The aim of this paper is to calculate the integrated reflectivity of a skew-symmetric triple-Laue interferometer under variable geometry conditions and with absorption. In these calculations we follow the path of Bonse & Graeff (1977) expanded by subunit rotations. Further we discuss the design of the interferometer used for the experiment, in which a new developed optical autocollimator (ACT) capable of resolving 0.000 01 sec of arc is calibrated by angular X-ray interferometry.

PS-14.03.05 MODIFIED BRAGG LAW FOR HETEROLAYER STRUCTURES. By W.A. Keller* and D.S. de Vasconcelos, Instituto de Física, Universidade Federal da Bahia, Salvador-Ba, Brazil.

X-ray diffraction patterns for stratified structures including epilayers and superlattice structure are analyzed by an approach which was first developed for the self-consistent EM scattering by a single plane of dipoles, considered as a unit of scattering. The rigorous vectorial waves solution for the σ- and π-states of polarization has previously been found for the scattering unit and extended to a whole crystal, represented by a stack of such units. The guiding principle was the simple demand, of continuity of EM field vectors between all the units. As a result, a modified Bragg law for a perfect big crystal was obtained. We now join the known solutions for homogeneous crystal structures to resolve the scattering problem for stratified structures, for which individual components can have origin in different crystal structures as, for instance, Ge and GaAs. Again, we use the same guiding principle of continuity of EM field vectors between all the components. By this approach it is possible to obtain diffraction profiles for selected structures, that previously could only be handled by some hybrid kinematic-dynamic types of approach (S. Bensoussan, C. Malgrange and M. Sauvage-Simkin, 1987, J. Appl. Cryst. **20**, 222 and A. Authier, J. Gronkowski and C. Malgrange, 1987, Acta. Cryst. **A45**, 432).

The infinite multi-superlattice structures show the diffraction profiles with features such as a sequence of tophat curves for each satellite reflection (Fig.1a). The respective total reflection regions (TRR) depend, in a critical way, on the charge densities of the component units, their structure factors and the polarization state of the incident radiation. This dependence is of the same type as that observed for the main peak and it is preserved even in cases when TRR is reduced to fractions of the arc second. The angular region of the latter depends, for a given order of reflection, on chemical composition, homogeneous layer thickness, charge density value and inter- and intra-layer distances between scattering units.

The finite multi-superlattice and multi-epilayer structures display diffraction patterns of the kinematic type. A continuous transformation of the diffraction-profiles from kinematic to dynamic type can occur as a result of a simple change of numerical value of two parameters, which depend on structure components, such as the layer thickness and the charge density of the respective component (Fig.1b).

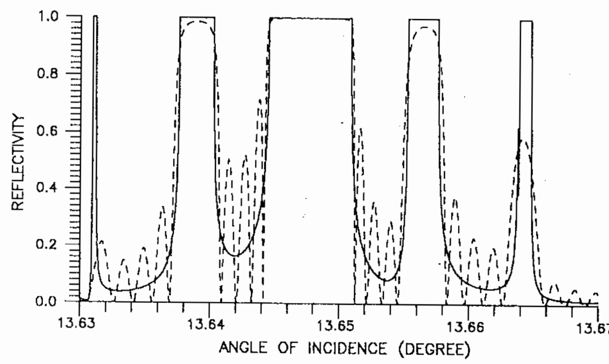

FIG.1: SUPERLATTICE STRUCTURE OF 1024*(111)Ge–700*(111)GaAs
—— 1a INFINITE NUMBER OF UNITS
- - - 1b 4 UNITS

An attempt is made to formulate a modified Bragg law version for satellites for the multilayer superstructures with appropriate indices of refraction intrinsically included into the scatttering model.

PS-14.03.06 AN EXACT AND ANALYTIC GEOMETRY OF BRAGG DIFFRACTION By Hsueh-Hsing Hung, Synchrotron Radiation Research Center, Taiwan

A novel interpretation of Bragg diffraction is reported. We have found a simple way to precisely reformulate the dynamical theory of diffraction so as to derive several important results with their clear geometric meaning on the well-constructed dispersion surface. Poynting vector is proved normal to the dispersion surface, on which a corrected hyperbola is proposed. By contrast with the conventional theories, our results not only propose a picture for the first time to cover the refraction (Fresnel's reflectivity) and diffraction (Darwin's curve) in all the angular range, but can be easily applied to the generic diffraction phenomena in periodic structure. The physics of Bragg diffraction is common in nature, the geometry should be expected simple. It is indeed and will be presented in this talk.

PS-14.03.07 DIRECT OBSERVATION OF DIFFRACTED X-RAY BEAM IN THE FORWARD DIRECTION FROM THIN AND IMPERFECT NATURAL DIAMOND CRYSTALS. By Krishan Lal*, S. Niranjana N. Goswami and Ajit Ram Verma, National Physical Laboratory, New Delhi - 110 012, India.

We have succeeded in direct observation and study of diffracted beams in the forward direction, in the case of thin

