ISR-RF/JB/1s 14th June, 1971

ISR RUNNING-IN

Beam Position Observation

Scaling factor of BPMS

Run 65, 8.6.1971, 22 GeV, 4 bunches

The purpose of this measurement was to check the linearity and calibration of the BPMS (Beam Position Monitoring System). Due to trouble, only 20 minutes were devoted to the measurements. Orbits (1), (2) and (3) were measured on injection orbit with repetitive injection. Measurement reproducibility is now very good (see vertical orbits) and if there are differences on the same P.U., it is due to PS instability, (horizontal orbits). Orbits (4) were measured with a single pulse maintained under RF on injection orbit. Differences here again are due to PS instability from pulse to pulse. Orbits (5) were measured with single pulse maintained under RF but after acceleration to an external orbit. Unfortunately, this pulse was very unstable and disturbed the orbit measurement. One can see between horizontal orbits (4) and (5) that the orbit shape is maintained, which means that the calculated α-values used for correction of the momentum compaction are realistic. However, to be more precise, more measurements should be done.

During orbit measurements, the Bunch Frequency was measured and from the average value the position was calculated. These figures are given on the plot (B.F.). Orbits (4) bis and (5) bis were replotted with the same rejected P.U. on both lists and the average position was calculated from the remaining readings. Average orbit position from B.F. and BPMS readings are still not in full agreement. Comparison is made in Fig. 1. One can see that there is a little offset (~ 0.5 mm) and the scaling factor for the BPMS is slightly too small (~ 0.5 mm at 34 mm) relative to the B.F. reading. However, more measurements should be done in order to obtain some statistics. The precision of the average vertical position is quite good (- 0.1 to 0 mm), which means that there is not a general unbalance in the processing system.

Clearing voltage applied to P.F.

Run 68, 9.6.1971

In presence of beam there is a pressure rise around the septum magnets because the clearing electrodes in that location had been replaced by special orbit angle pick ups (P.F.). We tried to apply a high positive voltage on it in order to see if they could act as clearing electrodes. Without beam the voltage can be brought up to 2.3 kVolt. We have seen that a gas discharge (about 3 - 20 μA) takes place in the chamber because it induces a large pressure rise. With beam (about 4 Amp) the voltage can only be brought up to 800 Volts without discharge. For effect on beam, see report by W. Schnell, (10.6.1971).

J. Borer

Distribution

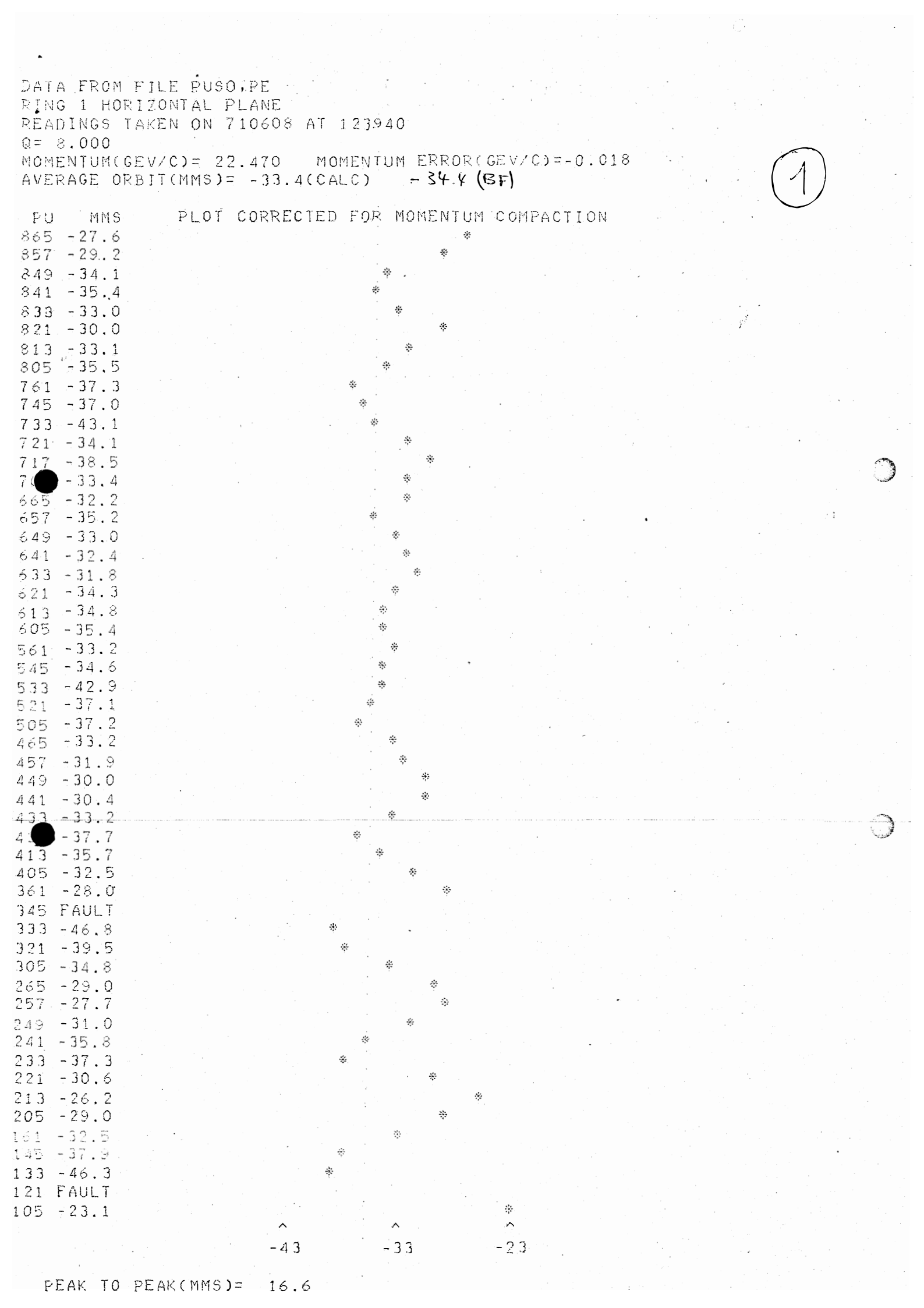
ISR Group Leaders
Running In Committee
Engineers in Charge
RF Group
E. Brouzet MPS
M. Höfert HP

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 123940
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)=-0.018
AVERAGE ORBIT(MMS)= -33.4(CALC) -34.4 (BF)

(1)

PLOT CORRECTED FOR MOMENTUM COMPACTION

PU	MMS
865	-27.6
857	-29.2
849	-34.1
841	-35.4
833	-33.0
821	-30.0
813	-33.1
805	-35.5
761	-37.3
745	-37.0
733	-43.1
721	-34.1
717	-38.5
7[illegible]	-33.4
665	-32.2
657	-35.2
649	-33.0
641	-32.4
633	-31.8
621	-34.3
613	-34.8
605	-35.4
561	-33.2
545	-34.6
533	-42.9
521	-37.1
505	-37.2
465	-33.2
457	-31.9
449	-30.0
441	-30.4
433	-33.2
4[illegible]	-37.7
413	-35.7
405	-32.5
361	-28.0
345	FAULT
333	-46.8
321	-39.5
305	-34.8
265	-29.0
257	-27.7
249	-31.0
241	-35.8
233	-37.3
221	-30.6
213	-26.2
205	-29.0
161	-32.5
145	-37.9
133	-46.3
121	FAULT
105	-23.1



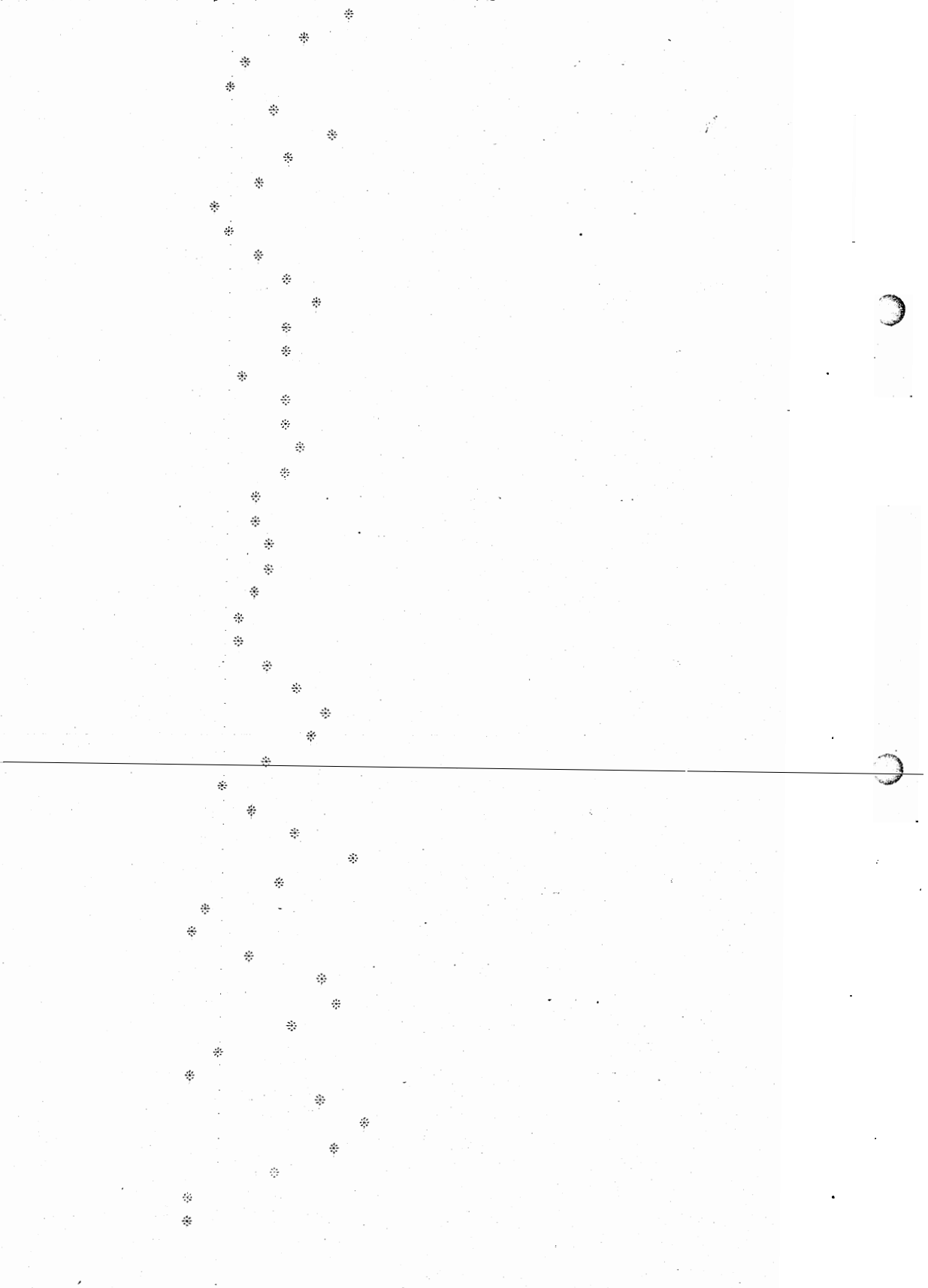
PEAK TO PEAK(MMS)= 16.6

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 124501
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)=-0.018
AVERAGE ORBIT(MMS)= -33.7(CALC) -34.4 (BF)

(2)

PU	MMS
865	-28.3
857	-30.8
849	-34.9
841	-35.9
833	-33.5
821	-30.6
813	-33.5
805	-35.2
761	-37.1
745	-36.9
733	-42.4
721	-33.7
717	-38.2
70[illegible]	-33.2
665	-32.0
657	-35.0
649	-32.7
641	-32.0
633	-31.7
621	-33.6
613	-34.8
605	-35.4
561	-32.8
545	-34.2
533	-43.0
521	-36.9
505	-36.9
465	-32.9
457	-31.3
449	-29.6
441	-29.9
433	-33.1
42[illegible]	-37.3
413	-35.3
405	-32.1
361	-27.6
345	-32.5
333	-46.1
321	-40.1
305	-35.1
265	-29.1
257	-28.1
249	-31.4
241	-36.3
233	-38.0
221	-30.9
213	-26.8
205	-29.7
161	-32.7
145	-38.5
133	-46.6
121	FAULT
105	FAULT

PLOT CORRECTED FOR MOMENTUM COMPACTION



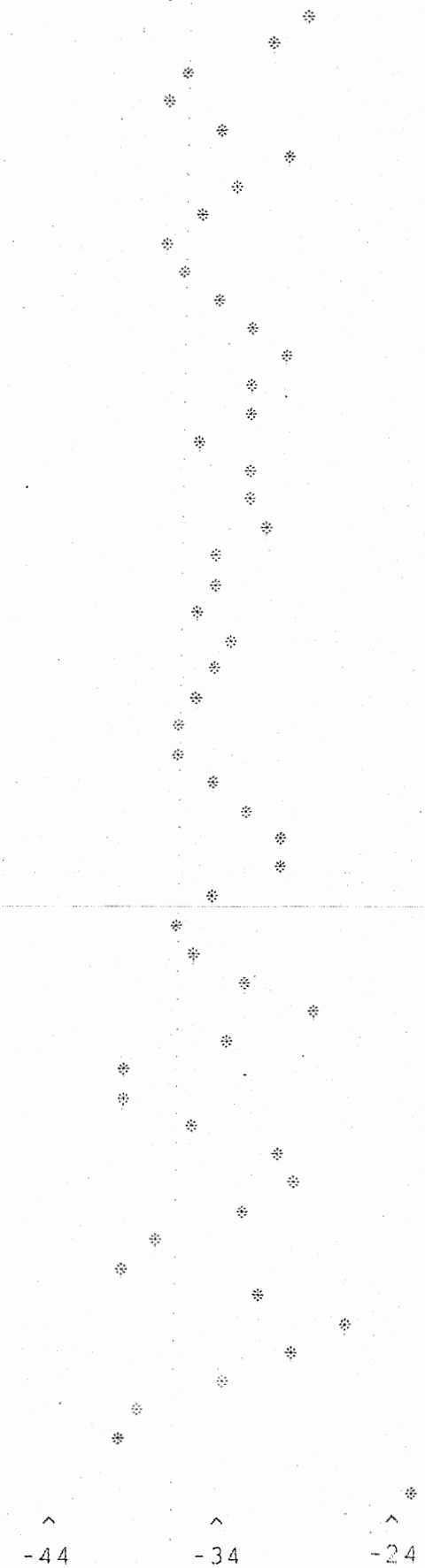
PEAK TO PEAK(MMS)= 12.4

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 124911
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)=-0.018
AVERAGE ORBIT (MMS)= -34.1(CALC) -34.4 (BF)

(3)

PU	MMS
865	-28.9
857	-31.3
849	-35.8
841	-37.0
833	-34.4
821	-31.7
813	-34.6
805	-36.2
761	-36.8
745	-36.8
733	-42.6
721	-33.7
717	-38.1
7[illegible]	-33.2
665	-32.1
657	-34.6
649	-32.7
641	-32.0
633	-31.5
621	-34.9
613	-35.4
605	-36.0
561	-33.5
545	-35.0
533	-43.9
521	-37.6
505	-37.4
465	-33.8
457	-32.1
449	-30.7
441	-30.8
433	-34.1
4[illegible]	-37.8
413	-36.3
405	-33.0
361	-28.3
345	-33.4
333	-47.2
321	-41.3
305	-36.0
265	-30.1
257	-29.1
249	-32.4
241	-37.0
233	-39.1
221	-32.0
213	-27.6
205	-30.7
161	-32.9
145	-38.9
133	-47.6
121	FAULT
105	-23.7

PLOT CORRECTED FOR MOMENTUM COMPACTION



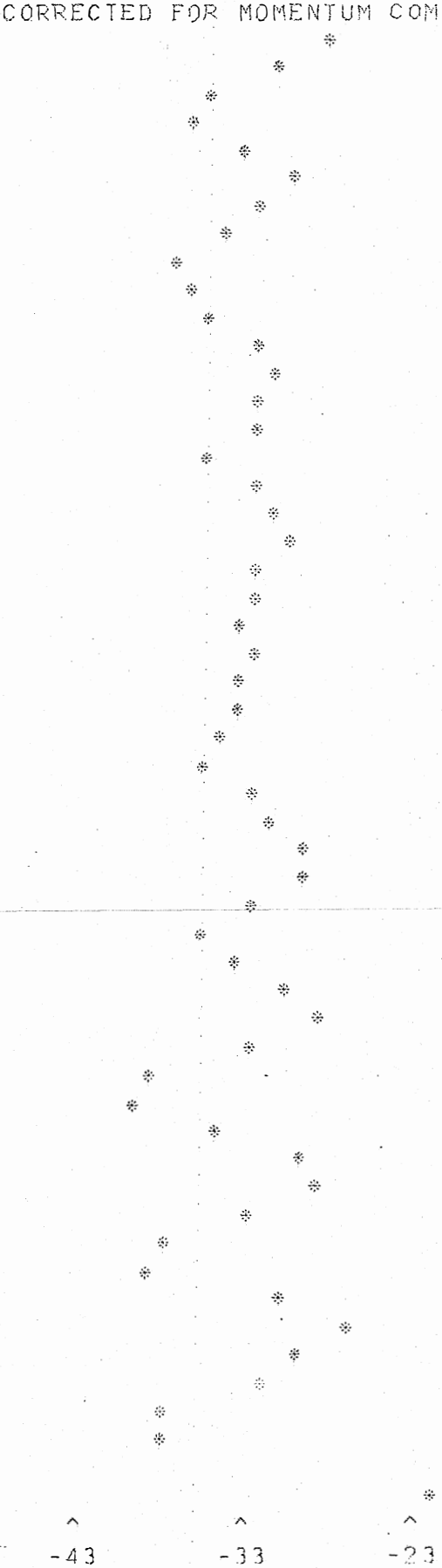
PEAK TO PEAK(MMS)= 17.0

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 130004
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)=-0.018
AVERAGE ORBIT(MMS)= -33.3(CALC) −34.5 (BF)

(4)

PLOT CORRECTED FOR MOMENTUM COMPACTION

PU	MMS
865	-28.2
857	-30.8
849	-34.9
841	-36.6
833	-33.7
821	-31.0
813	-33.5
805	-35.8
761	-37.1
745	-37.1
733	-43.2
721	-34.0
717	-38.7
70[illegible]	-33.4
665	-32.4
657	-35.4
649	-32.0
641	-31.5
633	-30.5
621	-33.1
613	-33.7
605	-34.3
561	-32.1
545	-33.4
533	-42.0
521	-35.5
505	-36.0
465	-32.1
457	-30.9
449	-29.1
441	-29.4
433	-32.4
42[illegible]	-36.5
413	-34.5
405	-31.3
361	-28.1
345	-33.2
333	-46.6
321	-41.1
305	-35.6
265	-29.4
257	-28.3
249	-31.9
241	-37.1
233	-38.6
221	-31.3
213	-27.1
205	-29.8
161	-31.6
145	-37.8
133	-45.7
121	FAULT
105	-22.8



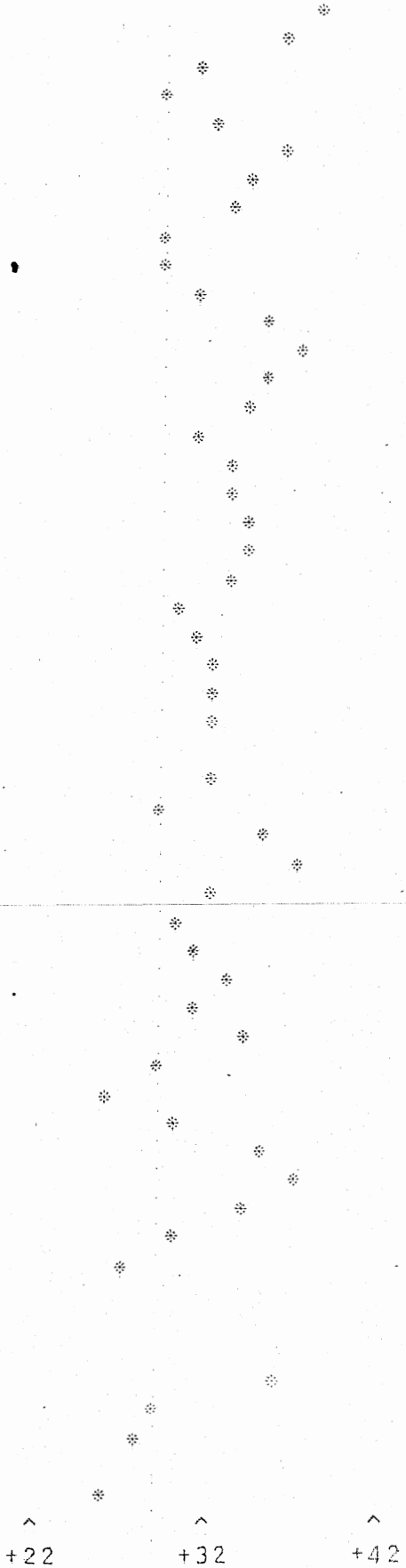
PEAK TO PEAK(MMS)= 17.7

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 131529
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)= 0.017
AVERAGE ORBIT(MMS)= 32.2(CALC) + 32,6 (BF)

(5)

PLOT CORRECTED FOR MOMENTUM COMPACTION

PU	MMS
865	37.0
857	35.0
849	30.0
841	28.7
833	31.4
821	36.7
813	34.4
805	32.9
761	28.6
745	28.6
733	38.3
721	36.3
717	43.4
7[illegible]	35.8
665	32.8
657	29.9
649	31.8
641	32.8
633	33.8
621	34.1
613	32.9
605	30.7
561	30.7
545	31.4
533	39.6
521	32.9
505	FAULT
465	30.7
457	28.5
449	34.3
441	36.2
433	31.3
4[illegible]	30.1
413	30.8
405	33.0
361	30.5
345	33.8
333	36.7
321	26.6
305	30.6
265	34.5
257	36.3
249	33.1
241	29.6
233	26.8
221	FAULT
213	FAULT
205	FAULT
161	34.9
145	28.6
133	35.3
121	FAULT
105	26.2



PEAK TO PEAK(MMS)= 12.2

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 130004
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)=-0.018
AVERAGE ORBIT(MMS)= -33.8(CALC) ~34.5 (BF)

(4) bi

PU MMS PLOT CORRECTED FOR MOMENTUM COMPACTION

865 -28.2
857 -30.8
849 -34.9
841 -36.6
833 -33.7
821 -31.0
813 -33.5
805 -35.8
761 -37.1
745 -37.1
733 -43.2 — large a
721 -34.0
717 -38.7 —
[illegible] -33.4
669 -32.4
657 -35.4
649 -32.0
641 -31.5
633 -30.5
621 -33.1
613 -33.7
605 -34.3
561 -32.1
545 -33.4
533 -42.0 —
521 -35.5
505 FAULT
465 -32.1
457 FAULT
449 -29.1
441 -29.4
433 -32.4
[illegible] -36.5
413 -34.5
405 -31.3
361 -28.1
345 -33.2
333 -46.6 —
321 -41.1
305 -35.6
265 -29.4
257 -28.3
249 -31.9
241 -37.1
233 -36.6
221 FAULT
213 FAULT
205 FAULT
161 -31.6
145 -37.8
133 -45.7 —
121 FAULT
105 FAULT

-44 -34 -24

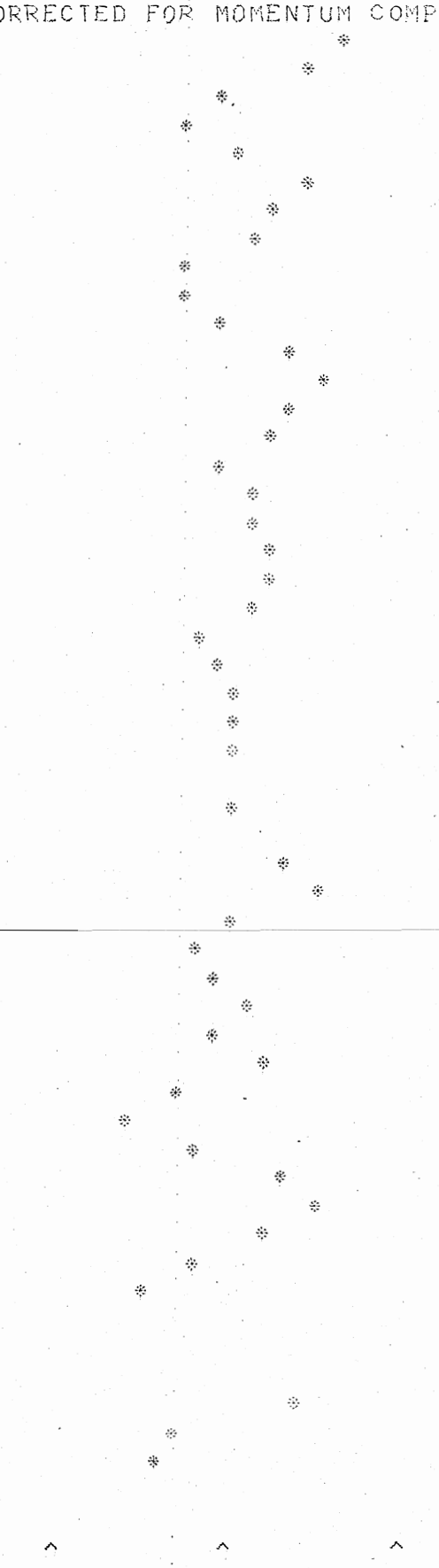
PEAK TO PEAK(MMS)= 11.3

DATA FROM FILE PUSO,PE
RING 1 HORIZONTAL PLANE
READINGS TAKEN ON 710608 AT 131529
Q= 8.000
MOMENTUM(GEV/C)= 22.470 MOMENTUM ERROR(GEV/C)= 0.017
AVERAGE ORBIT(MMS)= 32.4(CALC) + 32,6 (BF)

(5) bi

PU	MMS	
865	37.0	
857	35.0	
849	30.0	
841	28.7	
833	31.4	
821	36.7	
813	34.4	
805	32.9	
761	28.6	
745	28.6	
733	38.3	– largest
721	36.3	
717	43.4	–
7[illegible]	35.8	
665	32.8	
657	29.9	
649	31.8	
641	32.8	
633	33.8	
621	34.1	
613	32.9	
605	30.7	
561	30.7	
545	31.4	
533	39.6	–
521	32.9	
505	FAULT	
465	30.7	
457	FAULT	
449	34.3	
441	36.2	
433	31.3	
4[illegible]	30.1	
413	30.8	
405	33.0	
361	30.5	
345	33.8	
333	36.7	–
321	26.6	
305	30.6	
265	34.5	
257	36.3	
249	33.1	
241	29.6	
233	26.8	
221	FAULT	
213	FAULT	
205	FAULT	
141	34.9	
145	28.6	
133	35.3	–
121	FAULT	
105	FAULT	

PLOT CORRECTED FOR MOMENTUM COMPACTION



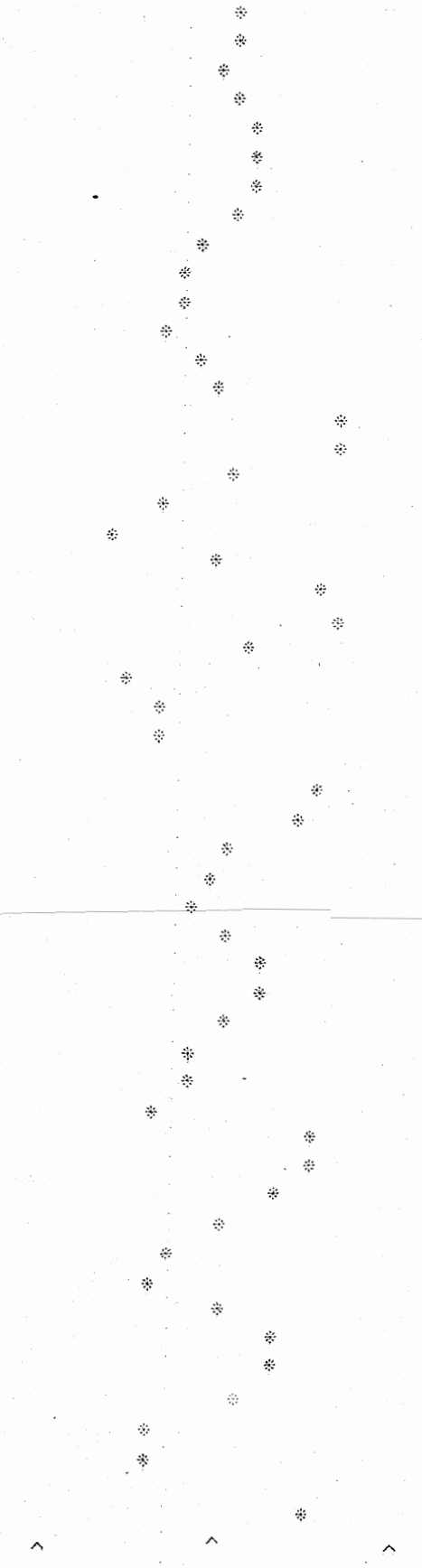
PEAK TO PEAK(MMS)= 12.2

DATA FROM FILE PUSO,PE
RING 1 VERTICAL PLANE
READINGS TAKEN ON 710608 AT 123940
Q= 8.000
MOMENTUM(GEV/C)= 22.000
AVERAGE ORBIT(MMS)= -0.0(MEAS)

(1)

PU	MMS
865	0.1
857	0.1
849	-0.7
841	-0.2
833	0.8
821	1.0
813	1.1
805	0.1
761	-1.8
745	-2.7
733	-2.5
721	-4.1
717	-2.2
[illegible]	-0.6
565	6.4
557	5.5
549	-0.0
541	-4.1
533	-7.0
521	-0.8
513	5.3
505	6.0
461	0.8
445	-5.5
433	-4.5
421	-4.3
405	FAULT
365	5.0
357	4.1
349	0.3
341	-1.5
333	-2.1
[illegible]	0.2
313	1.9
305	2.2
261	-0.3
245	-1.9
233	-2.4
221	-3.7
205	4.9
165	4.8
157	3.3
149	-0.4
141	-2.8
133	-3.5
121	0.1
113	3.0
105	3.4
61	0.9
45	-4.1
33	-3.9
21	FAULT
05	4.8

MEASURED ORBIT



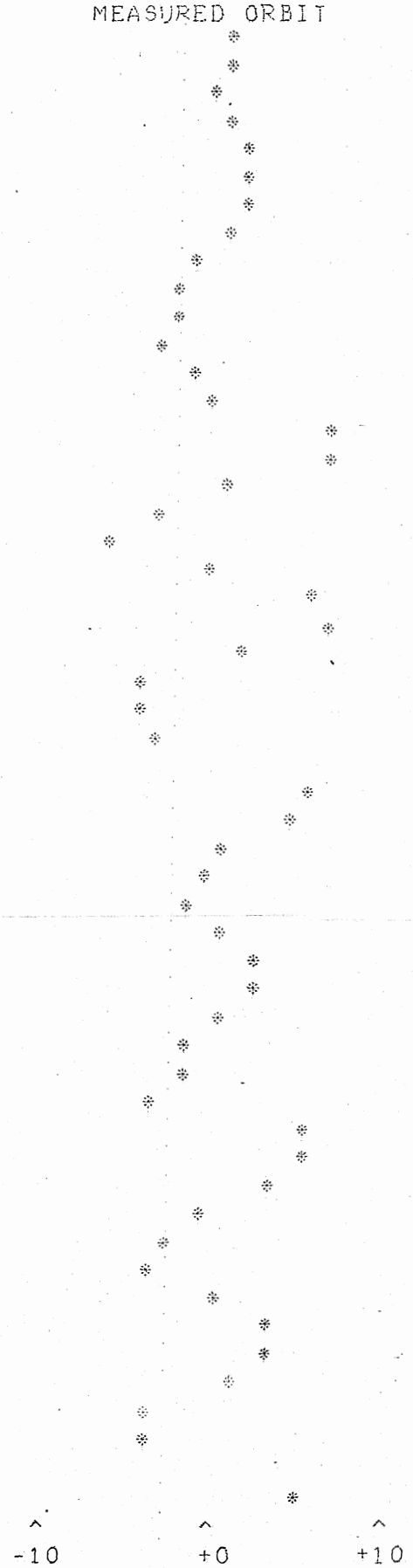
PEAK TO PEAK(MMS)= 13.4

DATA FROM FILE PUSO,PE
RING 1 VERTICAL PLANE
READINGS TAKEN ON 710608 AT 124501
Q= 8.000
MOMENTUM(GEV/C)= 22.000
AVERAGE ORBIT(MMS)= -0.0(MEAS)

(2)

PU	MMS
365	0.1
357	0.1
349	-0.6
341	-0.3
333	0.7
321	1.0
313	1.2
305	0.1
761	-1.9
745	-2.9
733	-2.6
721	-4.0
717	-2.2
[illegible]	-0.6
565	6.3
557	5.5
549	0.1
541	-4.1
533	-7.1
521	-0.8
513	5.3
505	6.0
561	0.9
545	-5.4
533	-4.5
521	-4.1
505	FAULT
165	5.0
157	4.1
149	0.3
141	-1.4
133	-2.1
[illegible]	0.2
113	1.9
105	2.3
161	-0.4
145	-1.9
133	-2.4
121	-3.7
105	5.0
65	4.8
57	3.2
49	-0.5
41	-2.8
33	-3.5
21	-0.0
13	3.0
05	3.5
61	0.9
45	-4.2
33	-3.9
21	FAULT
05	4.7

MEASURED ORBIT



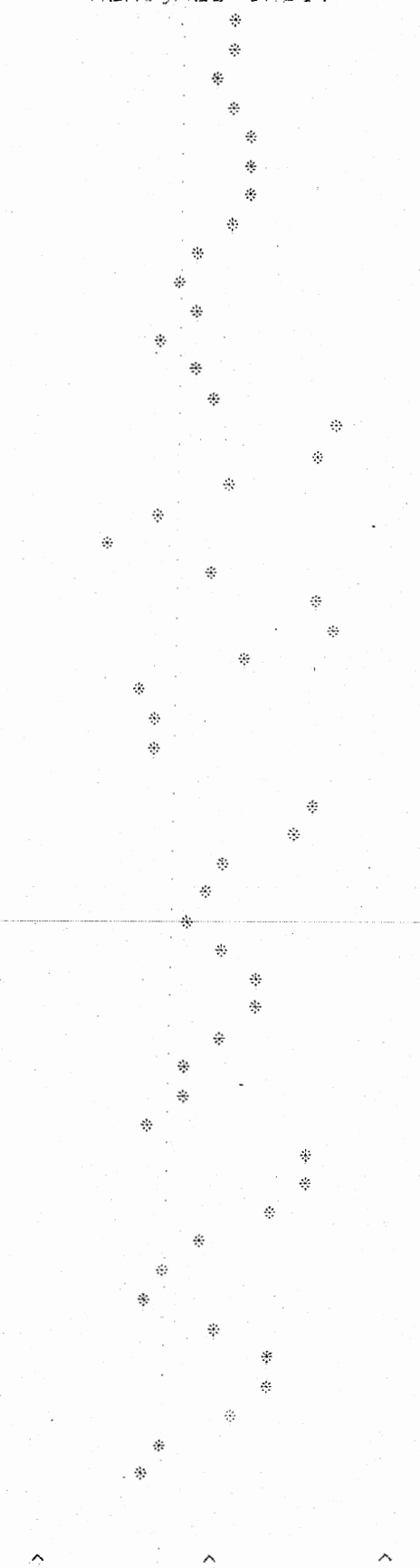
PEAK TO PEAK(MMS)= 13.5

(3)

DATA FROM FILE PUSO,PE
RING 1 VERTICAL PLANE
READINGS TAKEN ON 710608 AT 124911
Q= 8.000
MOMENTUM(GEV/C)= 22.000
AVERAGE ORBIT(MMS)= -0.1(MEAS)

PU	MMS
865	0.2
857	0.3
849	-0.6
841	0.1
833	0.9
821	1.2
813	1.4
805	0.3
761	-1.8
745	-2.9
733	-2.5
721	-4.1
717	-2.3
7[illegible]	-0.7
665	6.4
657	5.5
649	0.0
641	-4.2
633	-7.1
621	-0.8
613	5.2
605	6.1
561	0.7
545	-5.4
533	-4.5
521	-4.1
505	FAULT
465	5.1
457	3.9
449	0.4
441	-1.5
433	-2.1
4[illegible]	0.2
413	1.9
405	2.3
361	-0.4
345	-1.9
333	-2.4
321	-3.7
305	5.0
265	4.9
257	3.3
249	-0.6
241	-2.9
233	-3.6
221	-0.1
213	3.0
205	3.4
161	0.8
145	-3.3
133	-4.1
121	FAULT
105	FAULT

MEASURED ORBIT



PEAK TO PEAK(MMS)= 13.5

DATA FROM FILE PUSO,PE
RING 1 VERTICAL PLANE
READINGS TAKEN ON 710608 AT 130004
Q= 8.000
MOMENTUM(GEV/C)= 22.000
AVERAGE ORBIT(MMS)= -0.1(MEAS)

(4)

PU	MMS	MEASURED ORBIT
865	0.1	
857	0.2	
849	-0.6	
841	-0.1	
833	0.7	
821	0.9	
813	0.9	
805	0.3	
761	-1.7	
745	-2.9	
733	-2.6	
721	-4.1	
717	-2.2	
7[illegible]	-0.7	
665	6.4	
657	5.6	
649	0.0	
641	-4.1	
633	-6.9	
621	-0.7	
613	5.4	
605	6.1	
561	0.8	
545	-5.4	
533	-4.5	
521	-4.3	
505	FAULT	
465	4.9	
457	4.0	
449	0.3	
441	-1.4	
433	-2.1	
4[illegible]	0.3	
413	1.9	
405	2.3	
361	-0.4	
345	-2.1	
333	-2.5	
321	-3.7	
305	4.9	
265	4.7	
257	3.1	
249	-0.5	
241	-2.7	
233	-3.6	
221	-0.1	
213	2.9	
205	3.5	
1[illegible]	0.5	
145	-2.9	
133	-4.4	
121	FAULT	
105	FAULT	

-10 +0 +10

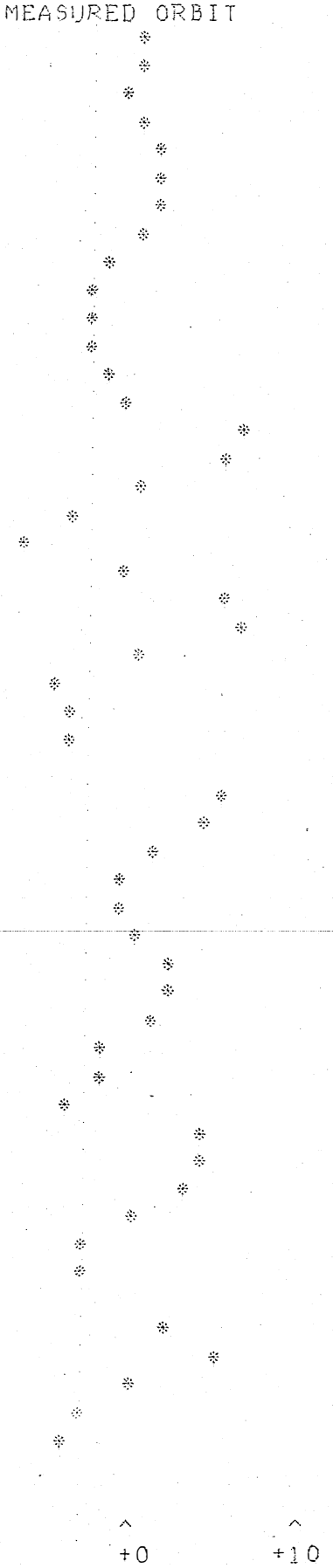
PEAK TO PEAK(MMS)= 13.3

DATA FROM FILE PUSO,PE
RING 1 VERTICAL PLANE
READINGS TAKEN ON 710608 AT 131529
Q= 8.000
MOMENTUM(GEV/C)= 22.000
AVERAGE ORBIT(MMS)= -0.1(MEAS)

(5)

PU	MMS
865	-0.2
857	0.3
849	-0.7
841	-0.2
833	0.8
821	0.8
813	1.0
805	-0.2
761	-2.1
745	-2.8
733	-2.8
721	-3.3
717	-2.1
705	-0.6
[illegible]	6.0
657	5.0
649	-0.2
641	-4.1
633	-6.6
621	-0.7
613	5.0
605	5.8
561	0.4
545	-5.2
533	-4.0
521	-3.6
505	FAULT
465	4.5
457	4.3
449	0.6
441	-1.1
433	-0.5
[illegible]	0.2
[illegible]	1.7
405	1.7
361	0.8
345	-1.7
333	-2.4
321	-3.7
305	4.4
265	4.4
257	3.1
249	-0.3
241	-3.0
233	-3.3
221	FAULT
213	2.0
205	5.0
161	0.1
145	-3.5
133	-4.4
121	FAULT
105	FAULT

MEASURED ORBIT



PEAK TO PEAK(MMS)= 12.6