ISR RUNNING-INRun 77 - 29 June 1971Ring 2 - 15 GeV/c - 4 bunchesInfluence of skew quadrupoles on resonancesWorking line: FS15

The purpose of the experiment was to observe the influence of the skew quadrupoles on the beam loss due to resonances. Only the normal skew quadrupoles (Q1) were used. Q measurements were not possible outside the measured range $-10\% < I(Q1) < 10\%$.

Q-shift:

The following changes of the Q-meter readings were observed:

I (Q1) %	ΔQ_{inj}		$\Delta Q_{0 \text{ mm}}$		$\Delta Q_{34 \text{ mm}}$	
	H	V	H	V	H	V
-10	0.011	-0.013	0.008	-0.008	0.008	-0.006
- 5	0.006	-0.008	0.005	-0.004	0.003	-0.002
+10	0.008	-0.011	0.008	-0.008	0.006	-0.004
± 2.5	not significant					

The working line was corrected according to this table before each of the beam loss measurements.

Beam loss:

The table below and Figures 1 through 7 show the observed beam loss when scanning the aperture by varying the main magnetic field for different settings of Q1. The scanning speed was 3 mm/sec. Three scans were performed with each pulse. It is seen that the relative losses decrease with the number of times the beam passes through the resonances. Each measurement was repeated and showed a good reproducibility. As it can be seen, there is a clear influence of the excitation of the skew quadrupoles on the losses when crossing the three resonances.

Not only are the coupled resonances excited, but the resonance $5 Q_H = 43$ is damped to such an extent that the total losses seem to pass through a minimum at about $I(Q1) = -5\%$. It might, therefore, be of interest to compare a stack made with this condition to the usual FS15 stack, and to compare beam lifetimes.

It might also be interesting to repeat the exercise crossing a strongly excited coupled resonance, for example: $2 Q_H + 2 Q_V = 35$ near CLEO.

I (Q1) %	loss A %	loss A+B %	observed resonances*	scan No.
-10	11	23	1, 3	5
-10	13	25	1, 3	6
- 5	6	15	1, 2, 3	7
- 5	6	16	1, 2, 3	8
- 2.5	9	27	1, 2	15
- 2.5	11	29	1, 2, (3)	16
0	36	36	1, (3)	1
0	38	38	1, (3)	4
0	39	39	1, (3)	11
0	32	32	1, (3)	12
+ 2.5	29	37	1, 3	13
+ 2.5	27	35	1, 3	14
+ 5	15	23	1, 2, 3	9
+ 5	15	23	1, 2, 3	10
+10	12	15	1, 3	2
+10	12	14	1, 3	3

* Resonance numbers: 1) $5 Q_H = 43$
 2) $4 Q_H + Q_V = 43$
 3) $3 Q_H + 2 Q_V = 43$

K.N. Henrichsen

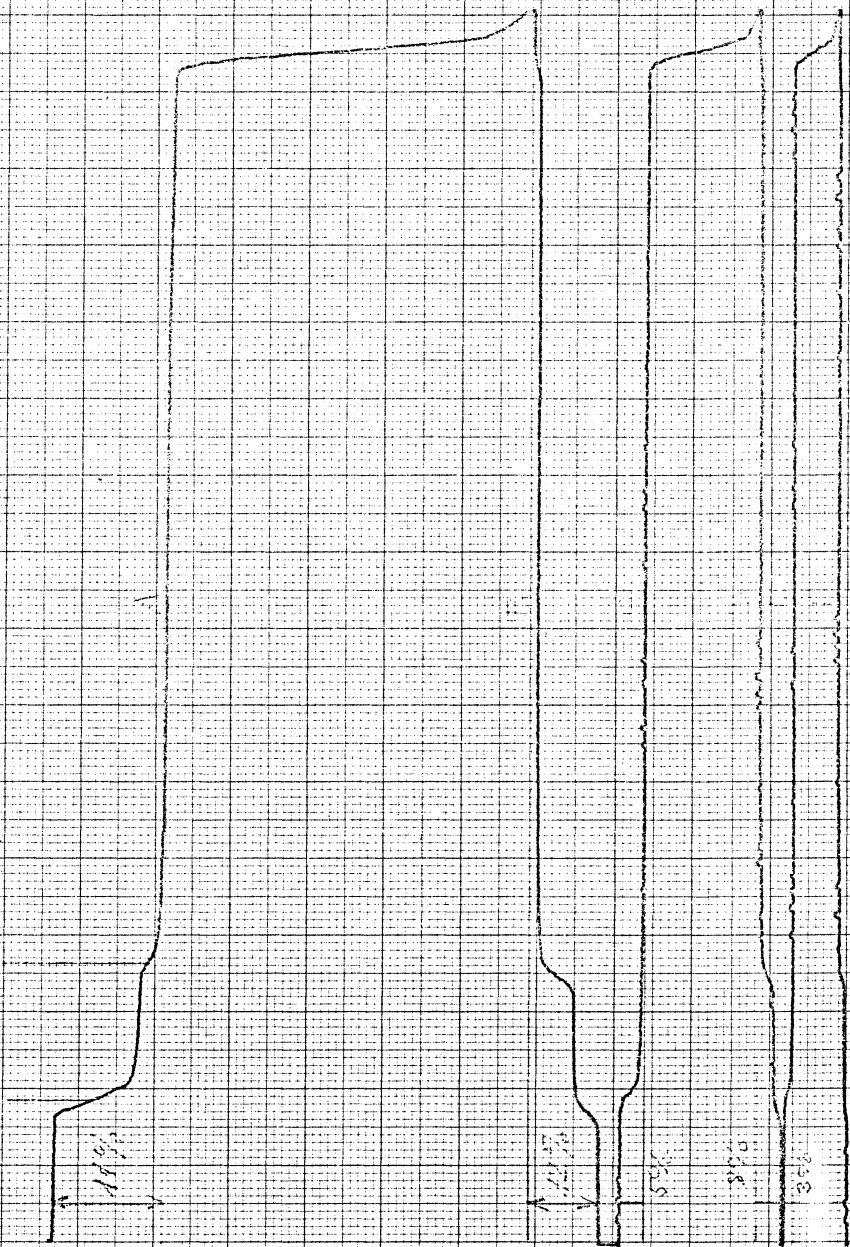
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SCAN 175

50762 337700 5113



F16.1
17(01) 10/20
10/10, R2

SCANN 1A 8



FIG. 2

1000000000
T.S. 153, R2

1
45

0

-33

SCREW 1/16

F16.34

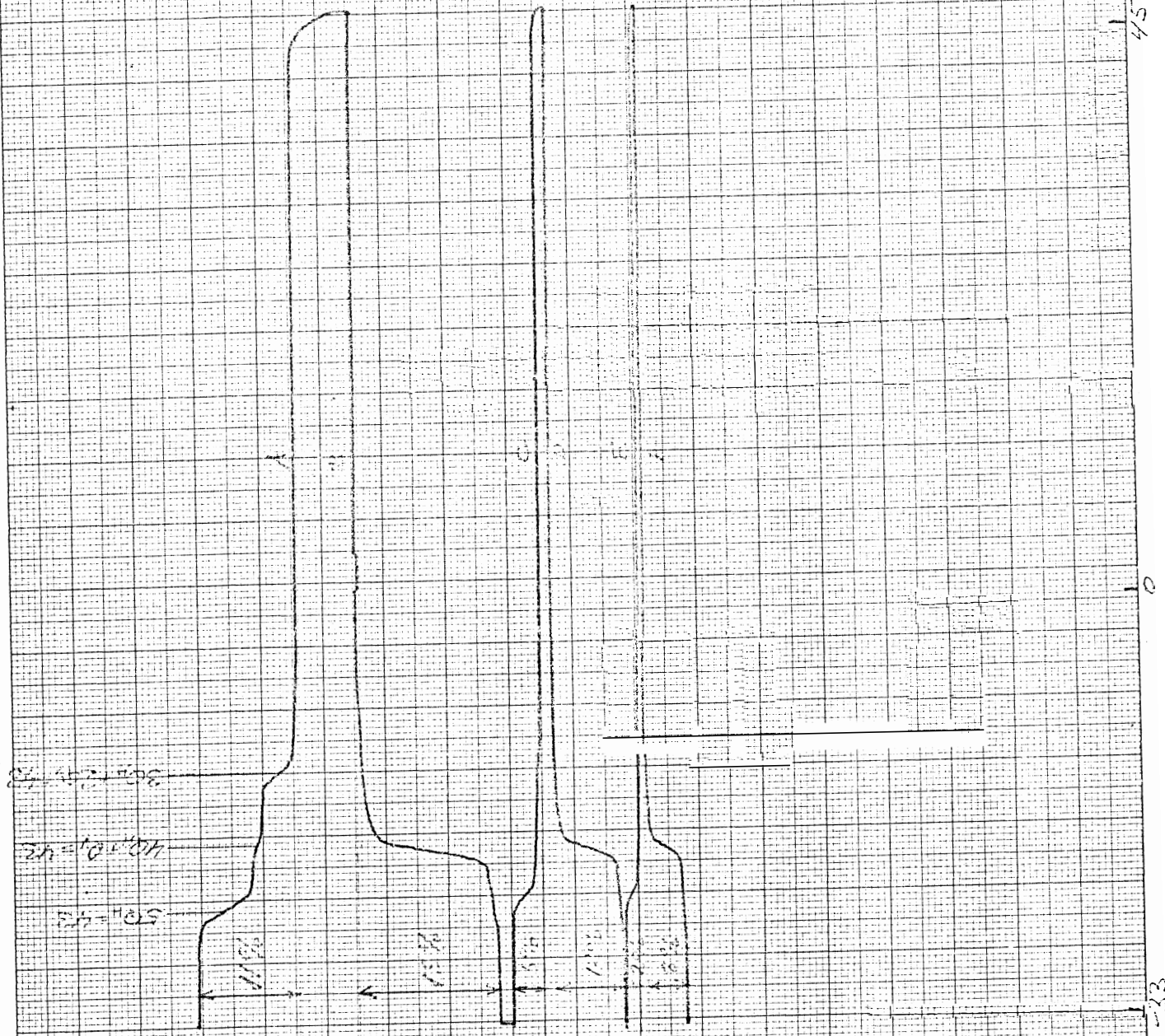
TRUSS 2.5%

TRUSS 2.5%

45

0

-23



SCAN # 4

FIG. 11

20/11/10

10/10/10



45

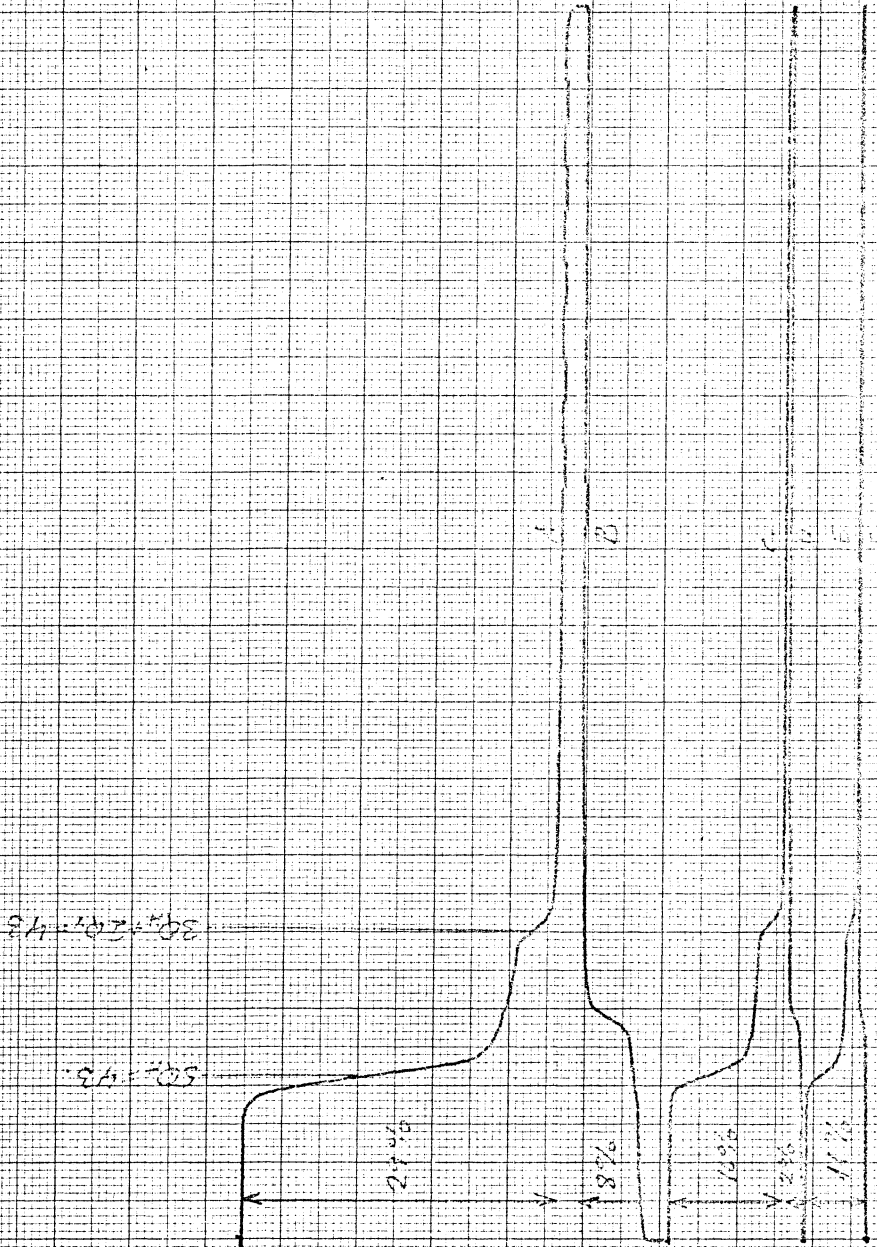
0

-33

SCIN 113

FIG. 5.

1953-1954
F. S. S. S.



45

0

-23

60 mm

30 mm

40 mm

50 mm

15 mm

8 mm

10 mm

16 mm

5 mm

15 mm
15 mm
15 mm

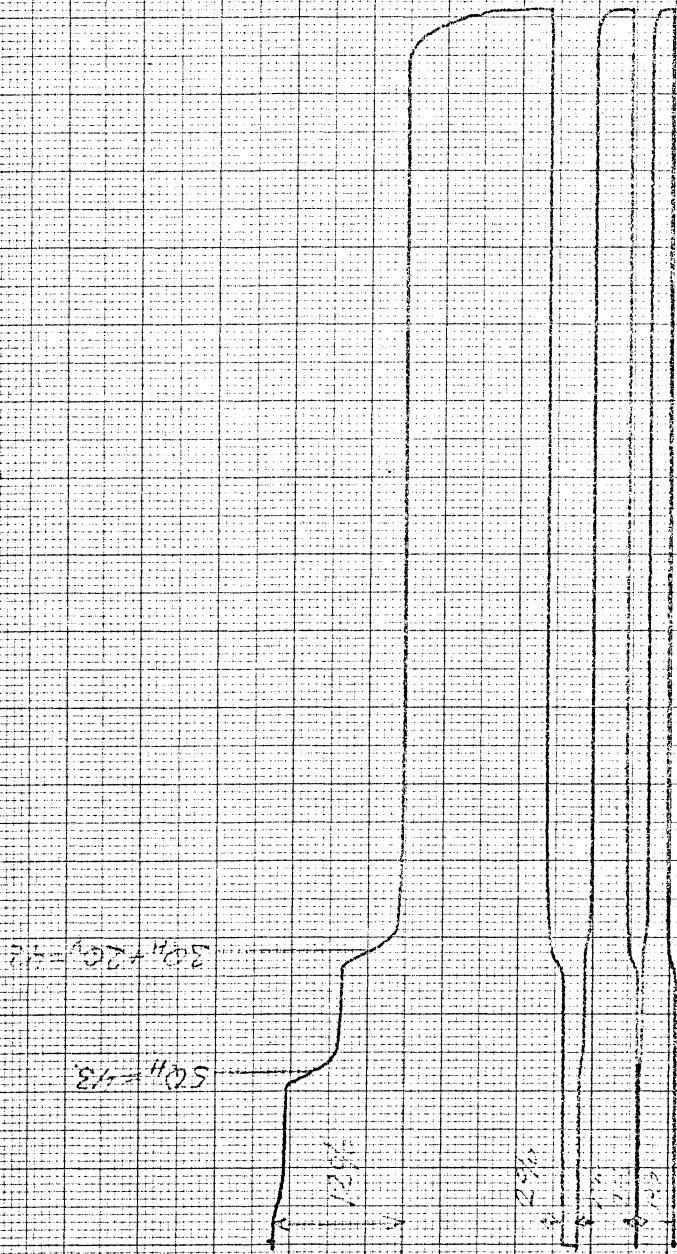
15

0

15

SC11-13

FIG. 12
1961-1962
FIS/15, 12



45

0

-33