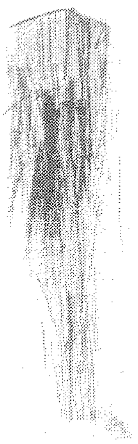
11.1-9 STROBOSCOPIC X-RAY TOPOGRAPHY OF QUARTZ RESONATORS by A.Zarka & B.Capelle, Laboratoire de Minéralogie-Cristallographie, U.A.09 CNRS, Université P.et M.CURIE 4 Place Jussieu, 75252 Paris Cedex 05 France and J.Detaint & J.Schwartzel, Centre National d'Etudes des Télécommunications, PAB/BAG/MCT, Bagneux, 92220, France.

Using the pulsed light of the storage ring of D.C.I.(Orsay, FRANCE) stroboscopic X-ray topography (C.C.Gluer, W.Graeff & H. Moller, Nuclear Instr. and Meth.,1983, 208 . 701-704) has been performed to observe the states of acoustic vibrations in quartz resonators. AT plano-convex resonators have been shaped (thickness of about 1.56mm) so that the third overtone resonance occured at the same frequency at which the stored positrons circulate in the ring (3.169280MHZ).
Two types of setting have been used. The first one corresponds to the Laue setting and the obtained patterns give a general view of the resonator for different reflections. By changing the values of the amplitude and the phase shift (between the input signal on the quartz and the source), the topographic contrasts give information of the local states of the vibration related to the internal defects. The second setting leads to experiments using monochomatic X-rays. The white incident beam is monochromatized by a crystal (a germanium sample adjusted for the 220 reflection) mounted on the first axis of a double crystal spectrometer. The exit beam is then diffracted by the resonator adjusted on the second axis (the 2$\bar{1}$0 reflection was used).
The topographic contrasts of the crystal obtained in the diffracted beam were followed with a TV camera and a Video system. Films were also used.
The different AT resonators have shown that the quality of the resonance is directly related to the density and the distribution of the dislocations. The topograph of the sample (without vibration) shows (Fig.1) a high density of dislocations in the central part. When the crystal is under resonance it can be observed (Fig. 2) that losses are important around these defects. Apart from the thickness modes, flexural coupled modes are also detected. These parasitic vibration modes are frequently observed, depending on the amplitude and the phase of the input signal on the resonator.



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11.1-10 THE INTENSITY DISTRIBUTION OF X-RAY WAVE FIELD ON THE ENTRANCE SURFACE IN THE BRAGG CASE. By Takuyuki S. Uragami, Division of Natural Science,Okayama University of Science, Ridai-cho, Okayama, 700 Japan.

The Pendellösung fringes in the Bragg case were studied by the present author (J.Phys. Soc. Japan 27 (1969) 147). The crystal wave excited by a narrow incident wave in the Bragg case gives a strong diffraction at the incident point. The region of high intensity extends about an extinction distance from the incident point on the entrance surface. A lattice defect around the incident point and within a region less than an extinction distance from the entrance surface may contribute to disturbing the crystal wave of high intensity. An incident wave of MoKα_1 radiation coming through a narrow slit was diffracted with the 220 and 440 reflections in a silicon crystal. The intensity distribution of the crystal wave is recorded on a nuclear emulsion plate. One of the receiving slits for the diffracted wave of high intensity is set by a small micrometer to adjust its position against the diffracted beam. The intensity distribution of X-rays in a deformed crystal was calculated in the Bragg case (J. Phys. Soc. Japan 54 (1985) 2559). Briefly speaking, the superposition of the wave component concerned with Pendellösung fringes in a perfect region and that created at a defect gives rise to interferences as it does in the Laue case. The diffracted wave of high intensity being stopped by the receiving slit, the plate receives the crystal wave from a point inside the crystal different from the point of incidence.