TS-SSC 91-031
T.Jaffery
February 4, 1991

DSA321 HARMONICS AT LAB 2

Magnetic multipole harmonics data was recorded both in AC and DC mode, using Magnetometer and HAL2 system, at 4.2K. The test plan for harmonics measurements was same as the 40 mm SSC dipole. A test for the periodic field measurement with Rawson Lush probe was added to the test plan(1).
For harmonics measurement, as a function of current, the magnet was ramped upto 7600 amps and data was recorded every 6 seconds. Table 1 shows the waveform used to set up the magnet for harmonics measurement as a function of position at ~5000 A. In the following pages you'll find the plots for DC harmonics measured, using Magnetometer and HAL2, at 5001 A.

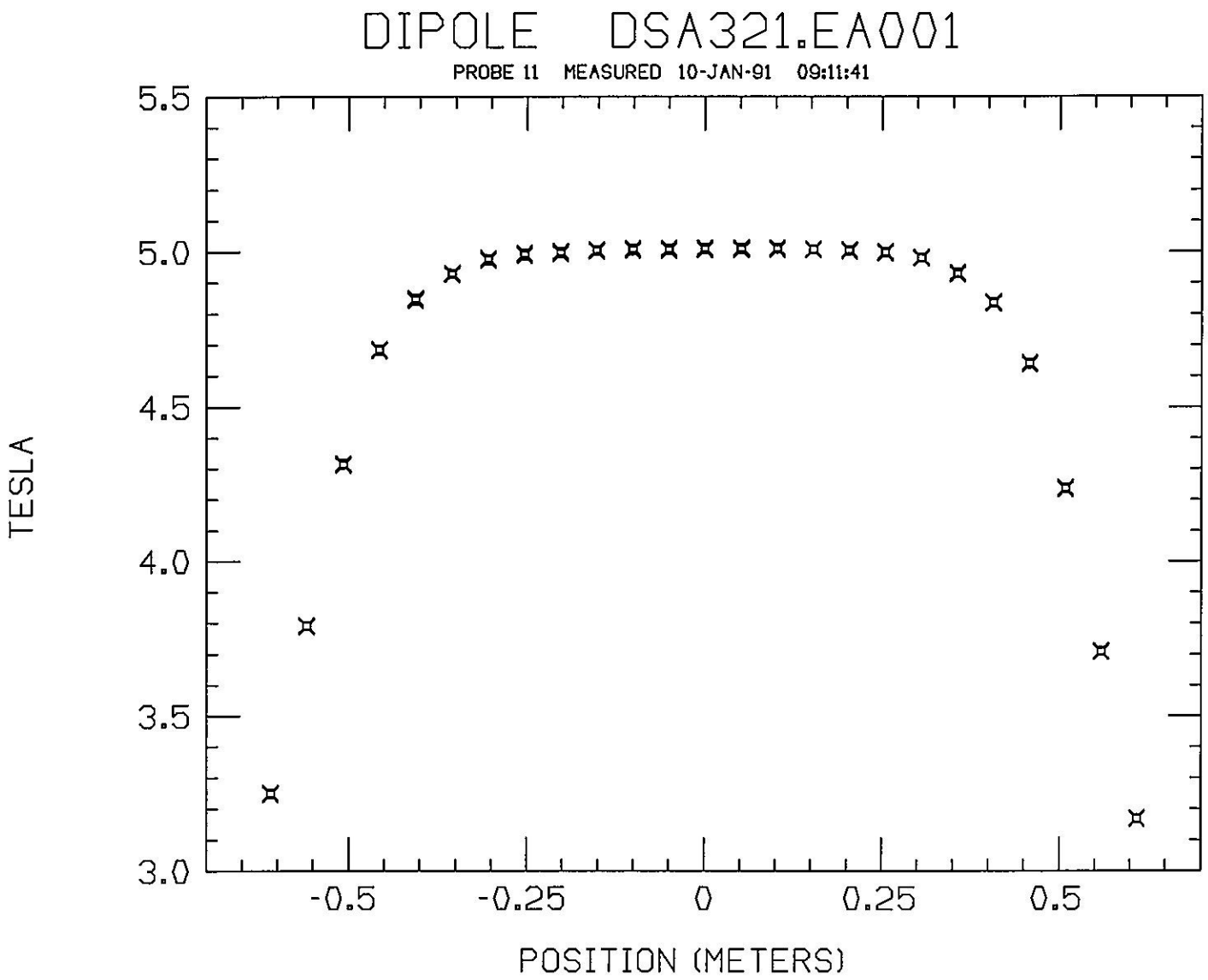
	Magnetometer	HAL2
Norm Sextupole	+ 2.6	+2.5
Skew Sextupole	- 0.17	-0.1
Norm Decapole	+ 0.35	+0.3
Skew Decapole	+ 0.05	+0.07

The official predicted transfer function at 5000 amps is 1.04016 (per Masayoshi) The transfer function at 5041 amps with Rawson Lush was 1.036, with Magnetometer data it was ~1.03 and with HAL2 was 1.039. These data were taken on different days. For Magnetometer and HAL2 same Morgan coil, Lab 2 probe 11, was used.

(1) Magnetization effect of pressure gage block, TS-SSC 91-024

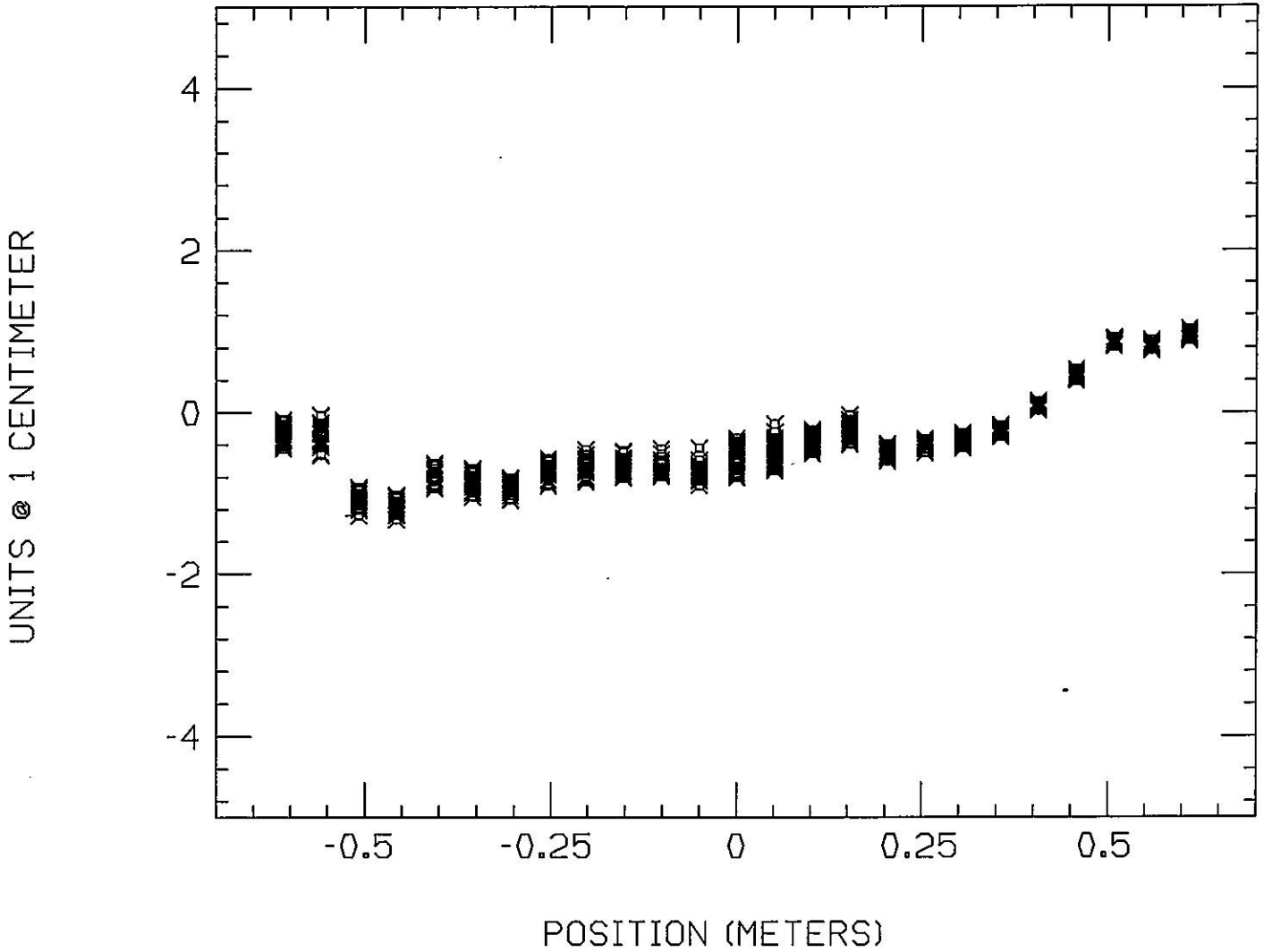
Waveform to set up 9f of DSA321 test

Segment #	Sarting Current	Ending Current	Idot A/S	Flat Top Seconds	Trigger Seconds	Control Flags	Current Rate	Data Rate
1	0.0000	6500.0000	12.0000	0.0000	0.0000	0	0.10000	0.00000
2	6500.0000	6500.0000	0.0000	120.0000	0.0000	0	0.10000	0.00000
3	6500.0000	110.0000	12.0000	0.0000	0.0000	0	0.10000	0.00000
4	110.0000	110.0000	0.0000	120.0000	0.0000	0	0.10000	0.00000
5	110.0000	5000.0000	6.0000	0.0000	0.0000	0	0.05000	0.00000

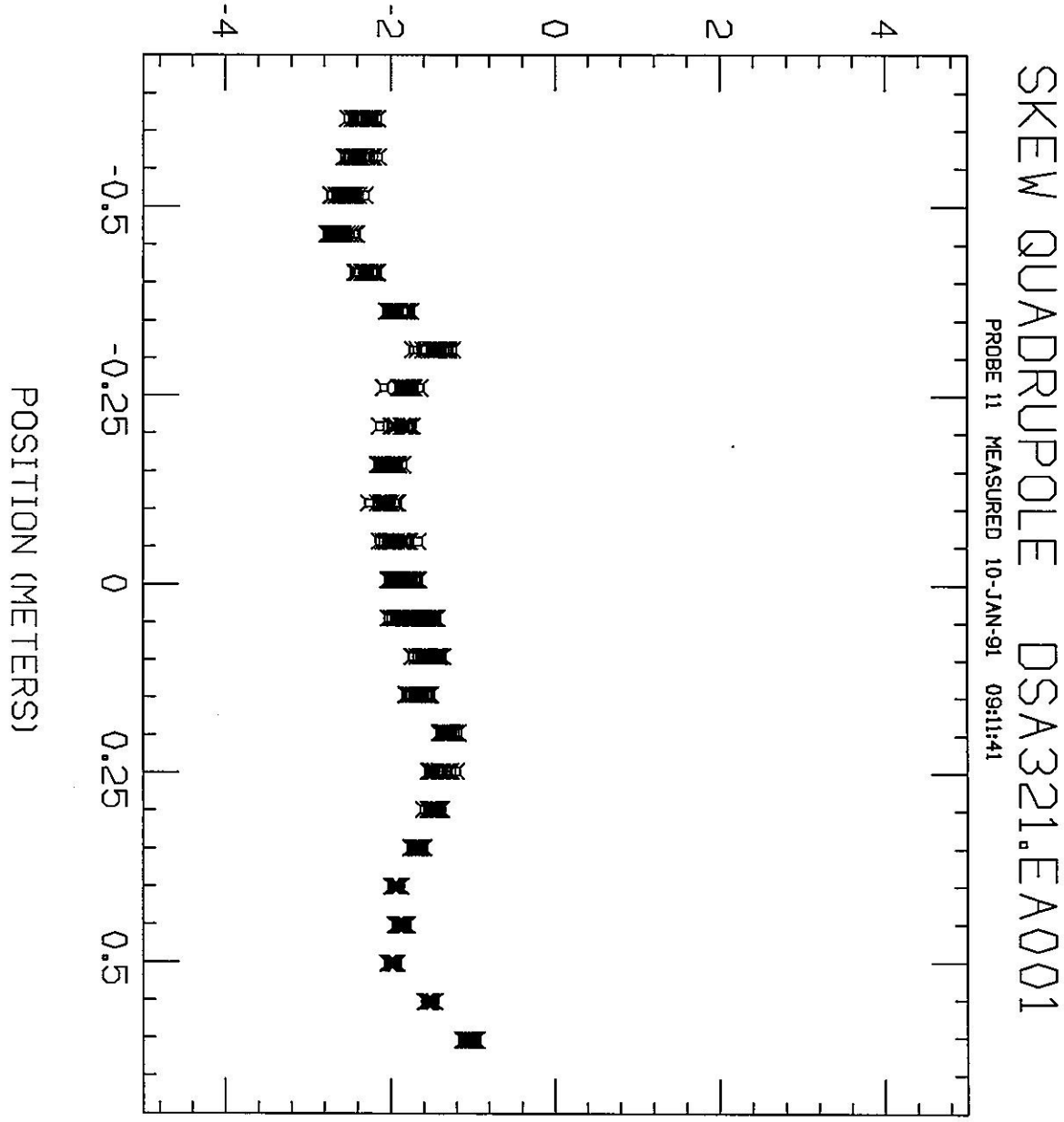

DIPOLE DSA321.EA001
PROBE 11 MEASURED 10-JAN-91 09:11:41
5.5
5.0
4.5
4.0
3.5
3.0
TESLA
-0.5
-0.25
0
0.25
0.5
POSITION (METERS)

NORMAL QUADRUPOLE DSA321.EA001

PROBE 11 MEASURED 10-JAN-91 09:11:41



UNITS @ 1 CENTIMETER



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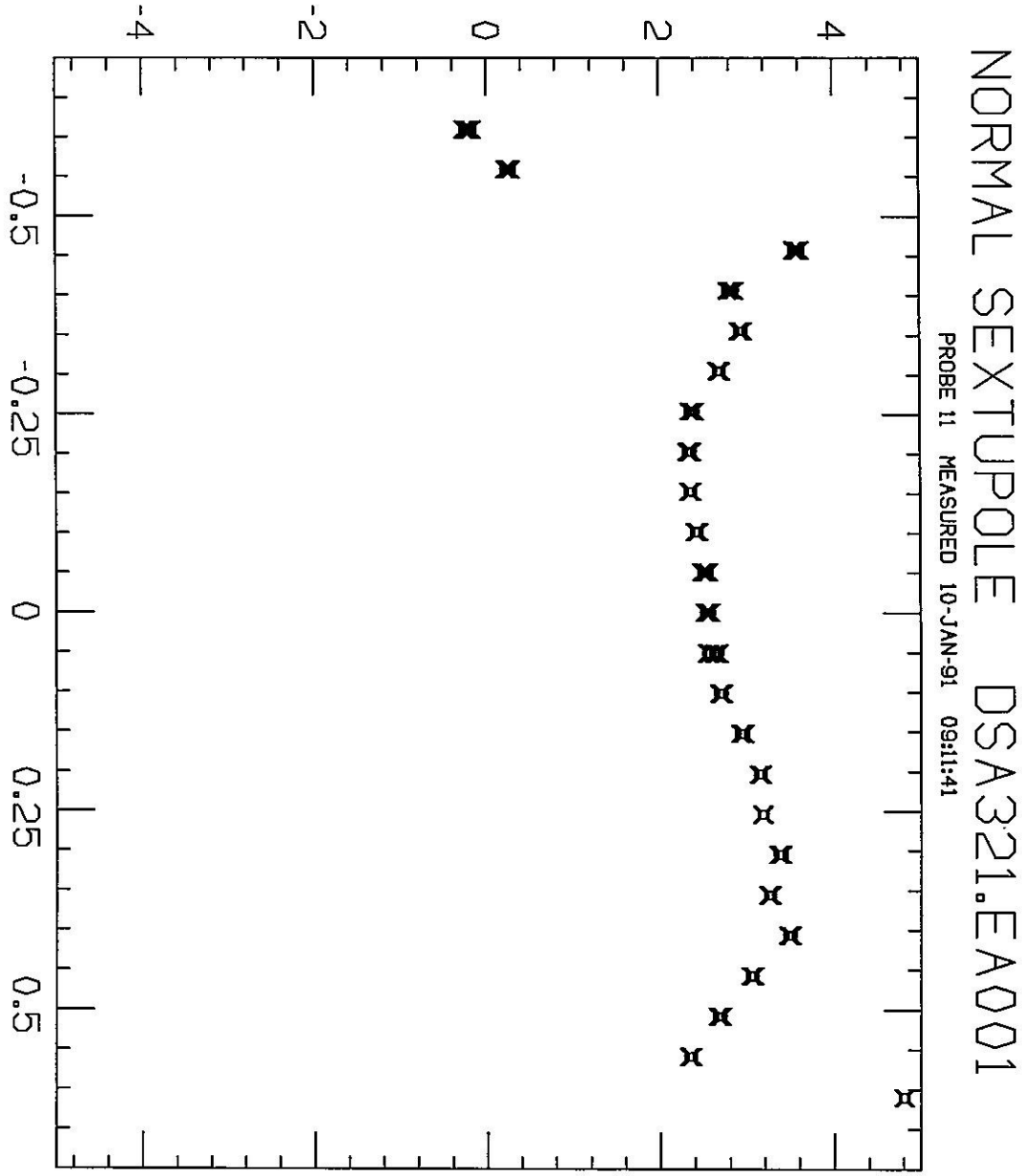

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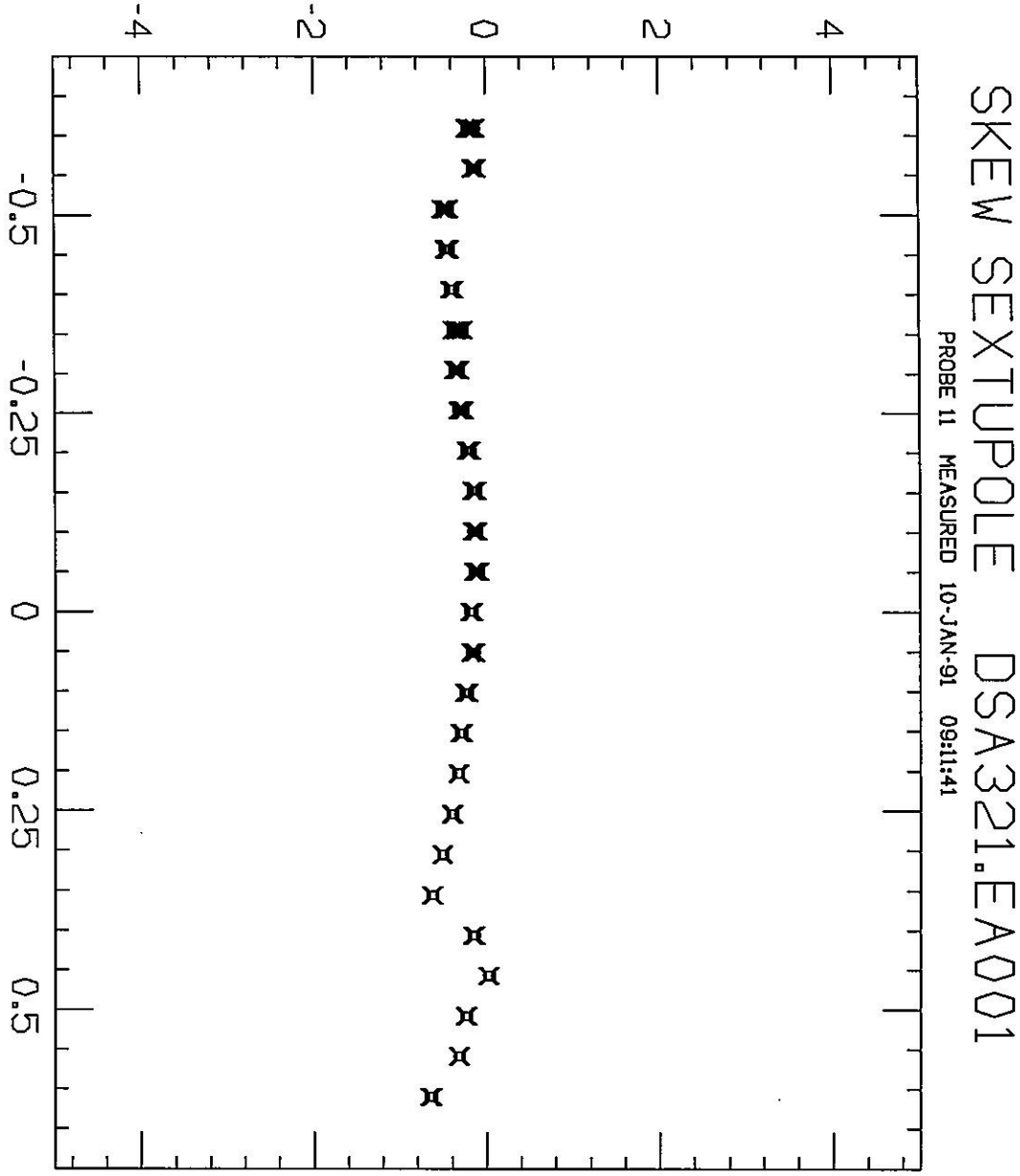

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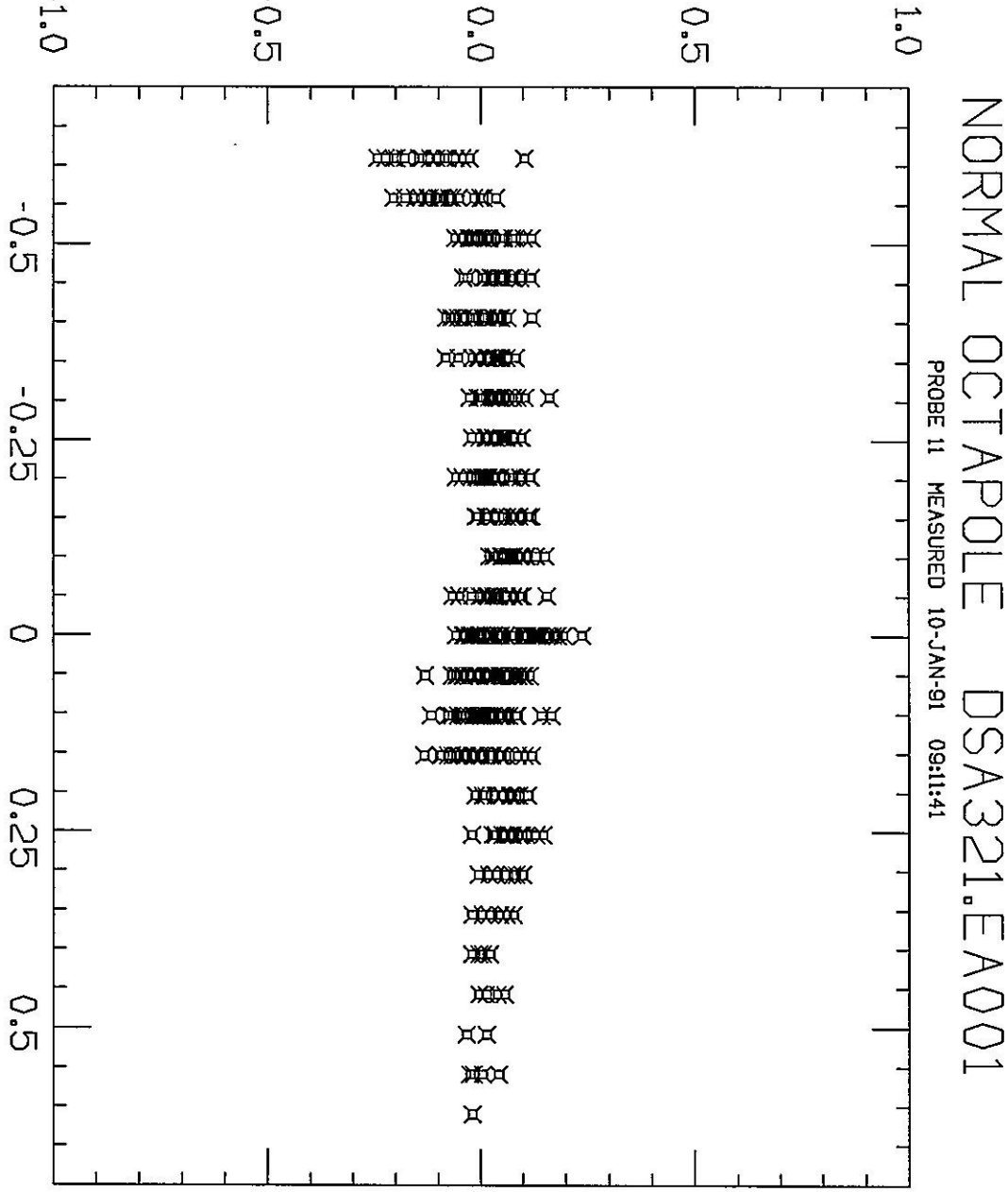
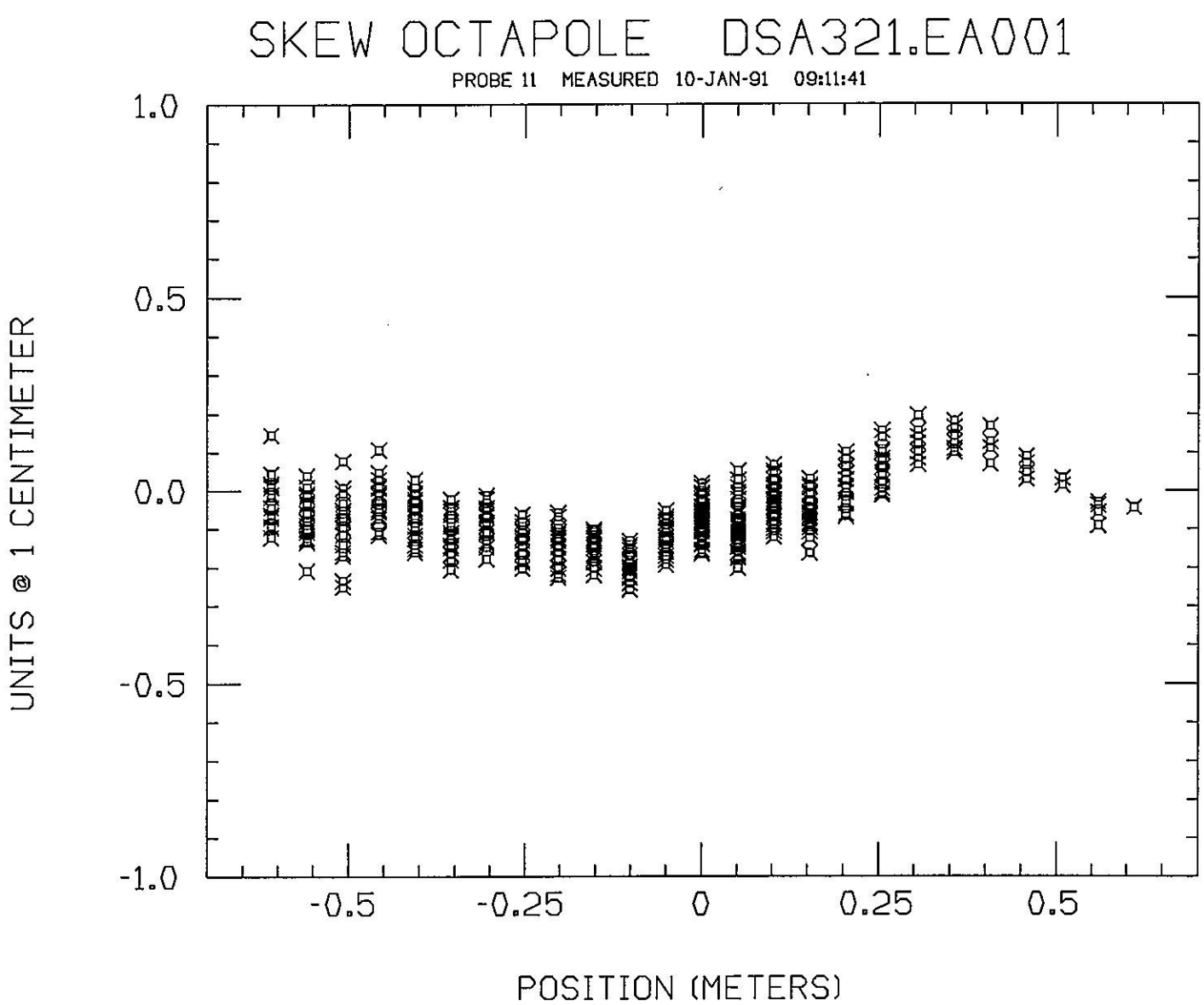
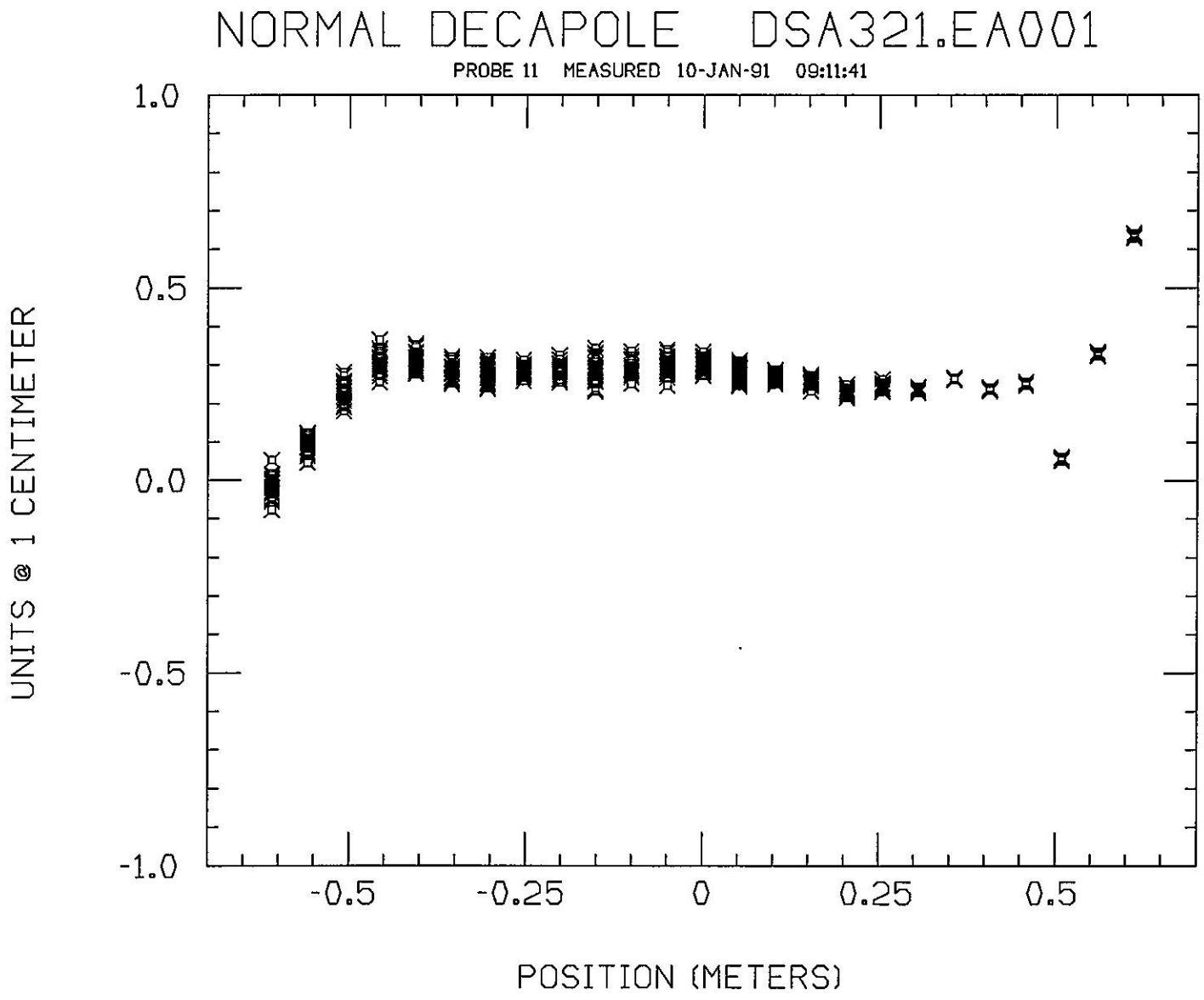
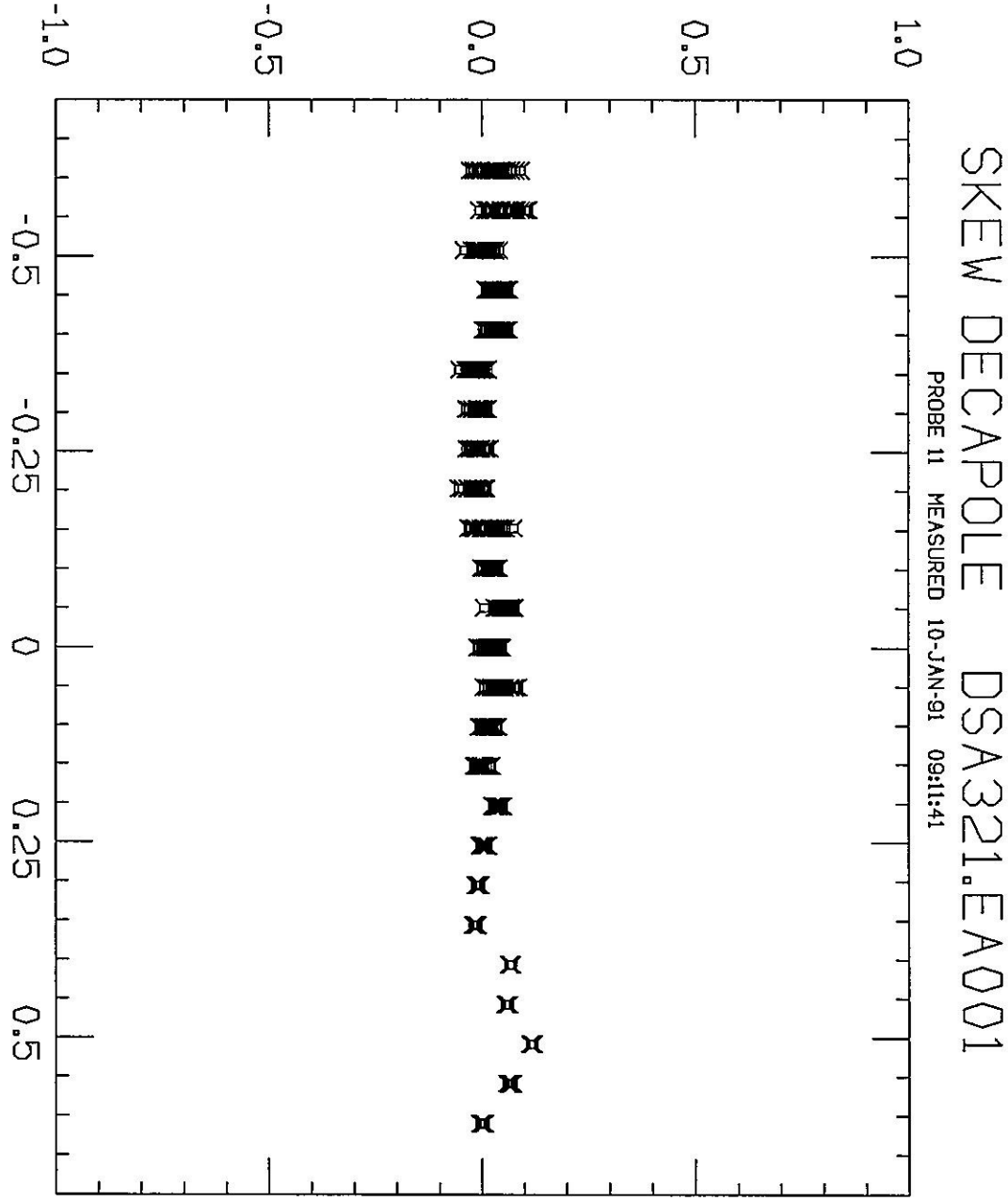


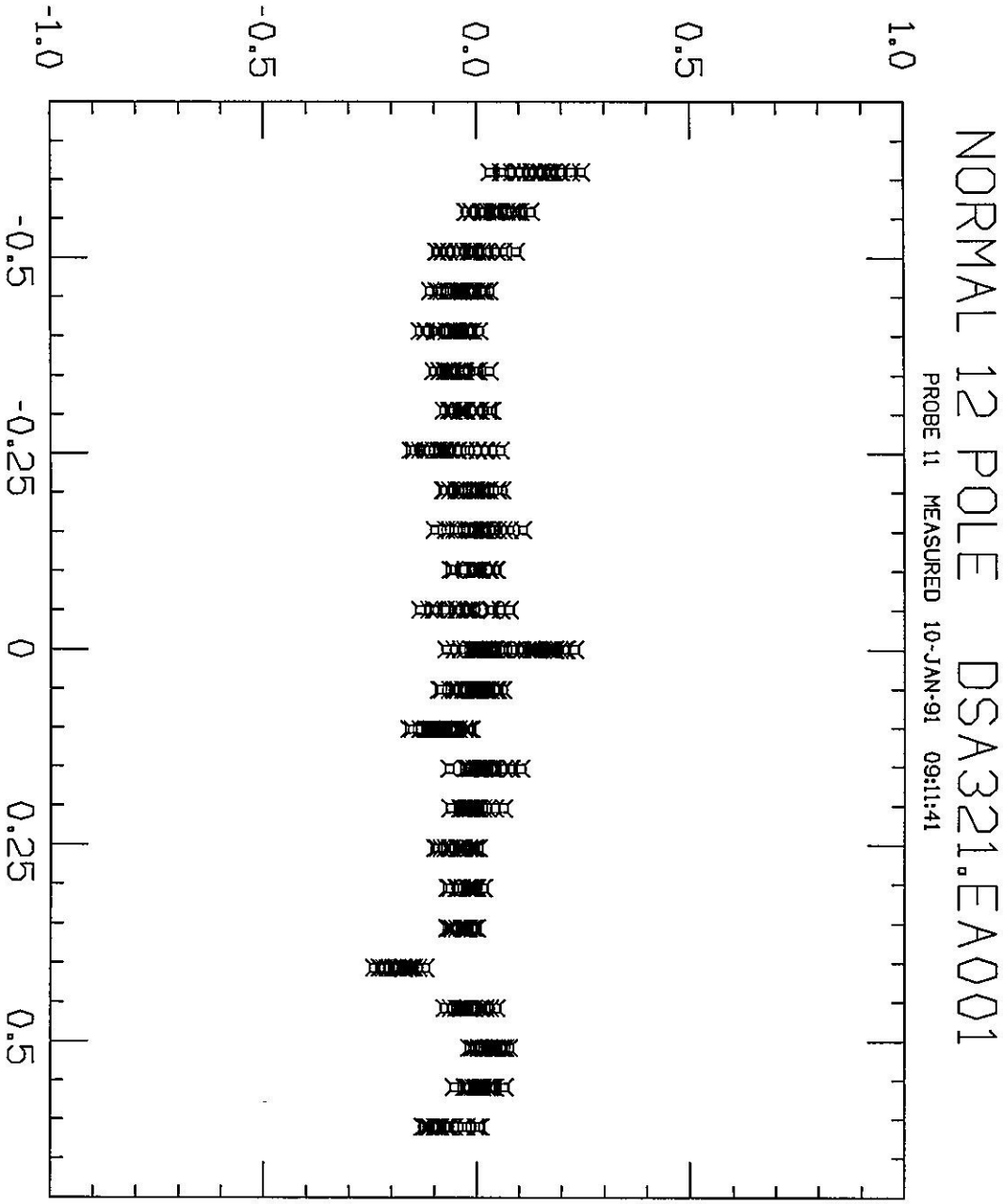

SKEW OCTAPOLE DSA321.EA001
PROBE 11 MEASURED 10-JAN-91 09:11:41
1.0
0.5
0.0
-0.5
-1.0
UNITS @ 1 CENTIMETER
-0.5
-0.25
0
0.25
0.5
POSITION (METERS)

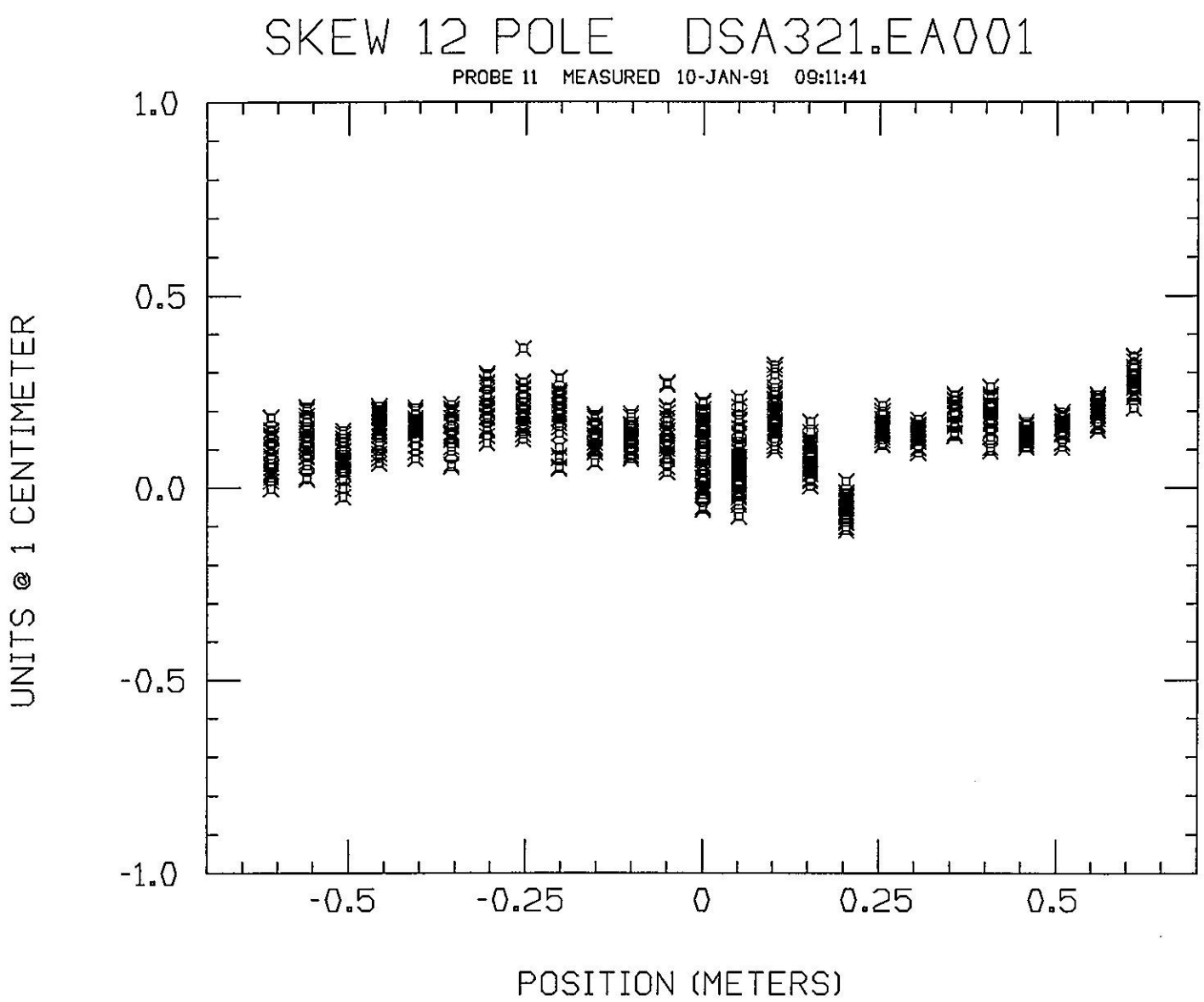

NORMAL DECAPOLE DSA321.EA001
PROBE 11 MEASURED 10-JAN-91 09:11:41
1.0
0.5
0.0
-0.5
-1.0
UNITS @ 1 CENTIMETER
-0.5
-0.25
0
0.25
0.5
POSITION (METERS)

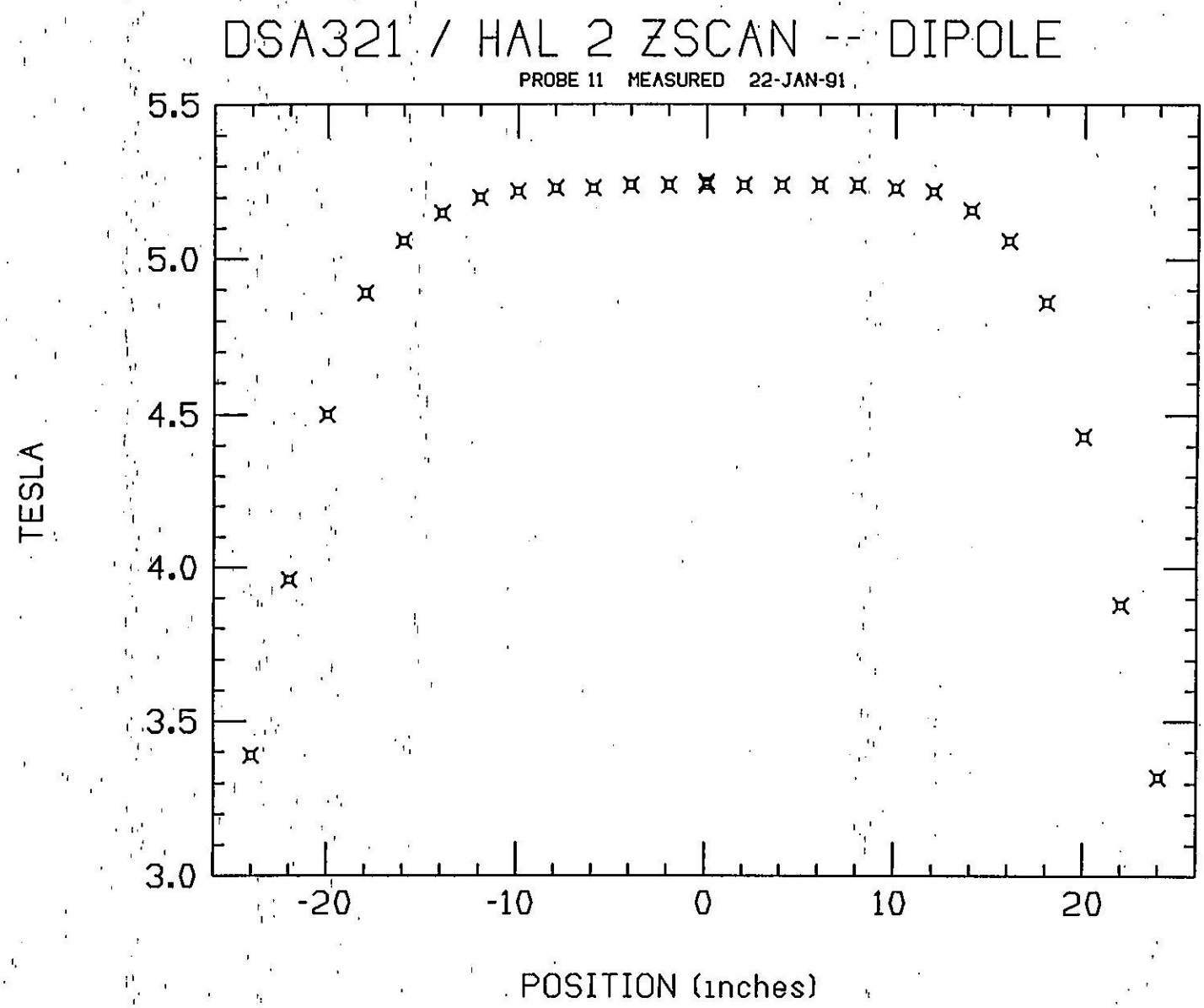
UNITS @ 1 CENTIMETER

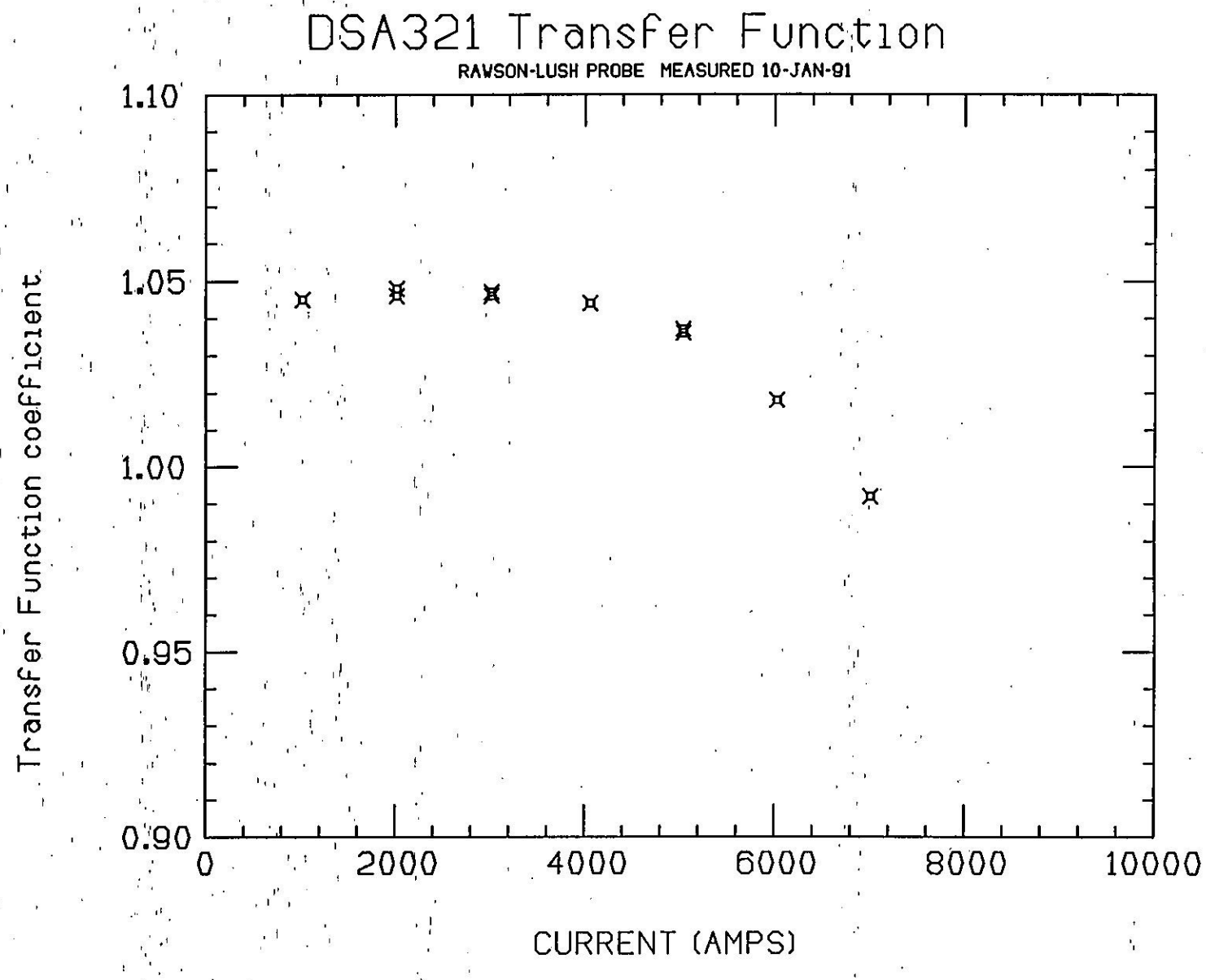


UNITS @ 1 CENTIMETER



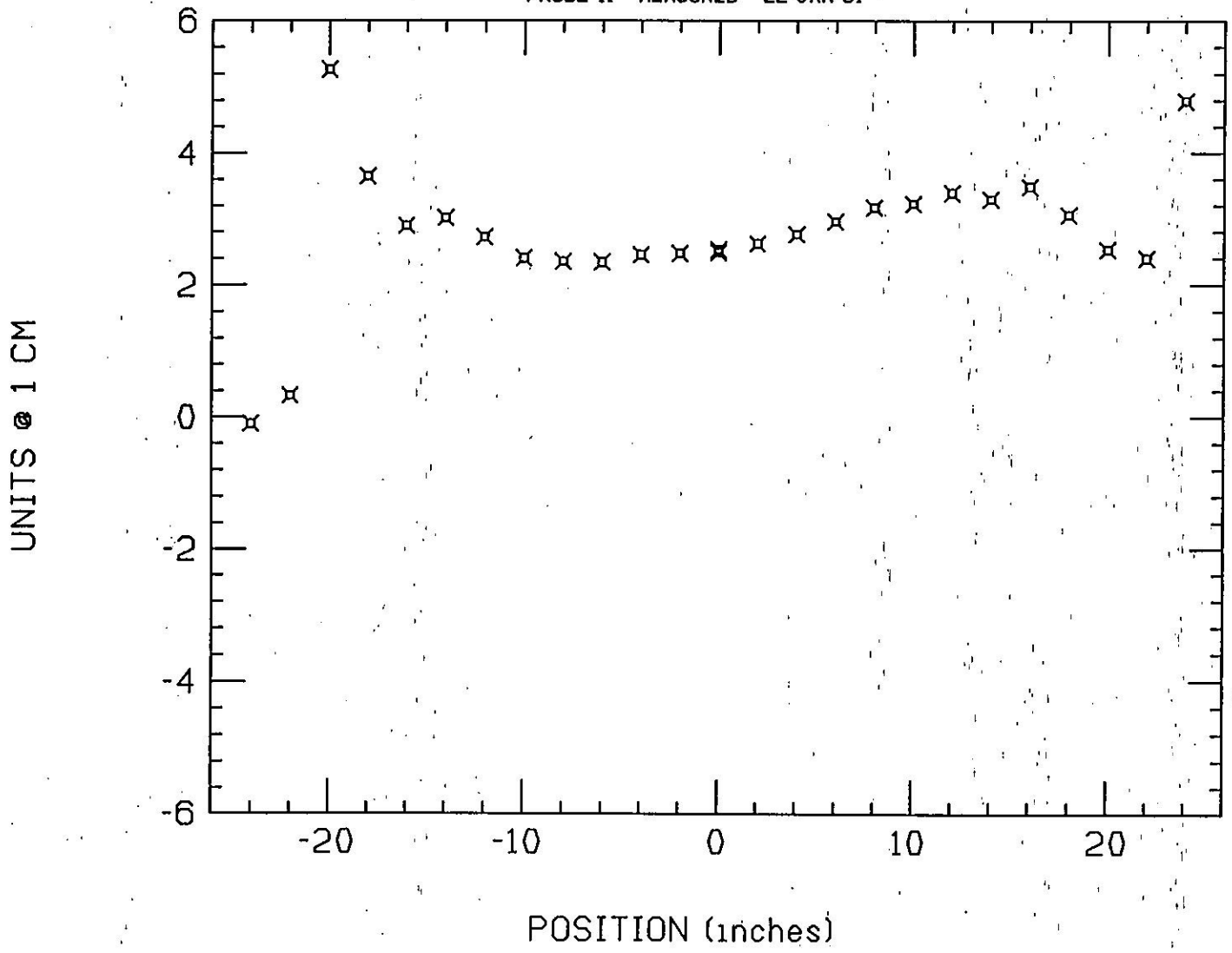

SKEW 12 POLE DSA321.EA001
PROBE 11 MEASURED 10-JAN-91 09:11:41
1.0
0.5
0.0
-0.5
-1.0
UNITS @ 1 CENTIMETER
-0.5
-0.25
0
0.25
0.5
POSITION (METERS)


DSA321 / HAL 2 ZSCAN -- DIPOLE
PROBE 11 MEASURED 22-JAN-91
TESLA
5.5
5.0
4.5
4.0
3.5
3.0
-20
-10
0
10
20
POSITION (inches)


DSA321 Transfer Function
RAWSON-LUSH PROBE MEASURED 10-JAN-91
Transfer Function coefficient
1.10
1.05
1.00
0.95
0.90
0
2000
4000
6000
8000
10000
CURRENT (AMPS)

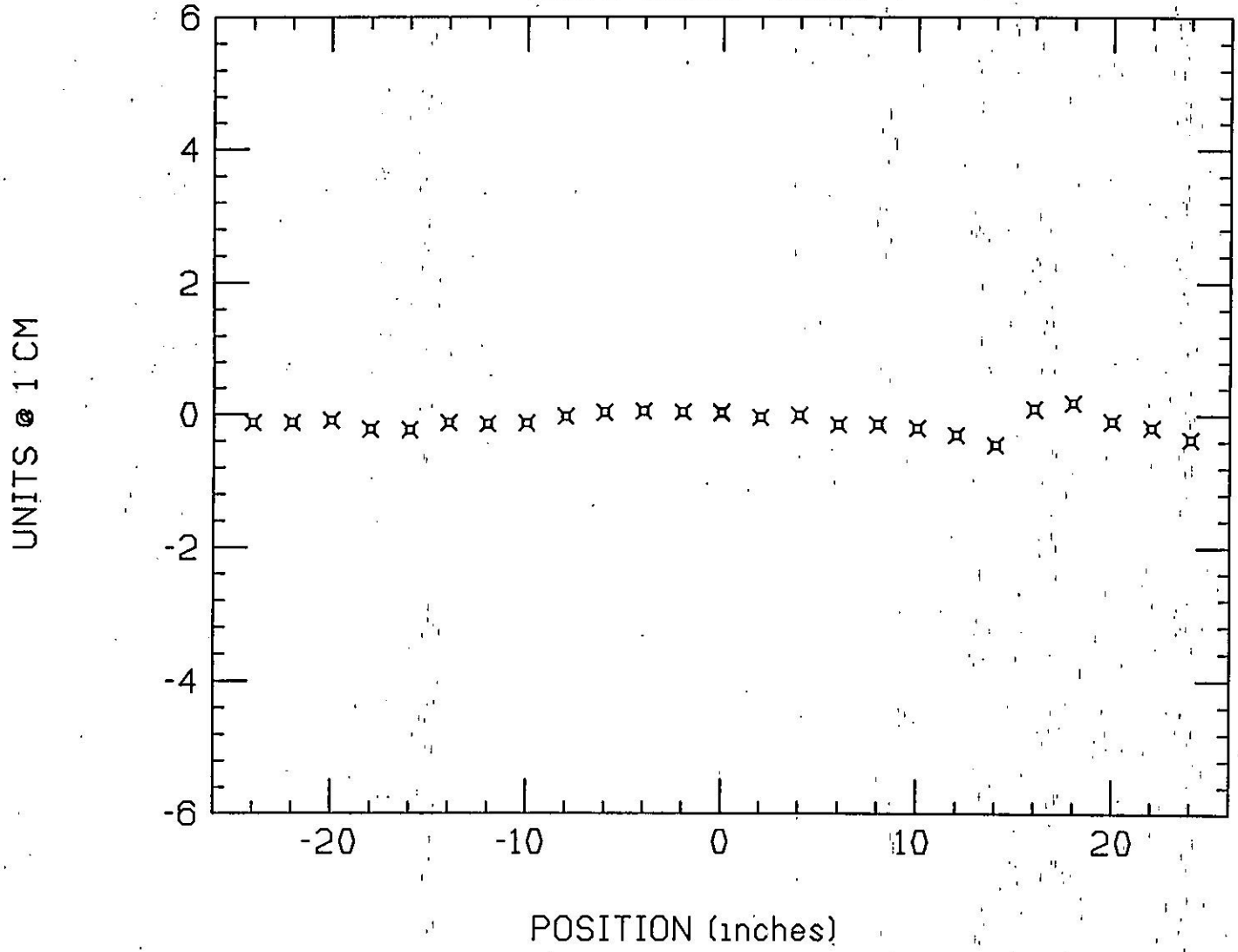
DSA321 / HAL 2 ZSCAN -- NORMAL SEXTUPOLE

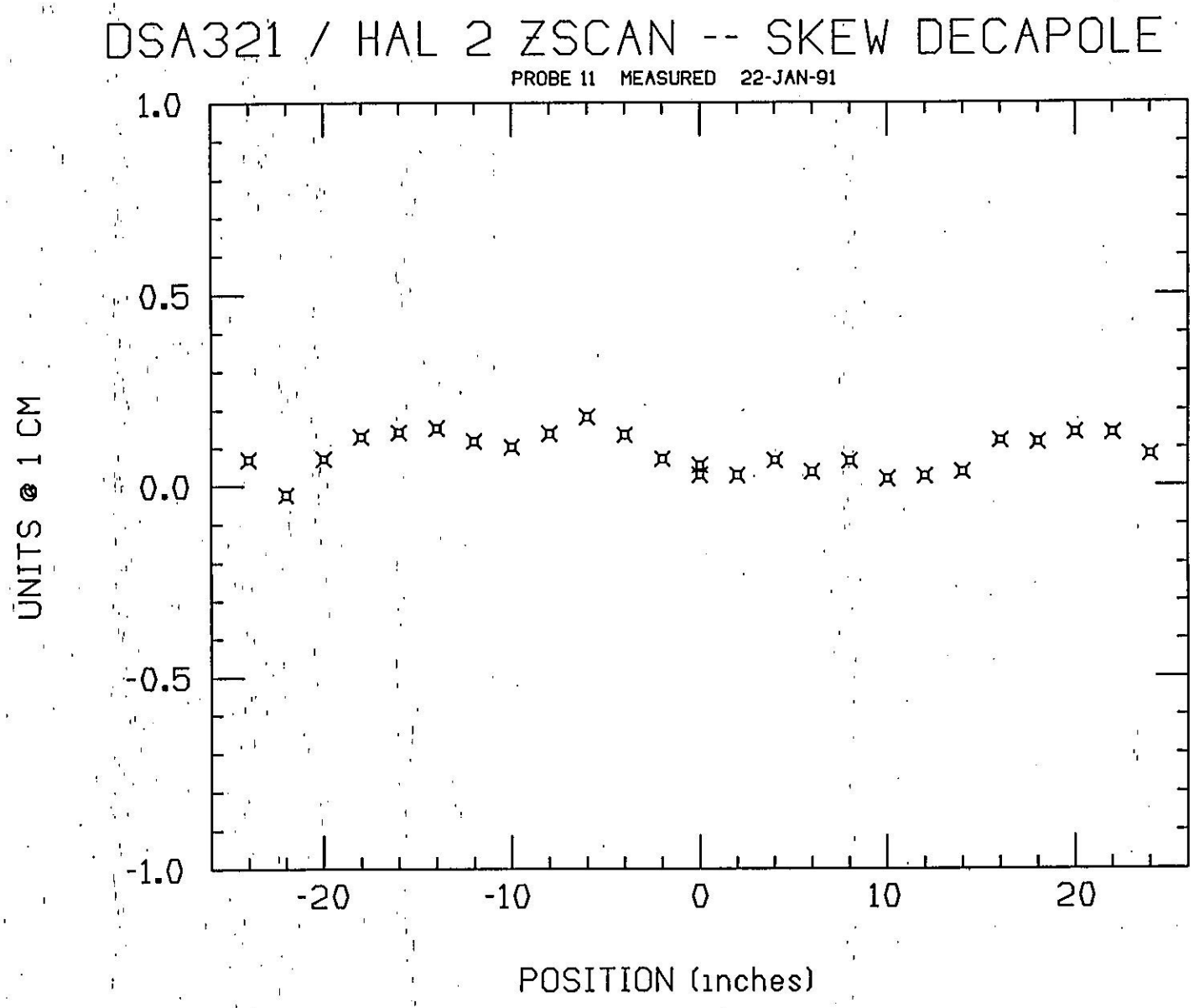
PROBE 11 MEASURED 22-JAN-91

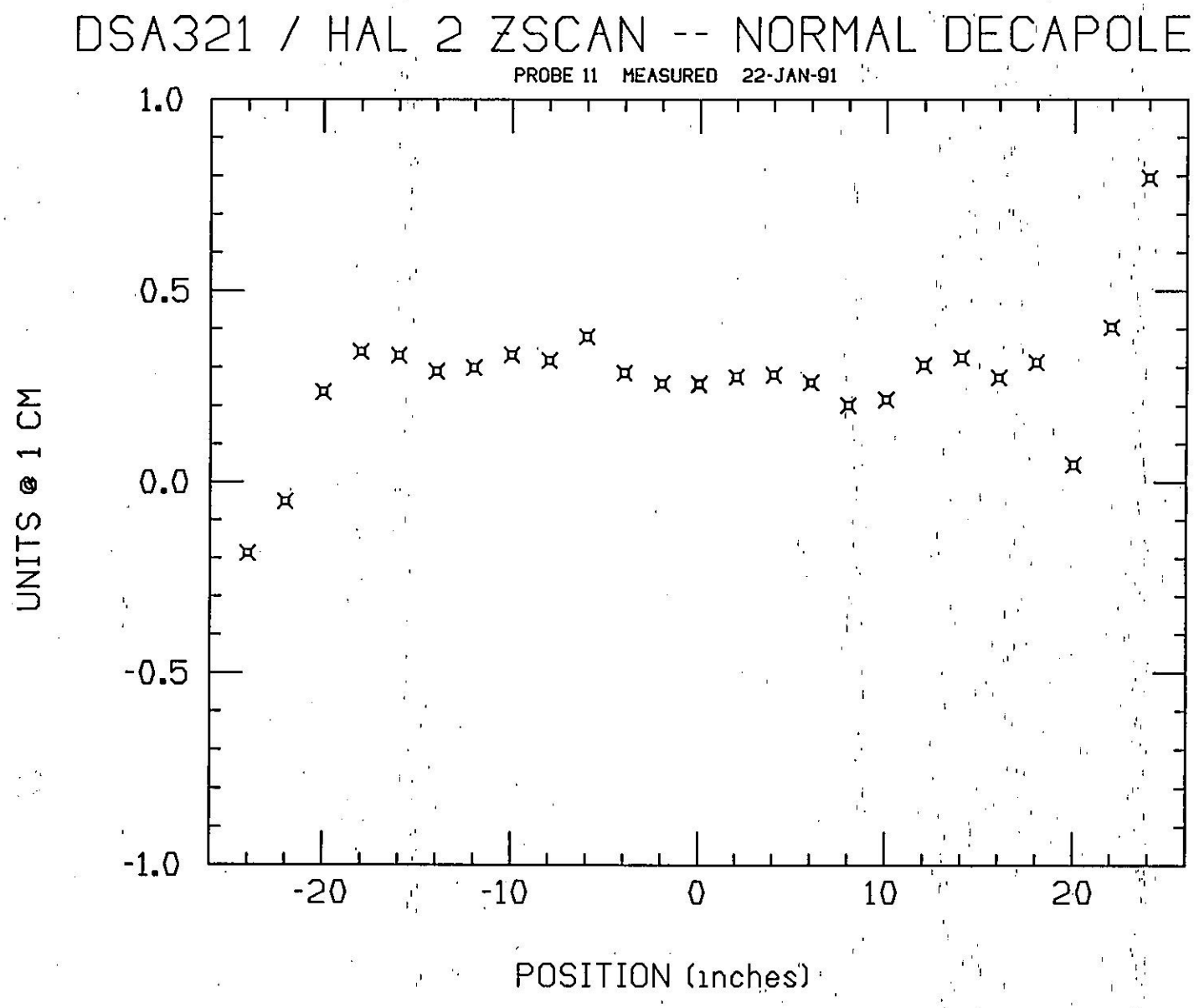


DSA321 / HAL 2 ZSCAN -- SKEW SEXTUPOLE

PROBE 11 MEASURED 22-JAN-91




DSA321 / HAL 2 ZSCAN -- SKEW DECAPOLE
PROBE 11 MEASURED 22-JAN-91
1.0
0.5
0.0
-0.5
-1.0
UNITS @ 1 CM
-20
-10
0
10
20
POSITION (inches)


DSA321 / HAL 2 ZSCAN -- NORMAL DECAPOLE
PROBE 11 MEASURED 22-JAN-91
1.0
0.5
0.0
-0.5
-1.0
UNITS @ 1 CM
-20
-10
0
10
20
POSITION (inches)

2/18/91

Distribution:

FNAL

J. Butteris
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J. Strait

SSCL

J. Tompkins

2/20/91 A. Devred
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