Preliminary Report on 7mm Tests of Feb. 17, 1995.

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The objective of this test was to measure the focus position in SFC1 as function of elevation. The measurements were done with a series of cross-scans in five positions of SFC1, spaces 9 units. Fig. 1 shows one series of such elevation scans. The intensities of the main and of the side lobes was determined by gaussfit, using lines=3. The resulting focus position determination is illustrated in Fig. 2; it is mainly based on the interpolated intensity maximum of the main beam, in addition the intensities of the northern and southern coma lobes were inspected. In preceeding test measurements (4th Report by the Test Commission # 15) it was seen that the point of equal intensity of both coma lobes was a good measure of the optimum focus position. In this test the values derived from the main beam were more reliable, probably because of sensitivity limitation and by superposition of regular side lobes on the coma lobes.

The result is shown in Fig. 3. Near 50 deg. the nominal and actual values agree; the extrapolation gives a focus offset of -5 at 90 deg. and +5 at 10 deg. elevation. Estimating the HPW in SFC1 to about 42 units, the intensity deterioration due to the focus error should be only a few percent, if the feed is on axis. If it is off axis, as formerly the double beams of the 23 GHz maser, it can explain the significantly changing balance of the two beams.

Fig 4 shows the pointing error, introduced by moving in SFC1. It is most probably caused by the overestimation of the beam deviation factor. If this is confirmed (i.e. no significant pointing error with SFC1 movements at 6cm), then the beam deviation factor should be changed for all RX below 20 GHz, which should all have a similar illumination. Then the pointing models for long and short wavelengths should agree better. For quantitative application we give the average of 18 series of cross-scans:

delta SFC1	-18	-9	0	9	18
NULE (")	-9.30	-4.93	-1.22	2.98	7.11

We noticed in addition the following details:

a.) the average beamwidth at intermediate elevation is about 20.7 arcsec. This is significantly smaller than in former tests, which gave values near 25 arcsec. (Techn. Report # 18); the elevation dependence described there seems to be still present, proably a little reduced.

b.) The elevation dependence of the gain, seen in our data, still falls off to higher elevations. The present tests were not layed out to determine the antenna efficiency.

c.) The side lobes have partially changed (with reference to TB # 18):

Southern side lobes. The minimum moved to about 37 deg., the shape of the elevation dependence proably remained.
Northern side lobes. Unchanged.
Eastern side lobes. Increased about by factor of 3!
Western side lopes. Now weakest side lope; decreased by about a factor of 2.

Better data for gain curve and HPBW in this observing period are obtained and presented by Dr. Ivan Pauliny-Toth.

Version March 13, 1995.

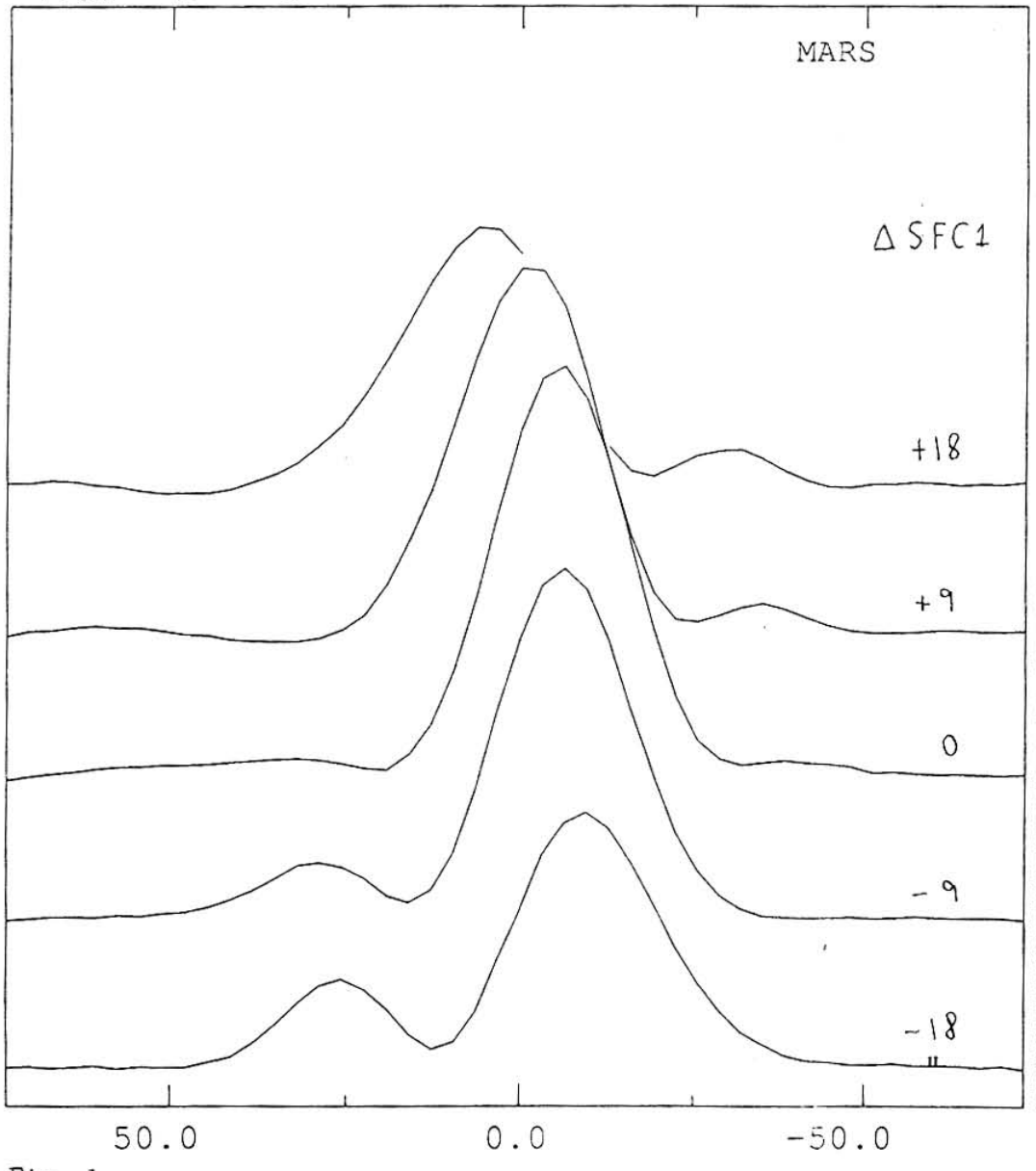
7762 1 1
MARS
Δ SFC1
+18
+9
0
-9
-18
50.0
0.0
-50.0

Fig. 1

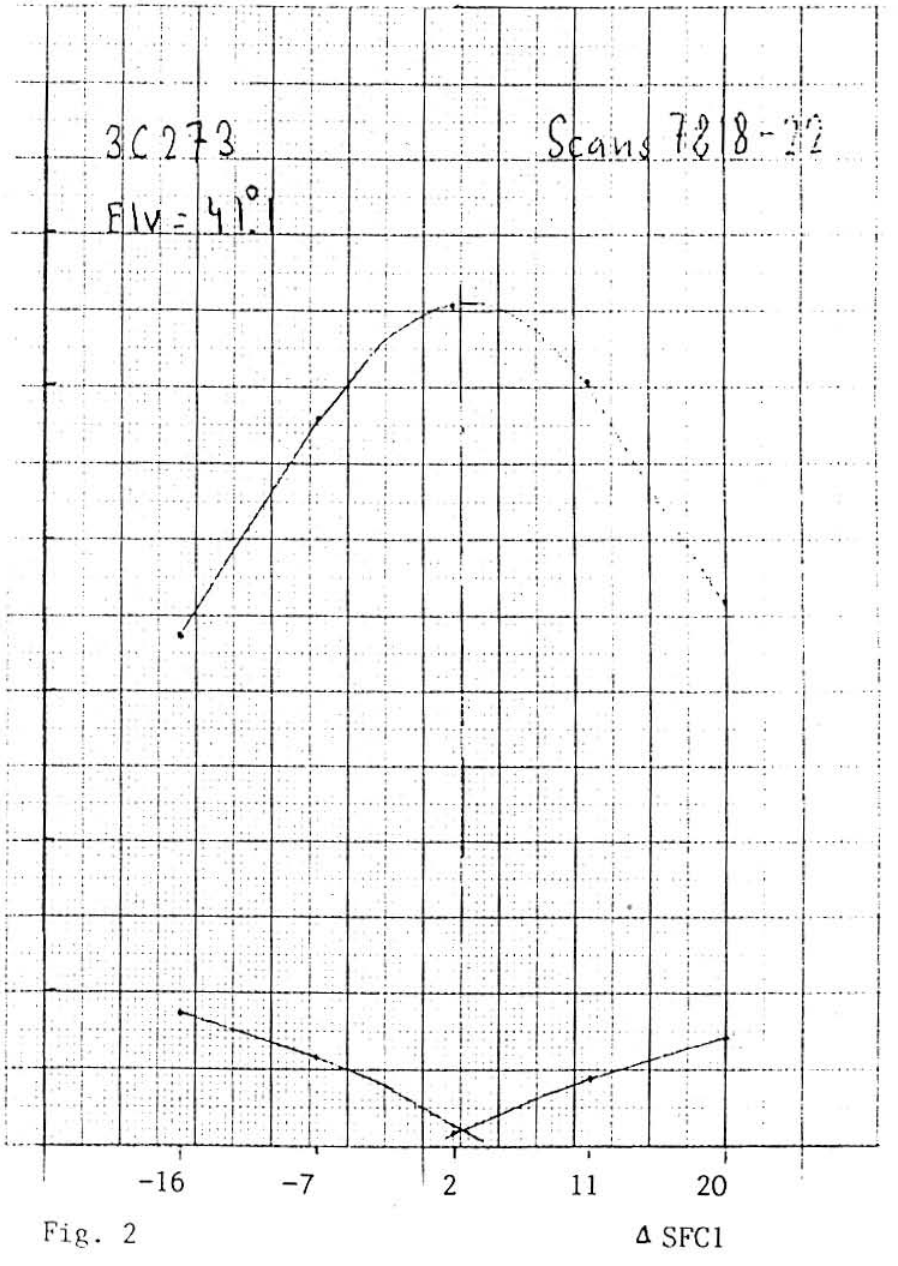
3C273
Scans 7818-22
Elv = 41°1
-16
-7
2
11
20
Δ SFC1

Fig. 2

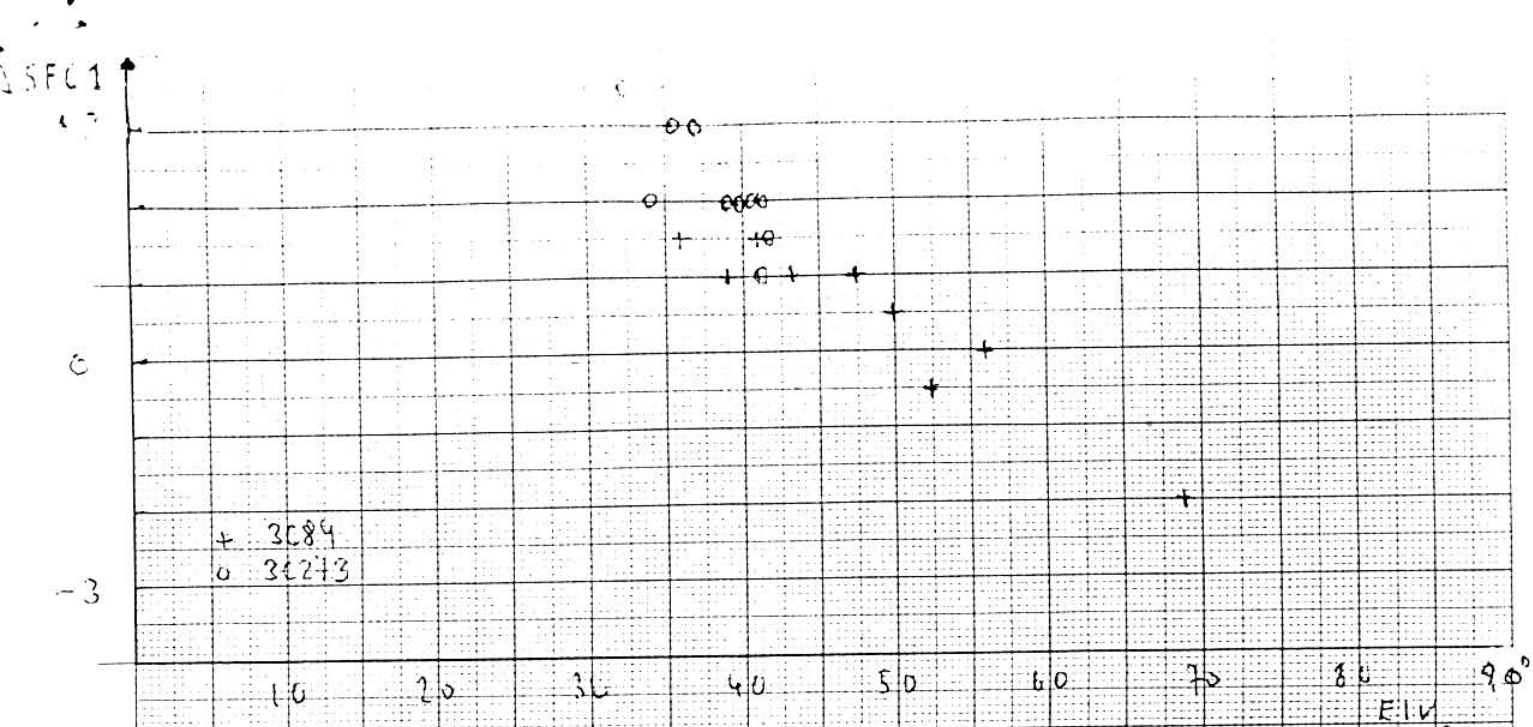
ΔSFC1
0
-3
+ 3C84
o 3C273
10
20
30
40
50
60
70
80
90°
ELV

Fig. 3

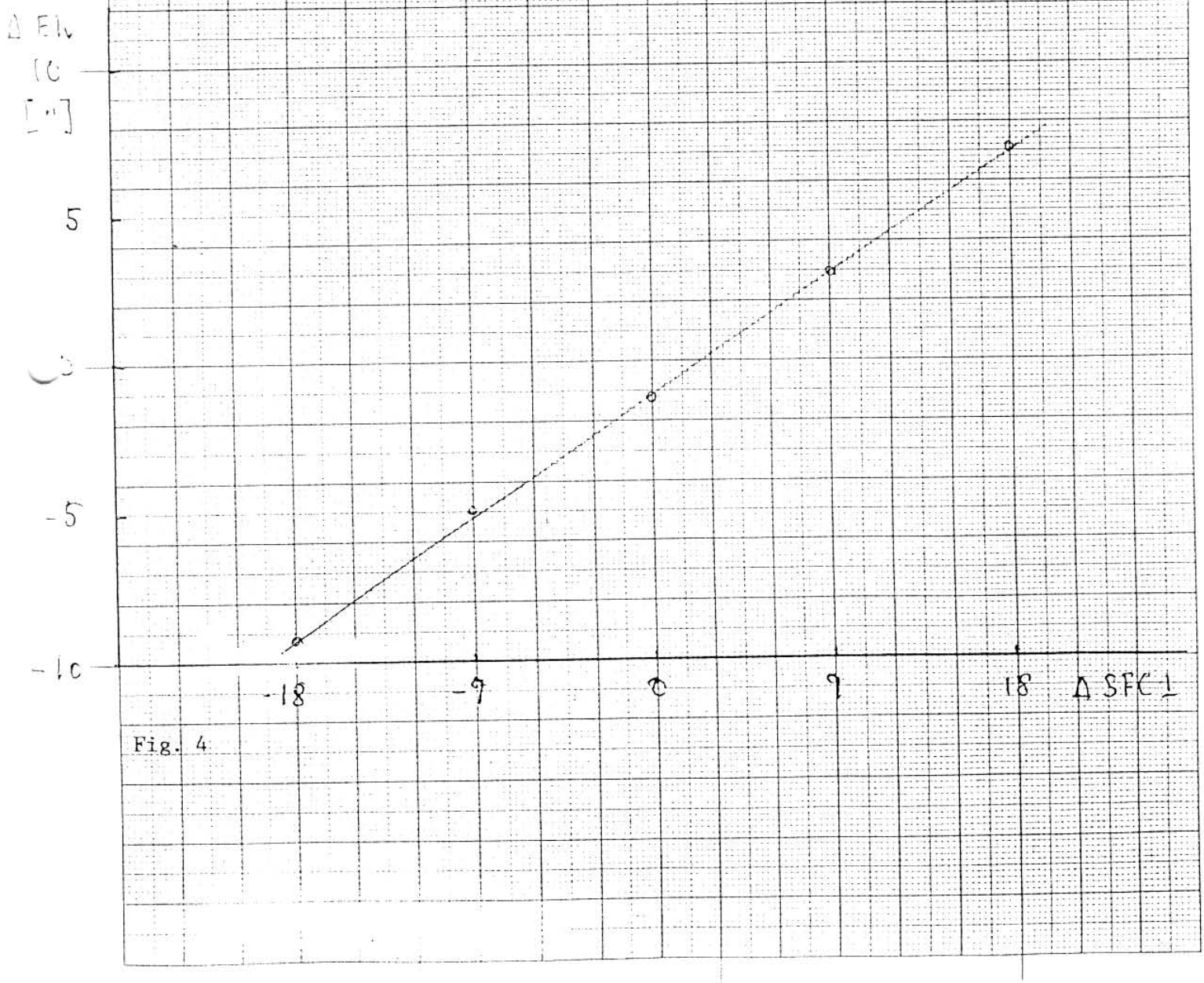
ΔELV
[C
[°]
5
-5
-10
-18
-9
0
9
18
ΔSFC1

Fig. 4