11.8-03 - NEW DEVELOPMENTS IN EXTINCTION CORRECTIONS. CONNECTION WITH PHYSICAL PROPERTIES. By P. Becker (1), F. Dunstetter (1), P. Bastie (2), H. Germehani (3)
1. CNRS, 25 rue du Maroc, 75015 Paris Labor. Cristallographie, co 140 54037 Nancy Cedex
3. Labor. Crist. co 140 54037 Nancy Cedex

I. Decomposing the entrance surface of the crystal into a superposition of point sources, it is possible to calculate exactly the X-ray or neutron integrated power for a rectangular crystal. This allows a comparison with approximate treatments, and modification of those is proposed. It is also possible to compare the results with the model of H. Nato. The case of perfect crystals will also be discussed.

II. Variation of Gamma ray intensities in KDP and RbDP with temperature, around the ferroelectric transition, has shown the possibility of reproducing data assuming a superposition of point sources, it is possible to calculate exactly the X-Ray or neutron integrated power for a rectangular crystal. This allows a comparison with approximate treatments, and modification of those is proposed. It is also possible to compare the results with the model of H. Nato. The case of perfect crystals will also be discussed.

III. In polarized neutron experiments, when the Bragg vector is not perpendicular to magnetization, one has to consider the scattering process where spin is reversed. We propose an exact matrix solution, and an approximate expression for correcting for this effect. Applications will be presented.

11.8-04 THE SATELLITE POSITIONS IN THE BRAGG CASE. By I.R. Entin and K.P. Assur, Institute of Solid State Physics, USSR Academy of Sciences, 142432, Chernogolovka, Moscow district, USSR.

The kinematic expression for an angle between satellites occurring in the vicinity of the diffraction reflexion H when exciting in the crystal an ultrasonic wave with a wave vector \( \mathbf{k} \) is 
\[
\Delta \theta = \frac{\mathbf{K} \cdot \mathbf{b} \cdot \cos \theta_0}{\lambda_0} \cdot \frac{1}{\mathbf{K} \cdot \mathbf{b}} \cdot \frac{1}{\mathbf{K} \cdot \mathbf{b}} \quad \text{or} \quad \frac{1}{\mathbf{K} \cdot \mathbf{b}} \cdot \frac{1}{\mathbf{K} \cdot \mathbf{b}} \quad \text{for each reflection}
\]
where \( \theta_0 \) is the primary extinction angle, \( \lambda_0 \) the wavelength, \( \mathbf{K} \) the wave vector of the incident radiation. In the Bragg case when \( \mathbf{K} \) is sufficiently small the satellites should have occurred within the total reflection region which is obviously devoid of any physical sense. The limitation of the kinematic approach to the problem was remarked by Haspechev et al. (Kristallografiya 24, 430, 1979). Dynamical consideration consists in constructing a dispersion surface for a crystal with superlattice (I.R. Entin, Sov. Phys. JETP 50, 110, 1979). The self-intersections of the dispersion surface correspond to the centres of the satellites. The satellite width is determined by the width of the gap appearing with lifting of the degeneracy (Fig. 1A). At a small sound amplitude we have 
\[
\Delta \theta = \Delta \theta_0 = \left( \frac{v}{V} \right) \left( \frac{v}{V} \right) \left( \frac{v}{V} \right) \quad \text{or} \quad \frac{1}{\mathbf{K} \cdot \mathbf{b}} \cdot \frac{1}{\mathbf{K} \cdot \mathbf{b}} \quad \text{for each reflection}
\]

Deviations from the kinematic formula are connected with the fact that in the vicinity of Bragg reflection the effective refractive index is a function of the angle of incidence. Autlicher double-crystal technique was used in the experiment (Fig. 1b).