

COUNTING RATES OF THE LEAR EXTRACTED 309 MeV/c

AT THE END OF THE MEASUREMENT LINE

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The two dE/dx scintillator counters^{1,2} (30x30 mm², 1 mm in thickness), already tested for performance, were installed on a "beam scanner" at the end of the measurement line of the LEAR e5 extracted beam. They were used to measure (singles and coincidence) counting rates during LEAR spills no. 279 and no. 280. The ratio of counting rates of both singles over coincidence were ~ 1.02 in their aligned position. Background is negligible $\sim 10/100$. This set-up allows to measure with accuracy the intensity of 309 MeV/c \bar{p} and therefore one can determine the LEAR extraction efficiencies. The lines hereafter give details of the conditions of both counters and beam under which the counting rates were measured and summarize the measurements.

Figure 1 shows the optical part of the two identical dE/dx scintillator counters. They were interconnected with their associate electronic chains which were installed in the LEAR Control Room. Figure 2 is the block diagram of the interconnections. (These interconnections were identical with those of the performance tests of the same counters installed at the Foc. 1 of the central branch of the e6 extracted antiproton beam on the 12.4.1984. The antiproton momentum was also 309 MeV/c.)²

Figures 3 and 4 show respectively the displays of the MWPC1 and MWPC2 after the beam transport elements were set up. The transverse dimensions of the beam at MWPC2 position were: horizontal 4 mm,

vertical 8 mm. The MWPC2 is only 2 meters in front of our counters. Figure 5 shows oscilloscope photographs of the two counters A and B signals at 50 Ω impedance and 100 meters coaxial 50 Ω cables. Figure 6 shows the discriminator A and B signal feeding the coincidence inputs. Figure 7 are plots of the counting rates of the counters, singles A and B as well as coincidence A \cap B, against the horizontal positions of the scintillators, during LEAR spill no. 279. Figure 8 are the plots of the counting rates of A \cap B against horizontal and vertical beam displacement by E5DHN02 and E5DVN02 elements respectively. (Plots prepared by D. Dekkers during spill no. 280.) Figures 9 and 10 are plots of the counting rates coincidence A \cap B as function of time (minutes after start of spill) respectively for LEAR spill no. 279 and no. 280.

Table 1 summarizes the measurements and gives from minute to minute the counting rates of singles A and B as well as coincidence A \cap B.

References

1. J.P. Bovigny, MD LEAR, Séance du 18.3.1984.
2. V. Agoritsas, Monitoring the LEAR extracted beams, 12.4.1984, Progress Report of PS Instrumentation Consultants Meeting.

Distribution

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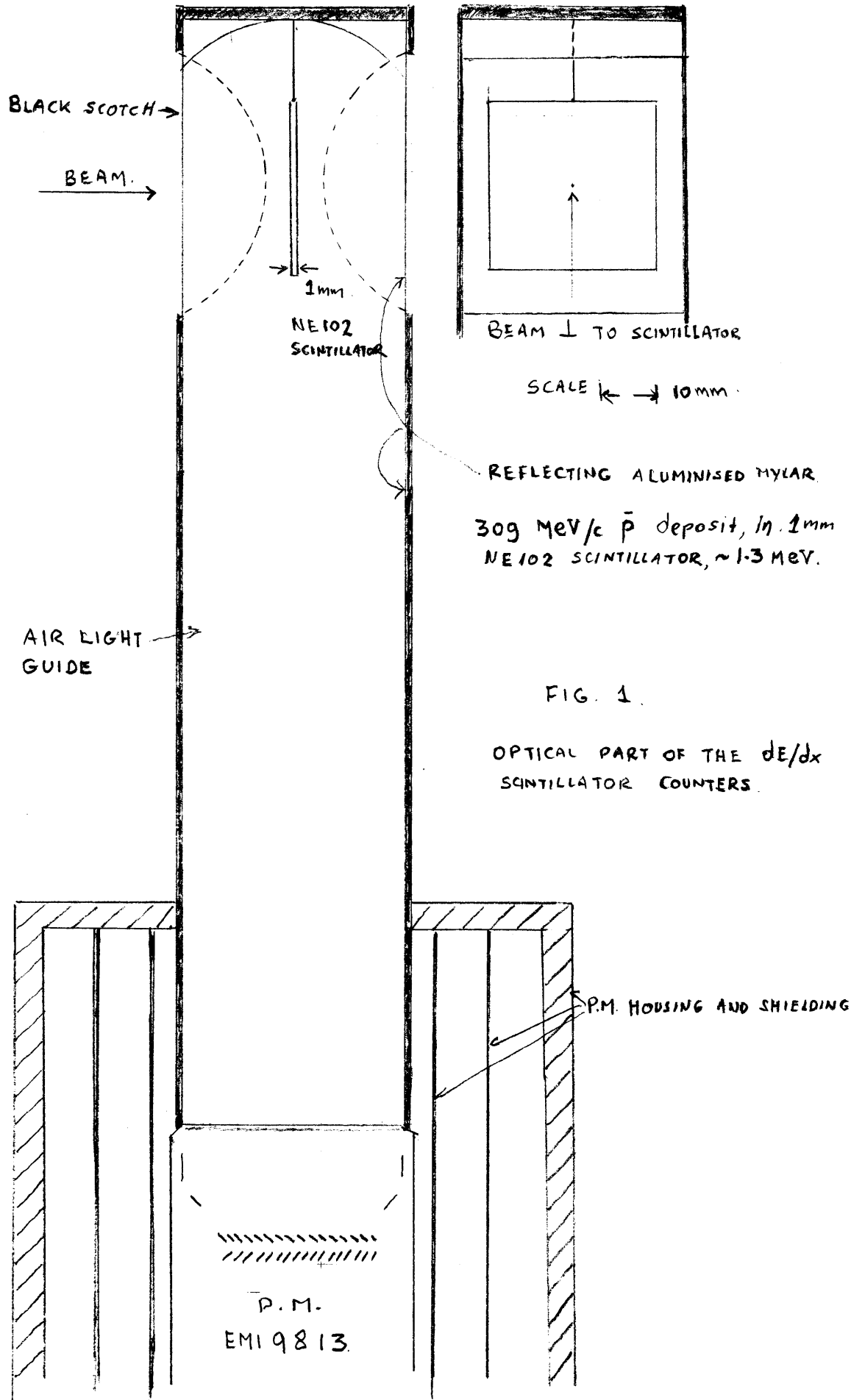


FIG. 1.

OPTICAL PART OF THE dE/dx SCINTILLATOR COUNTERS.

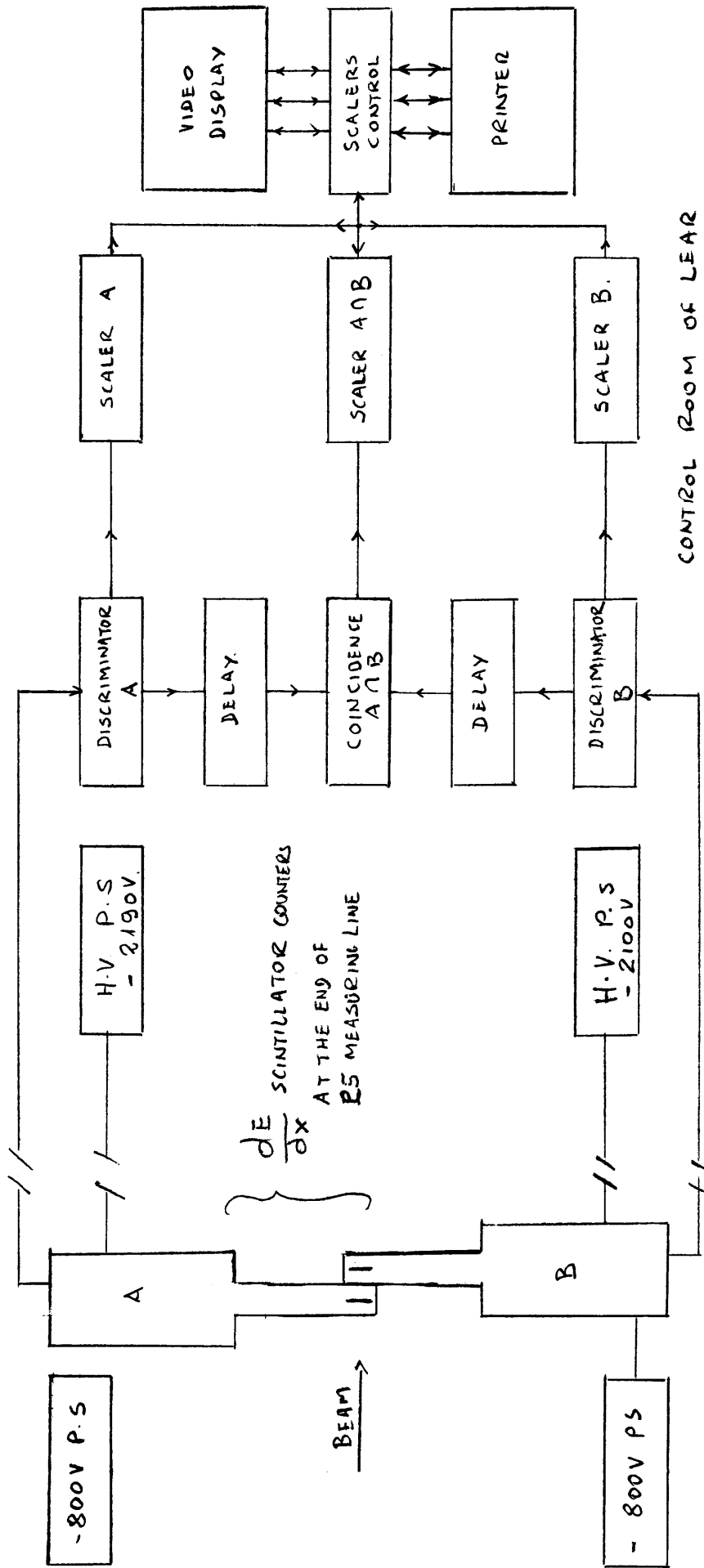


FIG. 2

BLOCK DIAGRAM OF dE/dx SCINTILLATOR COUNTERS INTERCONNECTIONS

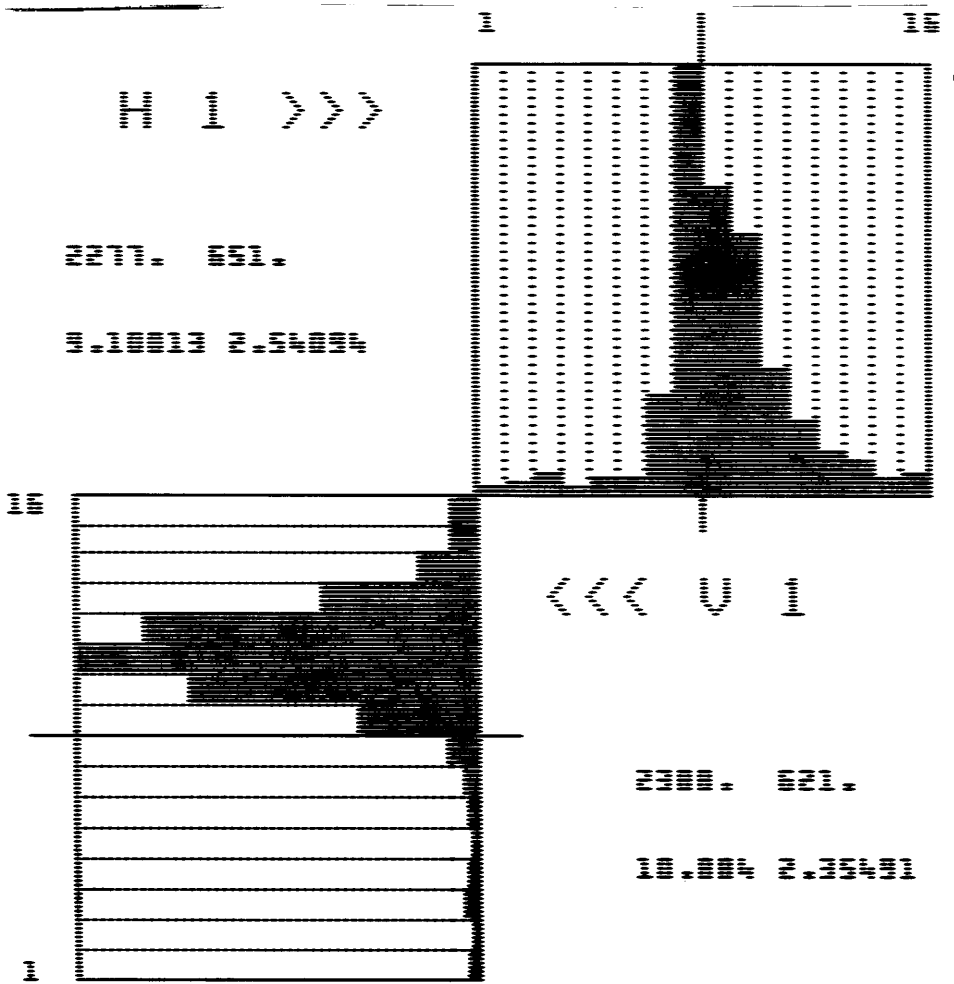


FIG. 3.

HORIZONTAL RESOLUTION
2 mm / CHANNEL

DISPLAYS
OF
MWPC 1

VERTICAL RESOLUTION
4 mm / CHANNEL

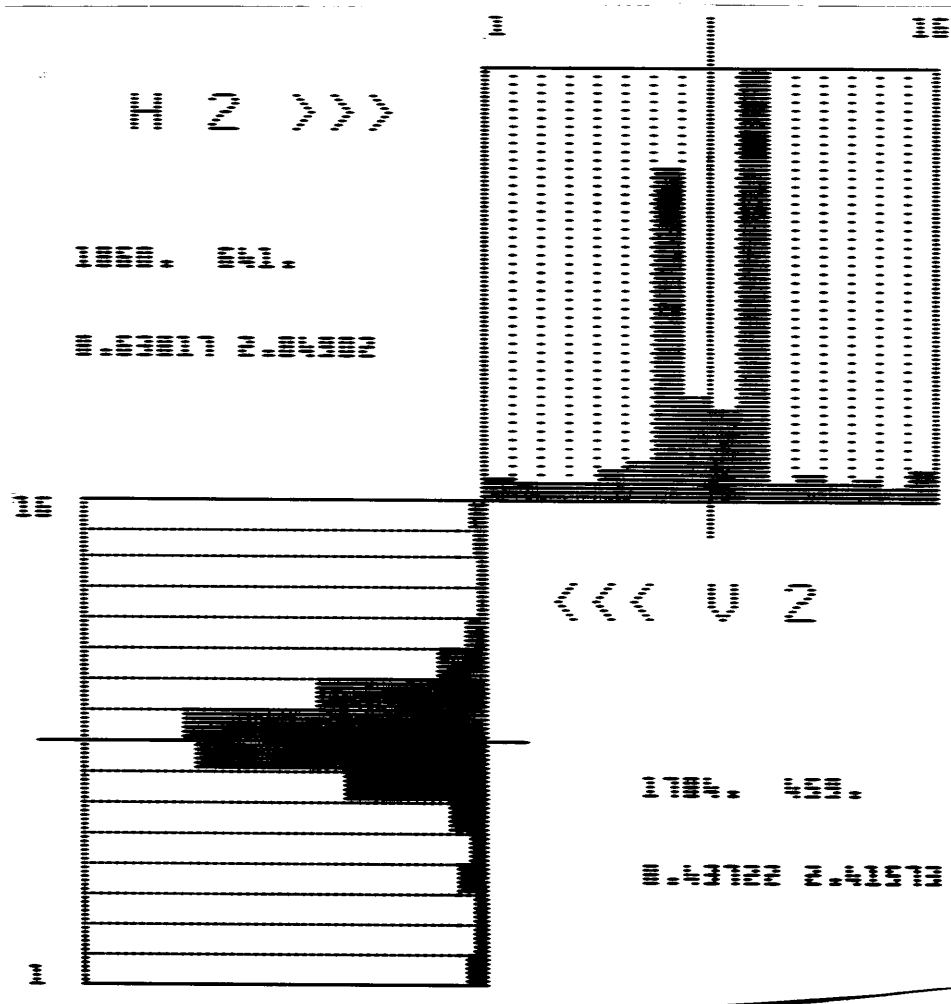


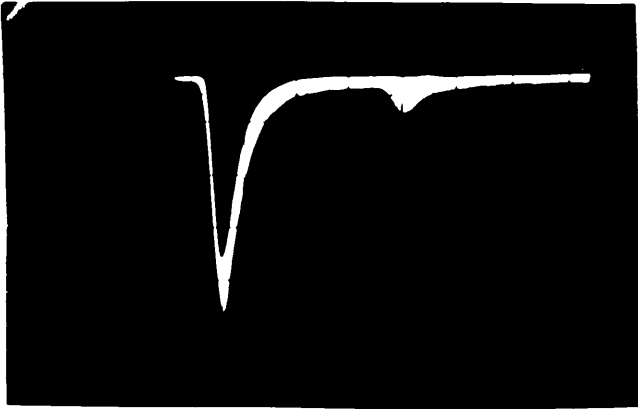
FIG. 4.

HORIZONTAL RESOLUTION
1 mm / CHANNEL

(N.B. CHANNELS 8 AND 9
ARE DEFECTIVE).

DISPLAYS
OF
MWPC 2

VERTICAL RESOLUTION
2 mm / CHANNEL



P.M. SIGNAL OF SCINT. COUNTER A

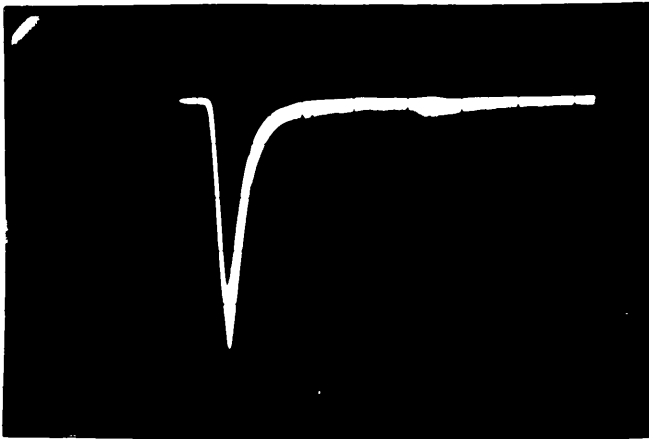
LAST DYNODES - 800V.
HT - 2190V

OSCIL. SETTINGS.

100 mV / DIV.
50 nsec / DIV.

AUTOTRIGGERED.

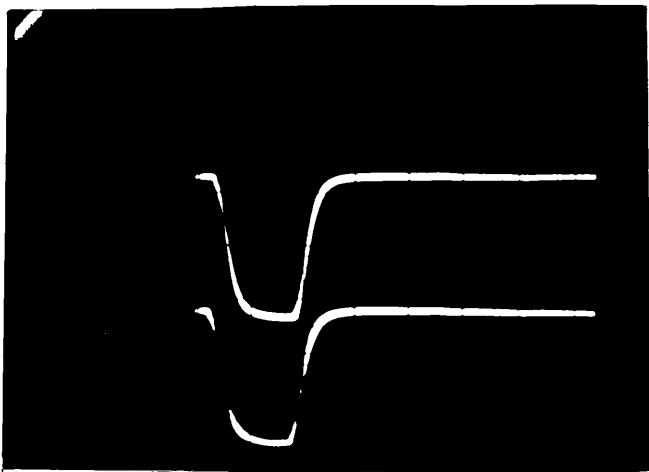
IMPEDANCE 50 Ω .



P.M. SIGNAL OF SCINT. COUNTER B.

LAST DYNODES - 800V.
HT. - 2100V.

FIG. 5.



← DISCRIMINATOR A OUTPUT

← DISCRIMINATOR B OUTPUT.

OSCIL. SETTINGS.

200 mV / DIV.
50 nsec / DIV.

TRIGGERED BY SIGNAL A.

FIG. 6.

3.5.84
LEAR SPILL # 279.

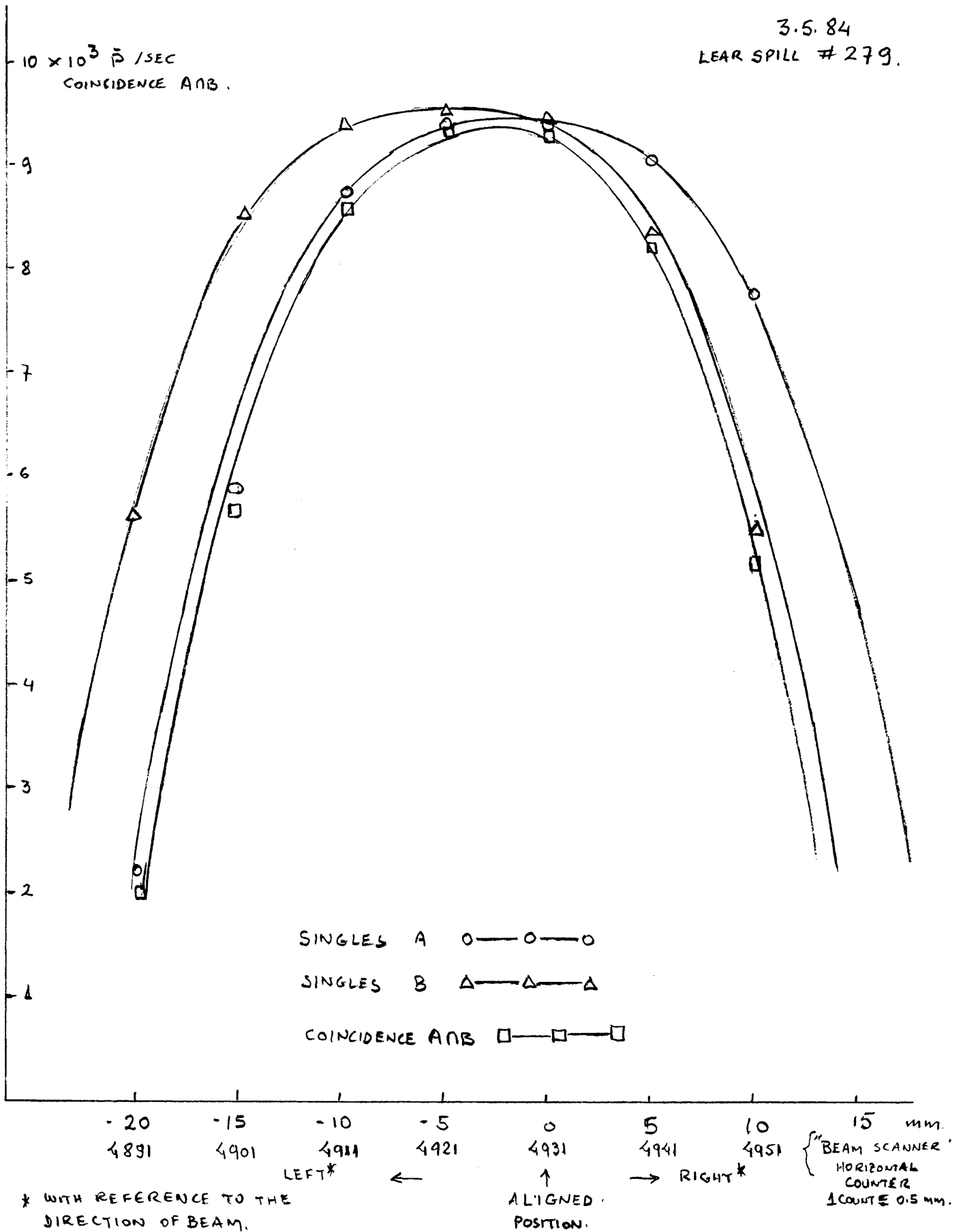


FIG. 7.

- FROM THESE PLOTS AND THE COUNTING RATES (SEE TABLE 4) ONE CAN FIND OUT:
1. > 98% OF THE BEAM WAS TRAVERSING BOTH SCINTILLATORS
 2. THERE IS 4 mm HORIZONTAL DIFFERENCE IN ALIGNEMENT OF SCINTILLATOR A WITH REFERENCE TO SCINTILLATOR B.

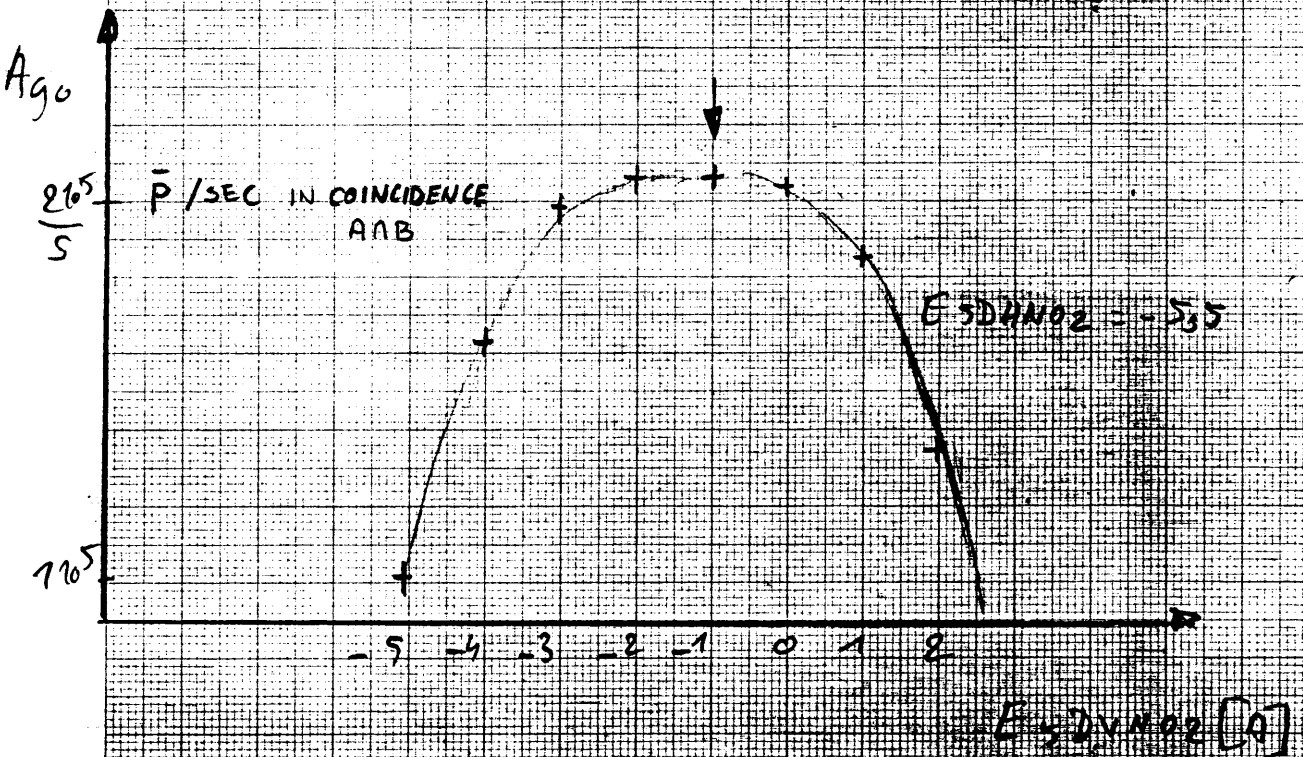
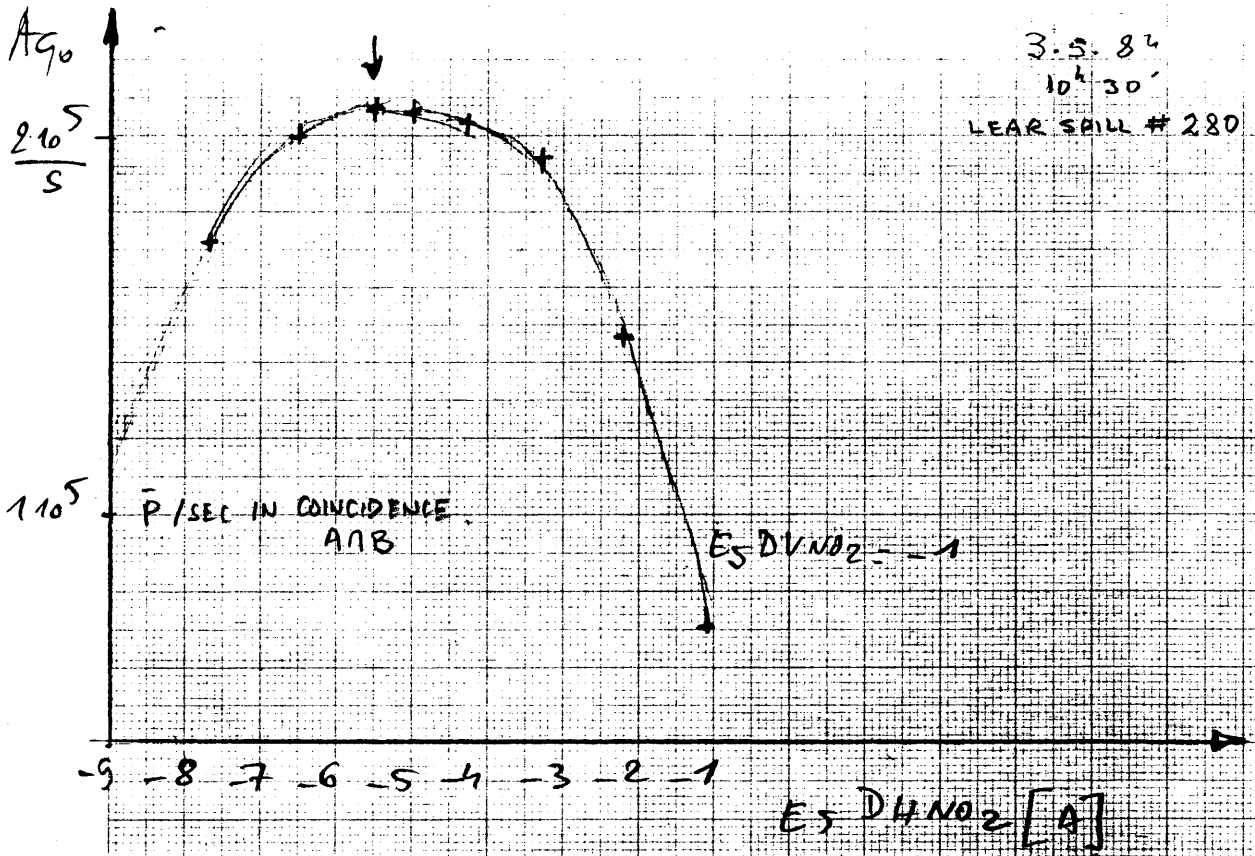


FIG. 2

BEFORE $\{ E_5 DV NO_2 = -5.5 \}$
 $\{ E_5 DV NO_2 = -1 \}$

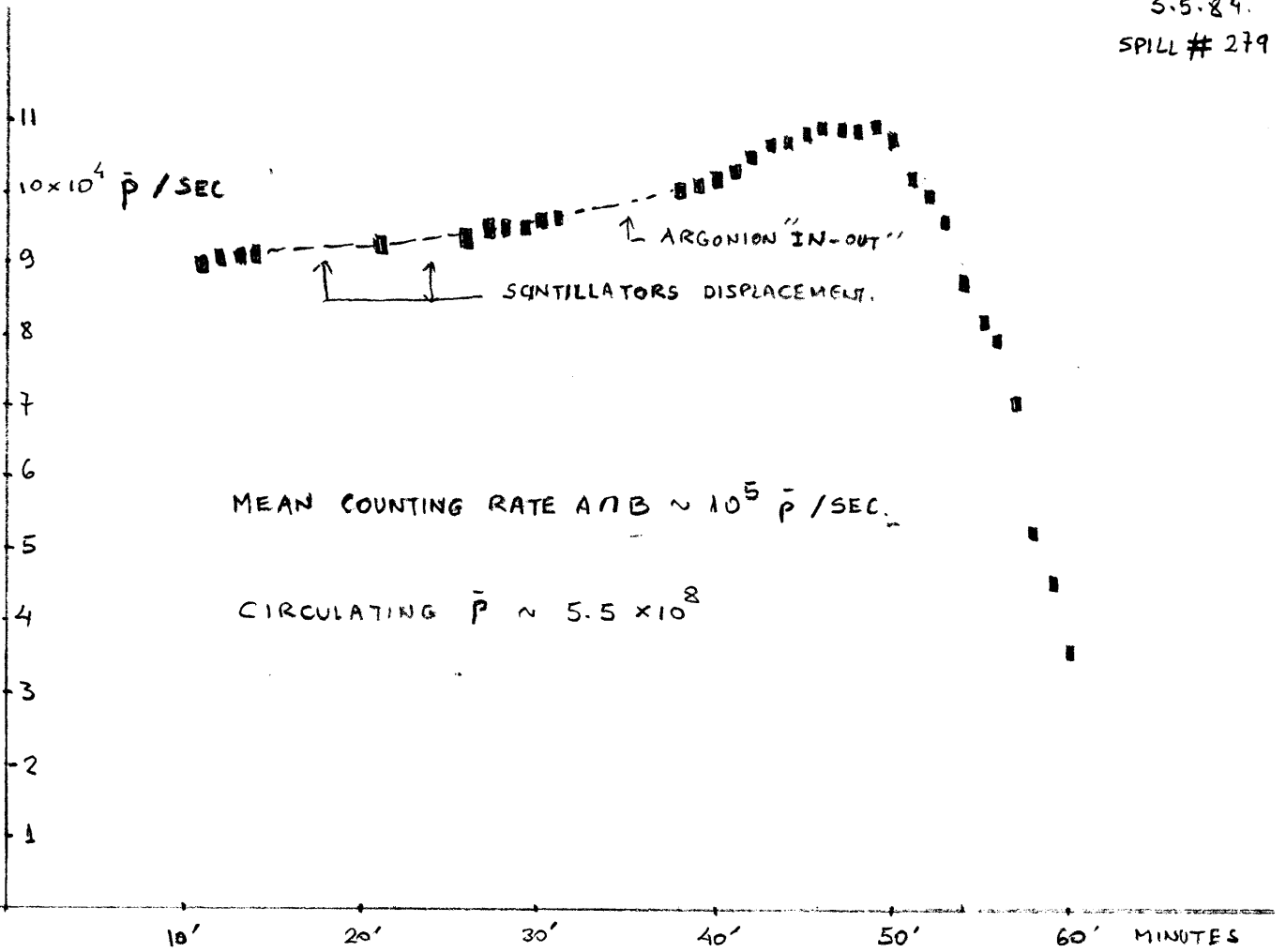


FIG. 9

(FROM START OF SPILL #279.)

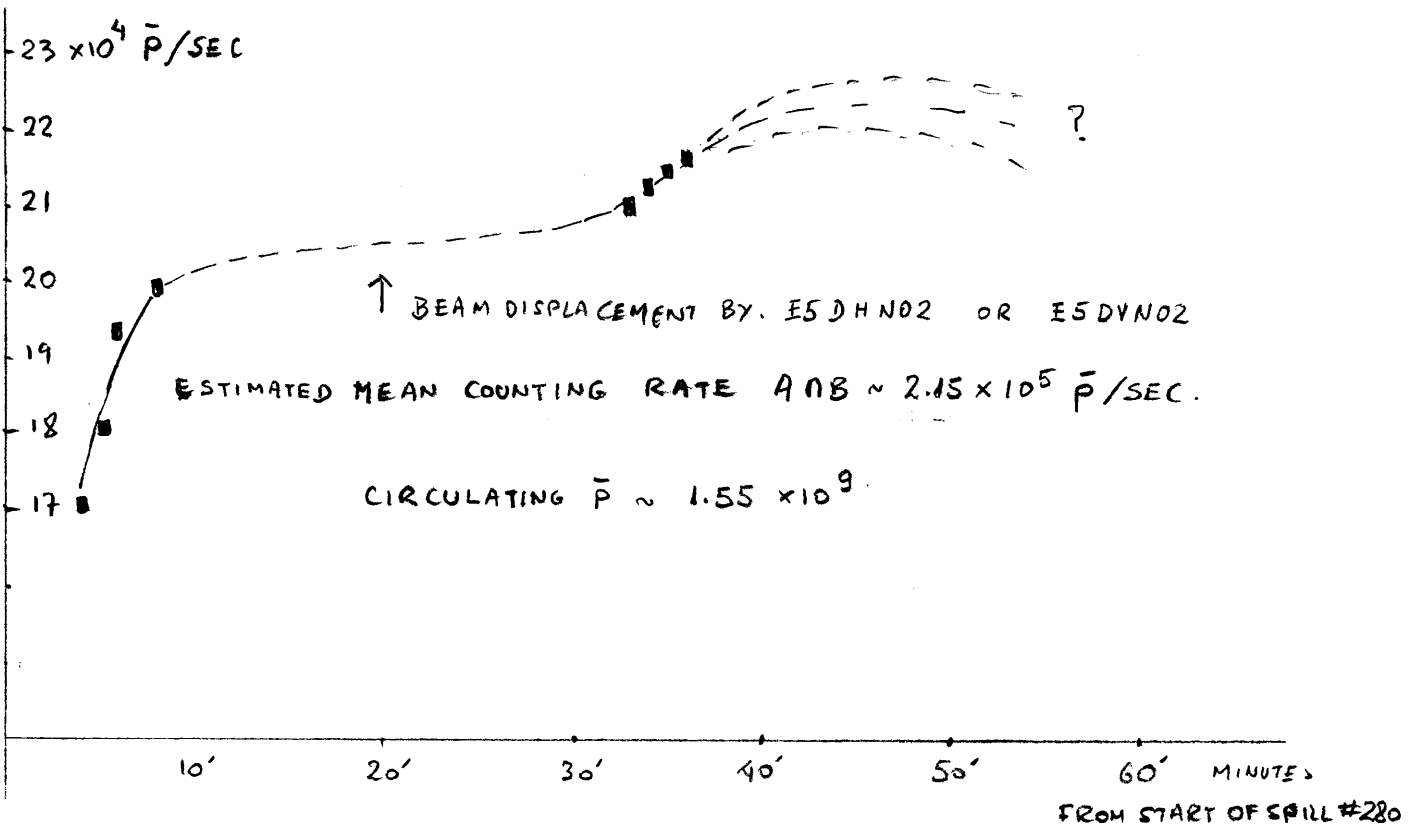


FIG. 10.

TABLE I
COUNTING RATES. (\bar{P}/SEC).

3.5.84
9400

LEAR SPILL	MINUTES AFTER START OF SPILL	SINGLES.		COINCIDENCE A n B	
		COUNTER A	COUNTER B		
# 279	11	91.0 x 10 ³	91.4 x 10 ³	89.8 x 10 ³	
	12	93.0 "	93.1 "	91.5 "	
	13	92.8 "	92.9 "	91.3	
	HORIZONTAL DISPLACEMENT OF SCINTILLATOR COUNTERS				
	22	94.7	94.7	93.0	
	25	94.8	95.0	93.4	
	26	95.6	95.7	94.2	
	27	95.8	95.9	94.4	
	28	95.9	96.1	94.4	
	29	96.8	96.9	95.4	
	30	96.7	96.9	95.3	
	37	101.2	101.3	100.	
	38	102.2	102.2	100.5	
	39	104.0	104.1	102.3	
	40	105.5	105.6	103.8	
	41	106.7	106.7	105.0	
	42	106.7	106.7	105.0	
	43	109.6	109.7	107.8	
	44	110.4	110.5	109.0	
	45	110.8	110.9	109.0	
	46	111.4	111.5	109.6	
	47	111.4	111.5	109.6	
	48	110.6	110.7	108.9	
	49	109.0	109.0	107.2	
	50	104.3	104.3	102.6	
	51	102.0	102.1	100.4	
	52	98.5	98.6	96.9	
	53	93.8	93.9	92.3	
	54	87.3	87.4	85.9	
	55	83.6	83.6	82.2	
56	72.2	72.2	71.0		
57	56.5	56.5	55.5		
58	50.5	50.5	49.6		
59	37.6	37.7	37.0		
60	B GND	0.11	0.12	0.0	
# 280	4	120. x 10 ³	120 x 10 ³	118 x 10 ³	
	5	173 "	173	171 "	
	6	182 "	182	179 "	
	7	194 "	195	192 "	
	8	199 "	199	196 "	
	DISPLACEMENT OF BEAM (HORIZONTAL AND VERTICAL)				
	32	210 "	214	209 "	
	33	211 "	215	210 "	
	34	215	219	214 "	
	36	B GND.	0.12	0.13	0.0