffraction (J. Phys. Soc. Jpn., 1962 Suppl. B-II, 17, 48-52)". He wrote up his dissertation by 1912, the year when M. von Laue et al. published the Nobel Prize work. Soonafter, his life work "Zur Begründung der Kristalloptik" appeared in following articles. The cores, however, can be found in the dissertation.

Teil I: Theorie der Dispersion. Ann. Physik. 1916, 49, 1-38. Teil II: Theorie der Reflexion und Brechnung. ibid. 1916, 49, 117-143. Teil III: Röntgenstrahlen. ibid. 1917, 54, 519-