11.1—13   STROBOSCOPIC SECTION TOPOGRAPHY OF
           VIBRATING QUARTZ RESONATORS

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The time structure of the synchrotron radiation source
DORIS has been utilized for stroboscopic topography of
thickness shear waves in quartz. The investigations
concentrated on changes of dislocation contrast and Pen-
dellösung fringes in section patterns.
The results are the following:

1) With increasing vibrational amplitude the Pendellösung
fringe contrast nearly disappears at a certain value and
occurs again at even higher values, but now with a
decreasing fringe distance towards the margins. If the
amplitude is raised further the section pattern is domi-
nated by the higher reflectivity of the strained parts
in the crystal (Fig. 1).

2) Dislocation contrast shows a complicated behaviour.
With increasing vibrational amplitude the direct image
always becomes weaker. The intermediary image is
strongly changing (Fig. 2). In suitable cases the direct
image nearly vanishes and is replaced by a strong con-
trast at a place which can be geometrically related to
the intersection point of the dislocation line with the
boundary of the Borrmann fan in the reflected direction.
Due to this effect the dislocation image in projection
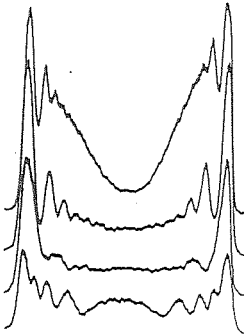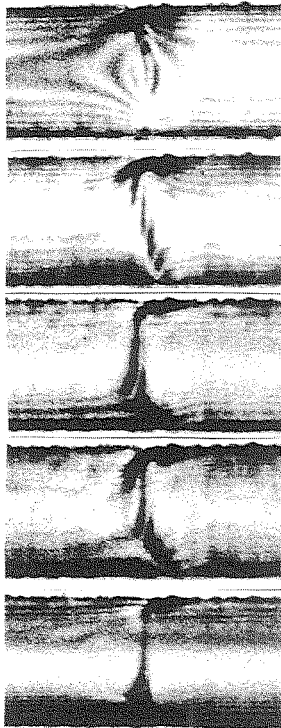topographs is shifted without a real motion of the dis-
location line.

Fig. 1: Change of Pendel-
lösung fringes with in-
creasing vibrational
amplitude.

Fig. 2: Section pattern
with dislocation image.
Acoustic wave amplitude
increases from top to
bottom.

11.1—14   IMAGE CONTRAST OF SURFACE ACOUSTIC WAVES IN

SR-TOPOGRAPHY , By H.Cerva[+] and W.Graeff, Hamburger
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By using the time structure of the synchrotron radia-
tion source DORIS we have investigated travelling acou-
stic waves on the surface of $LiNbO_3$ with white beam
topography. By synchronizing the wave excitation with
the source frequency "time frozen" wave images are ob-
tained.

The contrast formation in the Bragg case can be divi-
ded into two parts. One contribution is the surface re-
flected beam which shows intensity modulation due to the
periodic curvature of the reflecting net planes. Troughs
of the surface wave focus the reflected beam and crests
defocus. The focal distance depends on Bragg angle, wave
amplitude and the angle between the acoustic wave vector
and the plane of incidence.

The second contribution to the image is coming from
wavefields which first enter the crystal and are devia-
ted back to the entrance surface by the strain fields
of the SAW. Closely above the surface two peaks per
acoustic wave period are detected which have different
intensities due to the anomalously high or low absorp-
tion which has taken place during the wavefield devia-
tion inside the crystal. The peak with the higher in-
tensity is emerging from the troughs, the one with lower
intensity from the crests of the wave. With increasing
distance from the surface the peak with lower intensity
is dispersed whereas the other one is focused resulting
in a pattern which is nearly coinciding with the
surface reflected pattern.

Experimental evidence and theoretical explanation of
the above described image formation will be presented.

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11.1—15   MEMORY EFFECTS OF THE ANTIFERROMAGNETIC
DOMAIN STRUCTURES IN MnF_2. By J.Baruchel and M.El Kadiri,
Laboratoire Louis Néel, CNRS-USMG, and Institut Laue-
Langevin, Grenoble, France.

MnF_2 is antiferromagnetic below $T_N \simeq$ 67K. 180° anti-
ferromagnetic domains are physically distinct because the
magnetic moments of opposite sign, directed along the $\vec{c}$
axis of the rutile-type structure, are respectively loca-
ted at the corners and at the center of the unit cell,
and these two sites, although equivalent, are not related
by a lattice translation. Fig.1 shows the two kinds of
domains on a projection on the (001) plane.
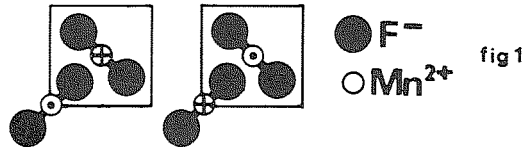
Neutrons can distinguish between both types of do-
mains because their structure factors are different for
a given neutron polarization parallel to $\vec{c}$-axis. The
observation of these domains was performed by polarized
neutron diffraction topography [Baruchel, Schlenker and
Barbara, J.Magn.Magn.Mat. 15-18,1518 (1980)] : indeed
only one domain type is imaged for each polarization
state when using the 210 reflection at $\sim$ 30 K.

The obtained domain structures display several unex-
pected memory effects. Fig. 2 shows topographs performed
at 30 K after cooling from a) room temperature, b) T_N
+ 30 K, c) T_N + 50 K, d) T_N + 90 K. The first three
topographs are very similar but not completely identical:
the flipping ratio R, which indicates the ratio of the
volumes occupied by each kind of domains, is constant,
but the total wall surface S_w is reduced, and the ratio
M we define, within the limits of the resolution of our
experimental technique, as the fraction of the volume
where the domain type switched,is less than 6.10^{-2} for