ISR-BOM/KB/JPG/ab

9 January 1978

ISR PERFORMANCE REPORT

Run 888 - 28 October 1977

Rings 1 and 2 - 26 GeV

Orbit distortions due to sextupole fields with the low-beta insertion - part 2

1. Purpose and conclusion

This is the continuation of an earlier investigation[1] on the possibility of reducing the off axis orbit distortions caused by the low-beta insertion by using the rotating sextupoles. New optimal values for both rings were found i.e. SCR 233 = -22 % in ring 1 and SCR 536 = -20 % in ring 2.

2. Experiment

The experiment and the evaluation of the results were done as described in 1).

In both rings, the orbits were measured for different strengths of the rotating sextupole, which was in the best position to correct the existing orbit distortion.

The results are shown in the attached graphs.

The abscissa is in units of $\mu_h/2\ \pi$, the ordinate in $K \left(\frac{\Delta p}{p}\right)^2 / \sqrt{\beta_h}$ $[\mathrm{mm\ m}^{-\frac{1}{2}}]$, where $K \left(\frac{\Delta p}{p}\right)^2$ is the orbit distortion introduced by the sextupoles (cf. 1).

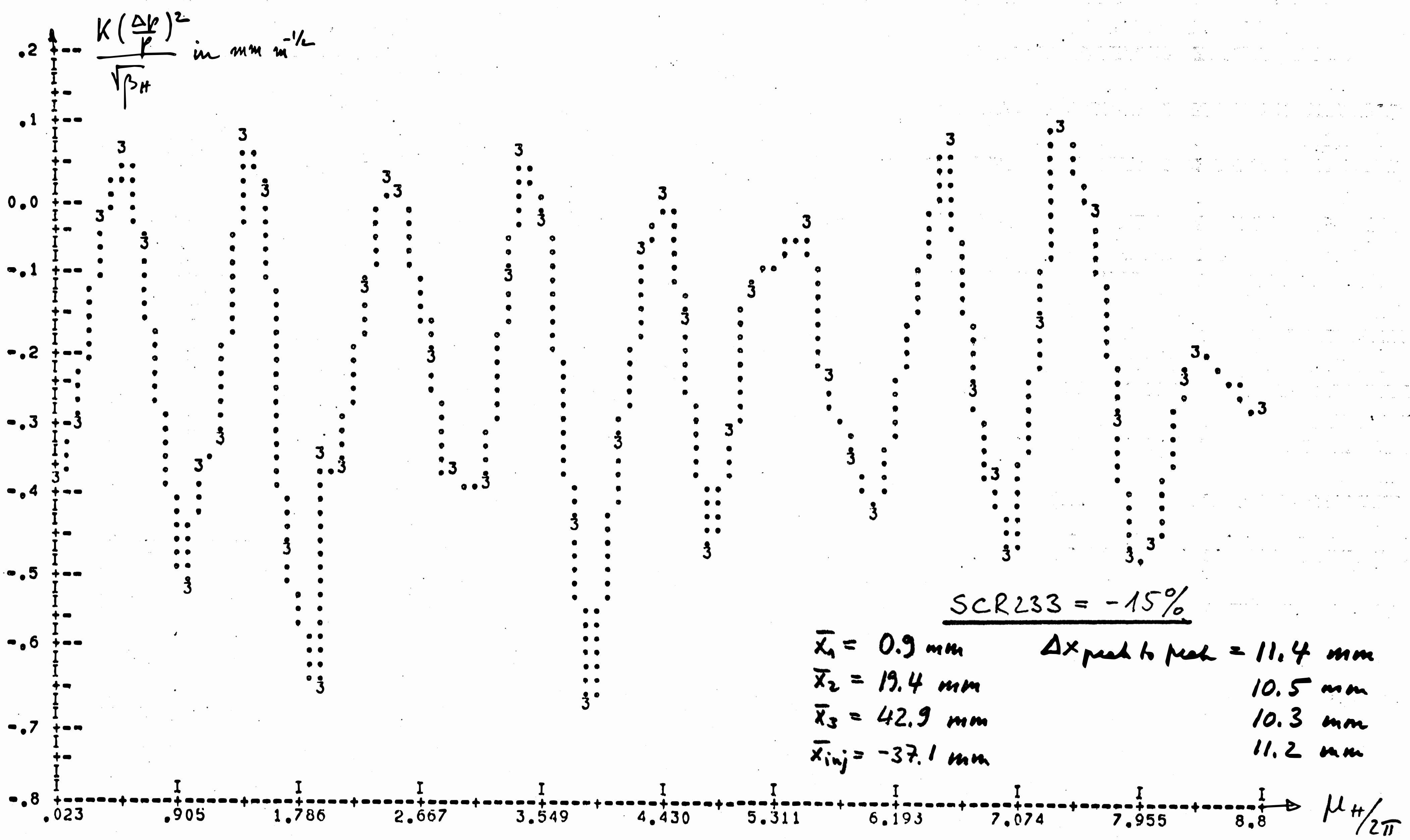
The optimum settings are :

for ring 1	SCR 233 = -22 %
for ring 2	SCR 536 = -20 %

These values were introduced in the low-beta acceleration files which were used in the following run.

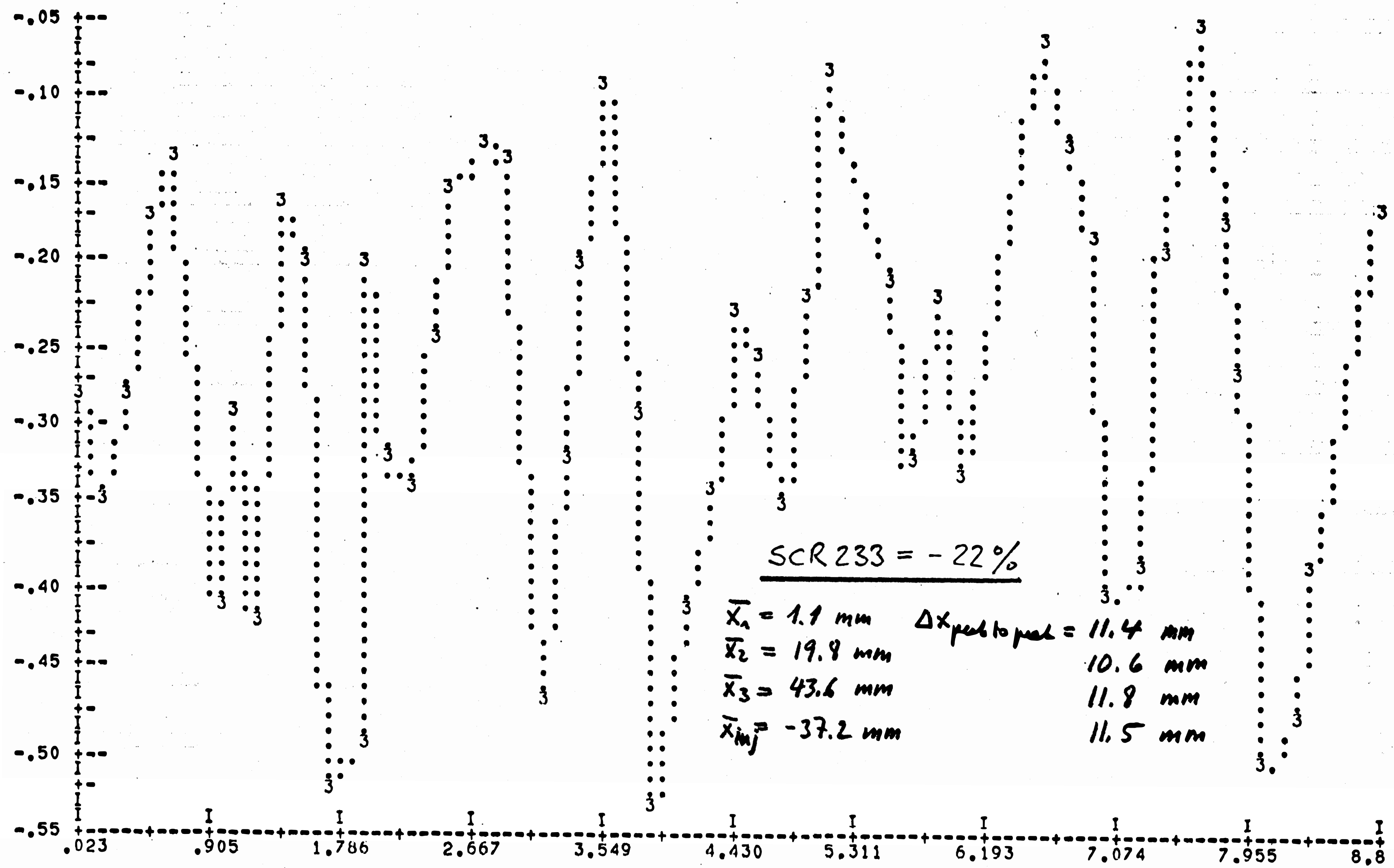
K. Brand
J.P. Gourber

1) ISR Performance Report - Run 873 - 7 October 1977 / ISR-BOM/JPG/rh

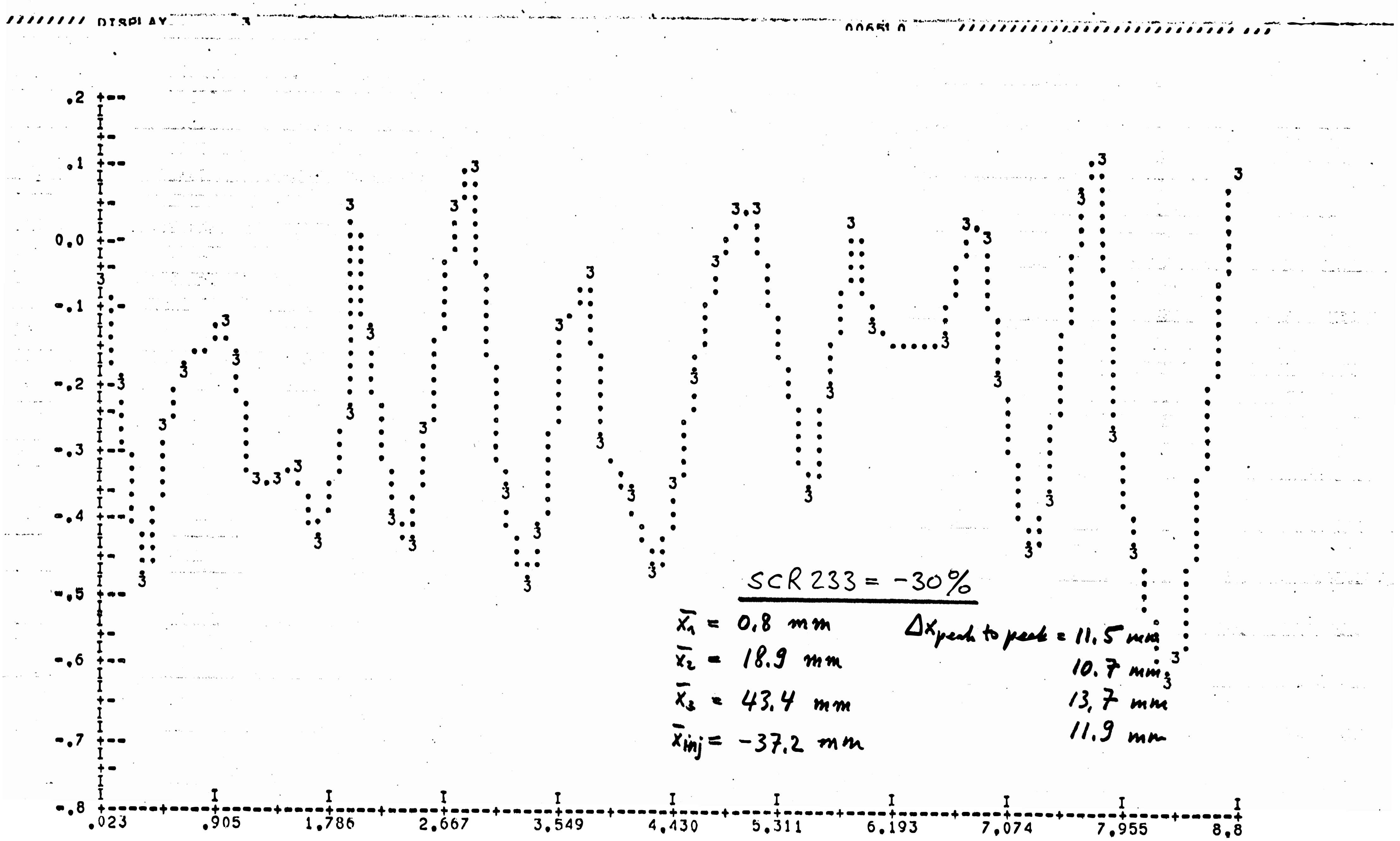


$\frac{K(\frac{\Delta p}{p})^2}{\sqrt{\beta_H}}$ in mm m$^{-1/2}$
.2
.1
0.0
-.1
-.2
-.3
-.4
-.5
-.6
-.7
-.8
.023
.905
1.786
2.667
3.549
4.430
5.311
6.193
7.074
7.955
8.8
$\mu_H / 2\pi$
SCR233 = -15%
$\bar{x}_1$ = 0.9 mm
$\bar{x}_2$ = 19.4 mm
$\bar{x}_3$ = 42.9 mm
$\bar{x}_{inj}$ = -37.1 mm
$\Delta x_{\text{peak to peak}}$ = 11.4 mm
10.5 mm
10.3 mm
11.2 mm

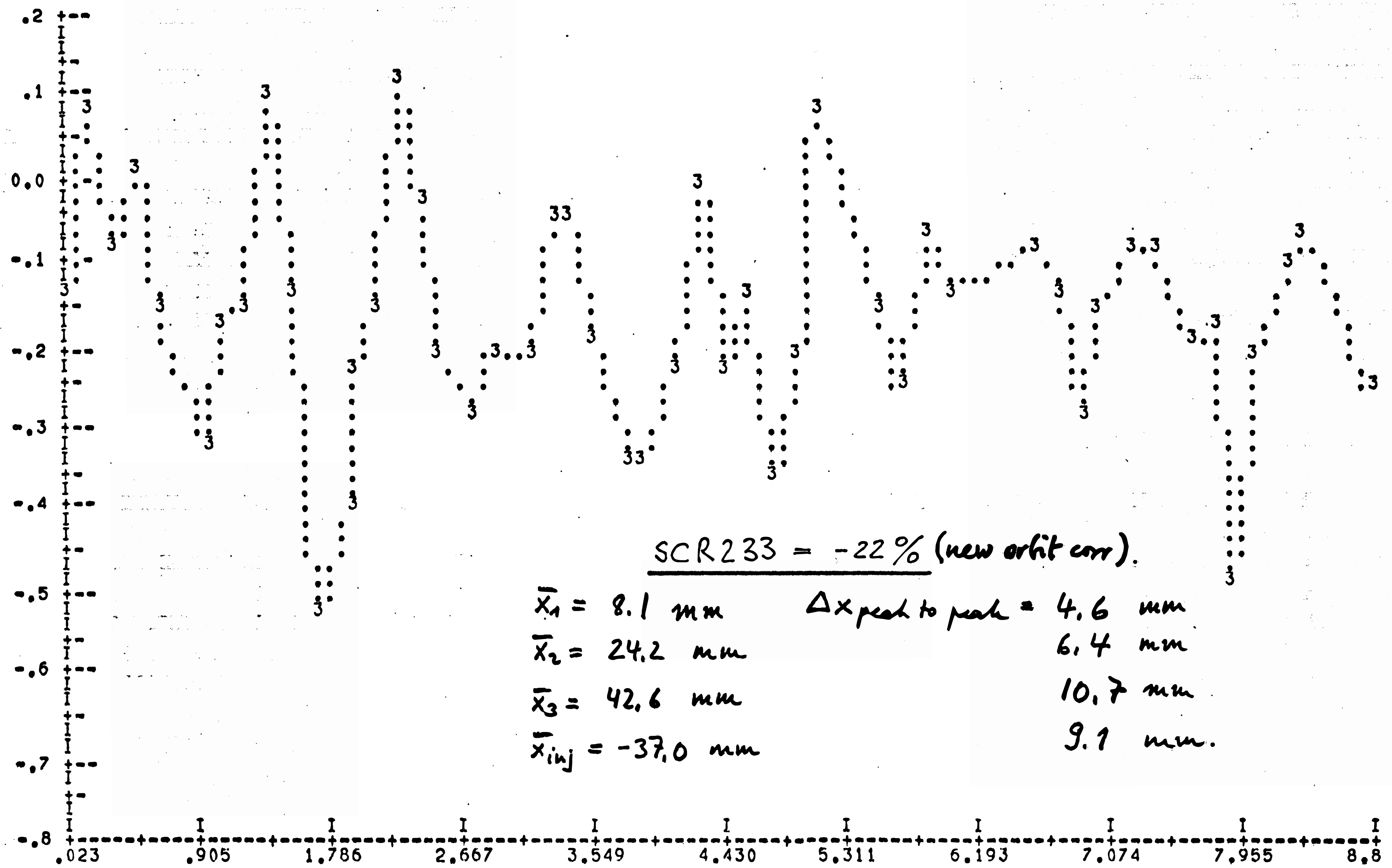
000520


SCR 233 = - 22 %
$\bar{x}_1$ = 1.1 mm
$\bar{x}_2$ = 19.8 mm
$\bar{x}_3$ = 43.6 mm
$\bar{x}_{inj}$ = -37.2 mm
$\Delta x_{peak\ to\ peak}$ = 11.4 mm
10.6 mm
11.8 mm
11.5 mm
-.05
-.10
-.15
-.20
-.25
-.30
-.35
-.40
-.45
-.50
-.55
.023
.905
1.786
2.667
3.549
4.430
5.311
6.193
7.074
7.955
8.8

000520



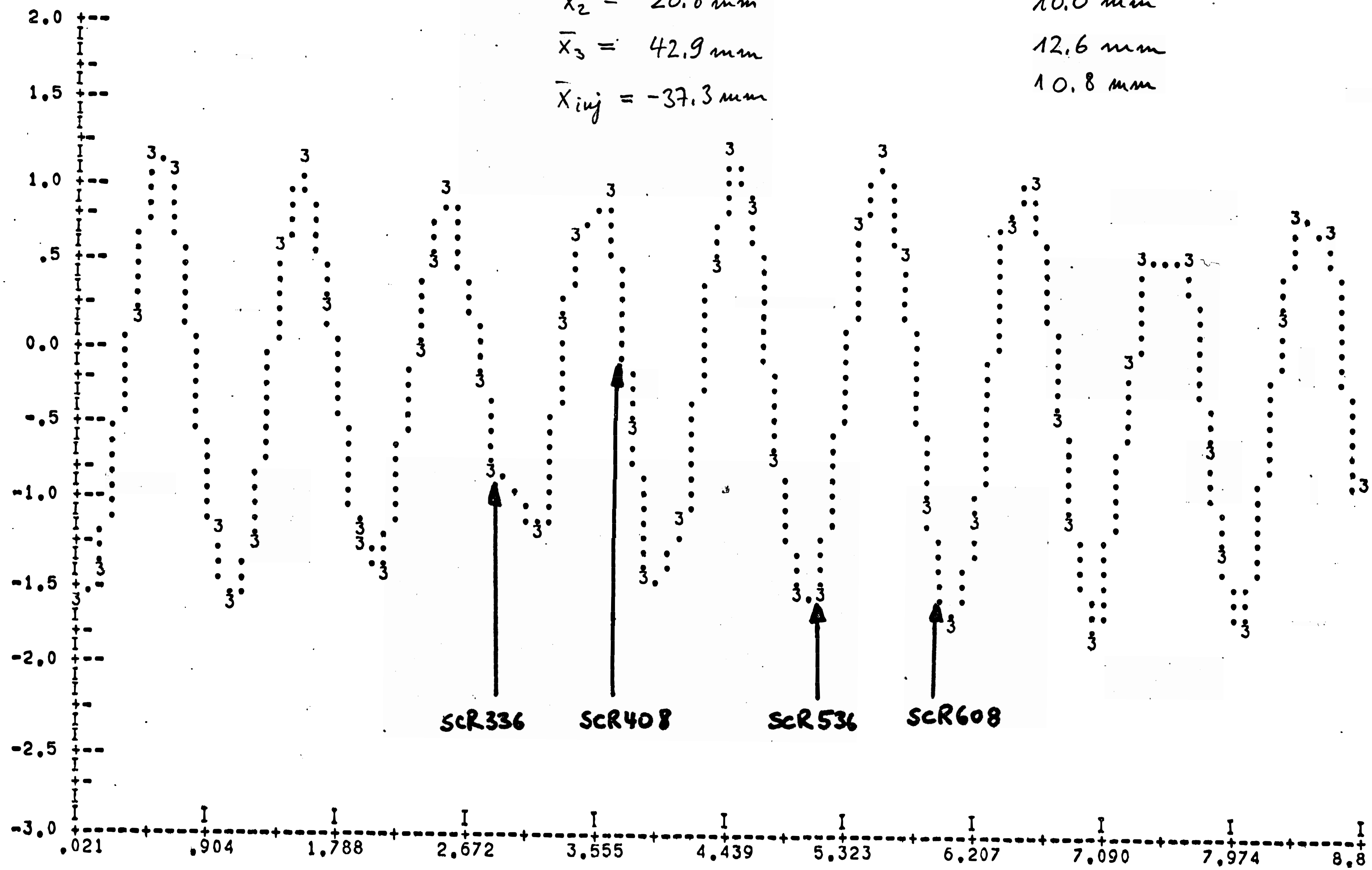
////////// DISPLAY 3
00651.0
.2
.1
0.0
-.1
-.2
-.3
-.4
-.5
-.6
-.7
-.8
.023
.905
1.786
2.667
3.549
4.430
5.311
6.193
7.074
7.955
8.8
SCR 233 = -30%
$\bar{x}_1$ = 0.8 mm
$\bar{x}_2$ = 18.9 mm
$\bar{x}_3$ = 43.4 mm
$\bar{x}_{inj}$ = -37.2 mm
$\Delta x_{peak\ to\ peak}$ = 11.5 mm
10.7 mm
13.7 mm
11.9 mm


.2
.1
0.0
-.1
-.2
-.3
-.4
-.5
-.6
-.7
-.8
.023
.905
1.786
2.667
3.549
4.430
5.311
6.193
7.074
7.955
8.8
SCR233 = -22% (new orbit corr).
$\bar{x}_1$ = 8.1 mm
Δx peak to peak = 4.6 mm
$\bar{x}_2$ = 24.2 mm
6.4 mm
$\bar{x}_3$ = 42.6 mm
10.7 mm
$\bar{x}_{inj}$ = -37.0 mm
9.1 mm.

without SCR

$\bar{X}_1 = 0.1$ mm
$\bar{X}_2 = 20.8$ mm
$\bar{X}_3 = 42.9$ mm
$\bar{X}_{inj} = -37.3$ mm

Δx peak to peak = 9.8 mm
10.0 mm
12.6 mm
10.8 mm



SCR[illegible]36 = -20%

$\bar{X}_1$ = 0.0 m[illegible]

$\bar{X}_2$ = 20.7 mm

$\bar{X}_3$ = 42.8 mm

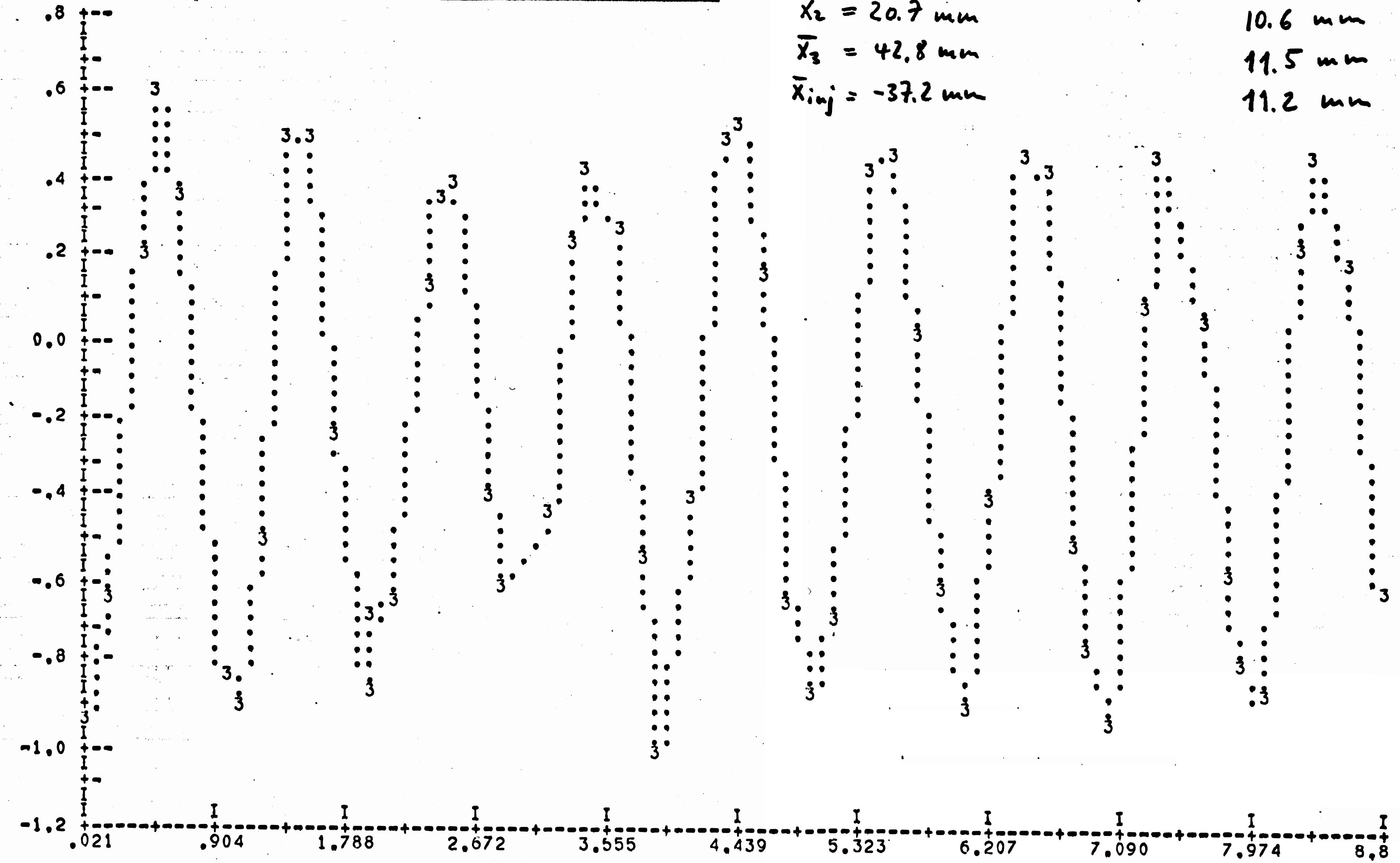
$\bar{X}_{inj}$ = -37.2 mm

$\Delta x_{peak\ to\ peak}$ = 9.7 mm

10.6 mm

11.5 mm

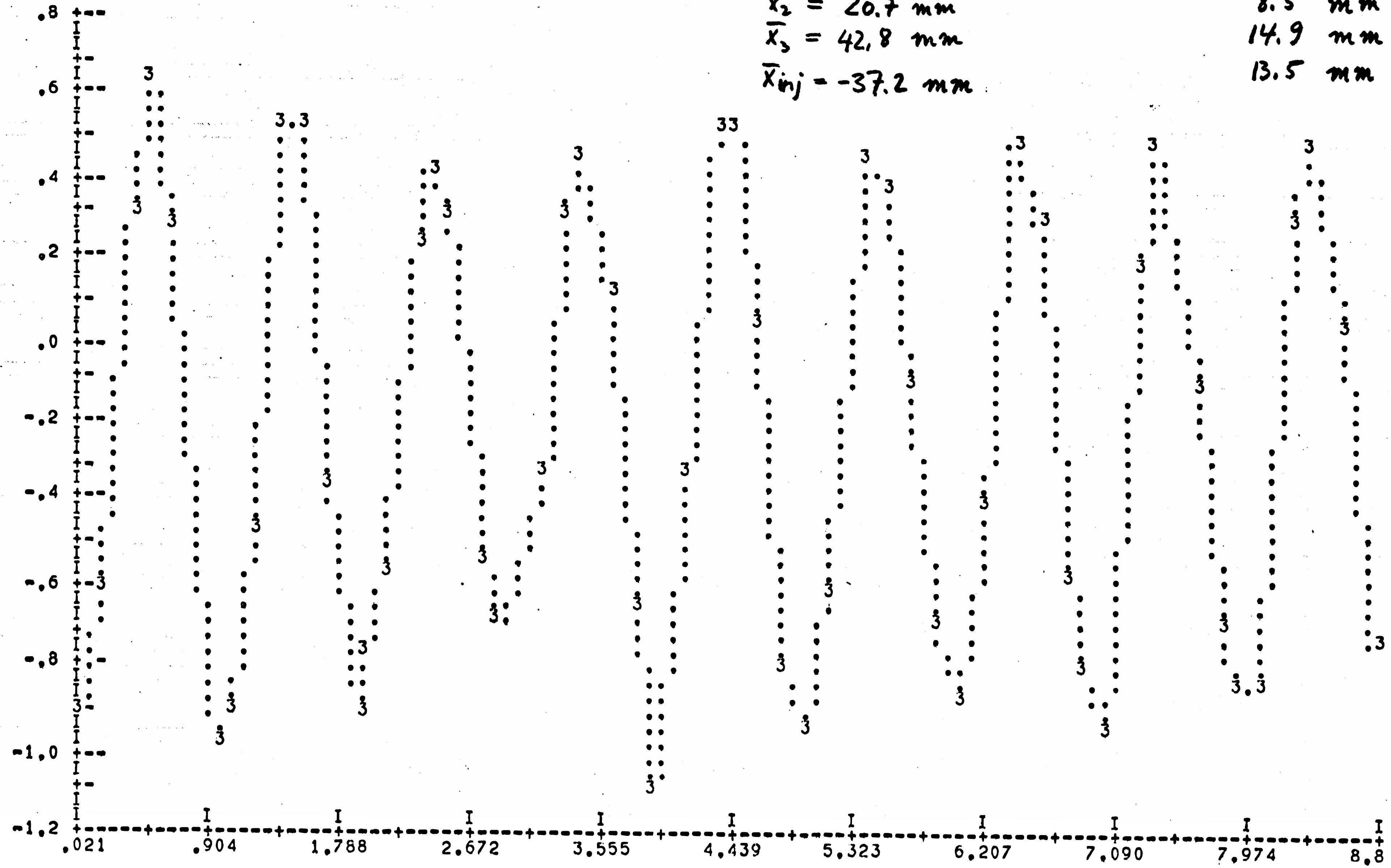
11.2 mm

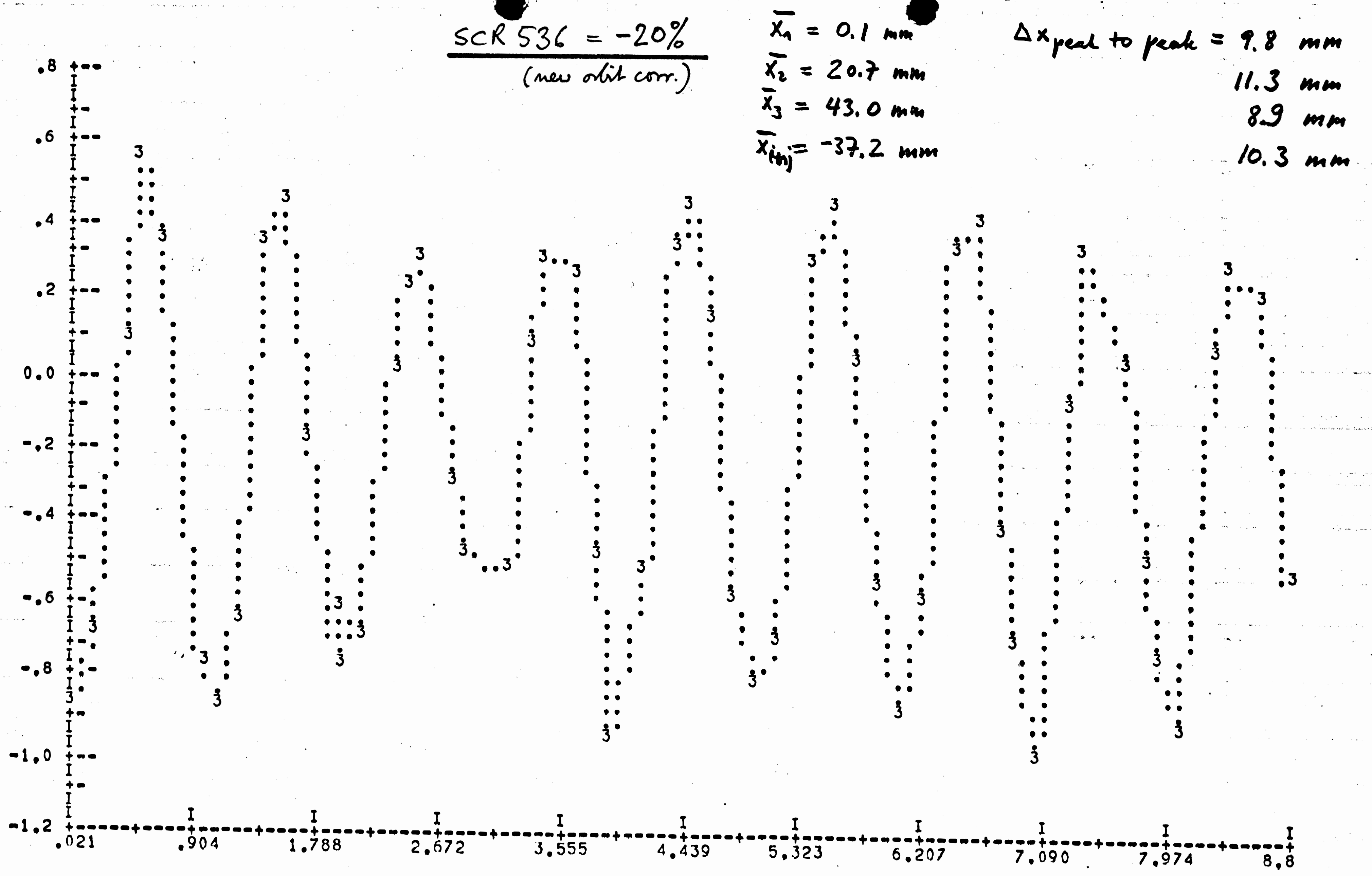


SCR 536 = −40%

$\bar{x}_1 = 0.1$ mm
$\bar{x}_2 = 20.7$ mm
$\bar{x}_3 = 42.8$ mm
$\bar{x}_{inj} = -37.2$ mm

$\Delta x_{peak\ to\ peak}$ 7.6 mm
8.5 mm
14.9 mm
13.5 mm





SCR 536 = -20%
(new orbit corr.)
$\bar{x}_1$ = 0.1 mm
$\bar{x}_2$ = 20.7 mm
$\bar{x}_3$ = 43.0 mm
$\bar{x}_{inj}$ = -37.2 mm
$\Delta x_{peak\ to\ peak}$ = 9.8 mm
11.3 mm
8.9 mm
10.3 mm
.8
.6
.4
.2
0.0
-.2
-.4
-.6
-.8
-1.0
-1.2
.021
.904
1.788
2.672
3.555
4.439
5.323
6.207
7.090
7.974
8.8