

Experiment & Calibration

LOG ~~BOOK~~ National[®] Brand
COMPUTATION NOTEBOOK

Department 07037/06035

Subject HIRA

Name #17 June 2010

Address _____

43-648

75 Sheets, 4 x 4 Quad., 11 3/4" x 9 1/4"



#3

0 73333 43648 8

Rediform Inc. • Coppell, TX 75019

Made in Mexico

CRDC2 mask calibration

Run #: 845	Date: 06/10/10	Your Name: <i>Alan</i>	Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: (mm)	Master: 9.0	MCP0: 197
Trigger: HIRA Singles MCP Singles	S800 Singles alpha S800+HIRA pulser Csl Singles junk		MCP1: 296	CSI_OR: 20
Attenuation:	MCP Target Drive Positions		CRAD04:	CRAD06:
Bp (segment 8):	MCP0 I250X-R	nylon mask mm	CRAD Ratio (4/6):	Trigger Live time: 98 %
Printed Bias Log Y N	MCP1 I250Y-R	nylon carbon mask mm		
Comments: CRDC2 mask calibration				

we paused the run and put CD2 target

Intensity Ramp

Run #: 846	Date: 06/10/10	Your Name:	Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: (mm)	Master:	MCP0:
Trigger: HIRA Singles MCP Singles	S800 Singles alpha S800+HIRA pulser Csl Singles junk		MCP1:	CSI_OR:
Attenuation: NO BEAM	MCP Target Drive Positions		CRAD04:	CRAD06:
Bp (segment 8):	MCP0 I250X-R	nylon mask mm	CRAD Ratio (4/6):	Trigger Live time: %
Printed Bias Log Y N	MCP1 I250Y-R	nylon carbon mask mm		
Comments: Fail bias on				

Run #: 847	Date: 06/10/10	Your Name:	Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: (mm)	Master: 30	MCP0: 550
Trigger: HIRA Singles MCP Singles	S800 Singles alpha S800+HIRA pulser Csl Singles junk		MCP1: 870	CSI_OR: 2.5
Attenuation: 1	MCP Target Drive Positions		CRAD04: 0.5	CRAD06: 10.3
Bp (segment 8):	MCP0 I250X-R	nylon mask mm	CRAD Ratio (4/6):	Trigger Live time: 92 %
Printed Bias Log Y N	MCP1 I250Y-R	nylon carbon mask mm		
Comments: Fail bias on Attenuator 1 xFP2 1 million				

Run #: 848	Date: 06/10/10	Your Name:		Raw Scaler Rates	
Beam: ^{56}Ni ^{58}Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: 100(mm)		Master: 4.5	MCP0: 106 k
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser	Csl Singles junk	MCP1: 164 k	CSI_OR: 0
Attenuation: 10	MCP Target Drive Positions				CRAD04: 0.1
Bp (segment 8):	MCP0 I250X-R	mylar mask	143 mm	CRAD06: 1.8	CRAD Ratio (4/6):
Printed Bias Log Y N	MCP1 I250Y-R	mylar carbon mask	89 mm	Trigger Live time: 99 %	
Comments: Attenuator 10, MCP foil bias on					

Run #: 849	Date: 06/10/10	Your Name:		Raw Scaler Rates	
Beam: ^{56}Ni ^{58}Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: (mm)		Master: 0.5	MCP0: 9.8 k
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser	Csl Singles junk	MCP1: 14.3 k	CSI_OR: 0
Attenuation: 100	MCP Target Drive Positions				CRAD04:
Bp (segment 8):	MCP0 I250X-R	mylar mask	mm	CRAD06:	CRAD Ratio (4/6):
Printed Bias Log Y N	MCP1 I250Y-R	mylar carbon mask	mm	Trigger Live time: 100%	
Comments: Attenuator - 100					

Run #: 850	Date: 06/10/10	Your Name:		Raw Scaler Rates	
Beam: ^{56}Ni ^{58}Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: (mm)		Master:	MCP0:
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser	Csl Singles junk	MCP1:	CSI_OR:
Attenuation: 100 NO	MCP Target Drive Positions				CRAD04:
Bp (segment 8):	MCP0 I250X-R	mylar mask	mm	CRAD06:	CRAD Ratio (4/6):
Printed Bias Log Y N	MCP1 I250Y-R	mylar carbon mask	mm	Trigger Live time:	
Comments: MCP foil bias off Attenuator - 100					

Run #: 851	Date: 06/10/10	Your Name: Max		Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ Blank	CD ₂ (1) carbon	CD ₂ (2) mask	Position: (mm)	Master: 0.5
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser		CsI Singles junk	MCP0: 6.41K
Attenuation: 100	MCP Target Drive Positions				MCP1: 7.71K
Bp (segment 8):	MCP0 I250X-R	mylar	mask	mm	CSI_OR: 0.5
Printed Bias Log Y N	MCP1 I250Y-R	mylar	carbon mask	mm	CRAD04:
Comments:					CRAD06:
					CRAD Ratio (4/6):
					Trigger Live time: 100%

Attenuator 100, mcp foil bias off

Run #: 852	Date: 06/10/10	Your Name: T		Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ Blank	CD ₂ (1) carbon	CD ₂ (2) mask	Position: (mm)	Master: 5.5
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser		CsI Singles junk	MCP0: 71K
Attenuation: 10	MCP Target Drive Positions				MCP1: 85K
Bp (segment 8):	MCP0 I250X-R	mylar	mask	mm	CSI_OR: 0.5
Printed Bias Log Y N	MCP1 I250Y-R	mylar	carbon mask	mm	CRAD04:
Comments:					CRAD06:
					CRAD Ratio (4/6):
					Trigger Live time: 90%

Att: 10 MCP Foil bias off

Run #: 853	Date: 06/10/10	Your Name:		Raw Scaler Rates	
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ Blank	CD ₂ (1) carbon	CD ₂ (2) mask	Position: (mm)	Master: 21.5
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser		CsI Singles junk	MCP0: 378K
Attenuation: 1	MCP Target Drive Positions				MCP1: 411K
Bp (segment 8):	MCP0 I250X-R	mylar	mask	mm	CSI_OR: 1.5
Printed Bias Log Y N	MCP1 I250Y-R	mylar	carbon mask	mm	CRAD04:
Comments:					CRAD06:
					CRAD Ratio (4/6):
					Trigger Live time: 99%

Att: 1 MCP Foil bias off

Run #: 854	Date: 06/10/10	Your Name: <i>Jelav</i>	Raw Scaler Rates
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: 100 (mm)	Master: 0 MCP0: 10 MCP1: 4 CSI_OR: 0 CRAD04: CRAD06: CRAD Ratio (4/6): Trigger Live time: 100
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser	Csl Singles junk
Attenuation:	MCP Target Drive Positions		
Bp (segment 8): 2.704	MCP0 I250X-R	mylar mask	143 mm
Printed Bias Log Y N	MCP1 I250Y-R	mylar carbon mask	89 mm
Comments:	NO BEAM, Foil off.		

END of intensifying ramp

Run #: 855	Date: 06/10/10	Your Name: <i>Jelav</i>	Raw Scaler Rates
Beam: ⁵⁶ Ni ⁵⁸ Ni α other:	Target: CH ₂ CD ₂ (1) CD ₂ (2) Blank carbon mask	Position: 100 (mm)	Master: 25 MCP0: 520 K MCP1: 810 K CSI_OR: 2.5 CRAD04: 0.6 CRAD06: 10 CRAD Ratio (4/6): Trigger Live time: 99
Trigger: HiRA Singles MCP Singles	S800 Singles alpha	S800+HiRA pulser	Csl Singles junk
Attenuation: 1	MCP Target Drive Positions		
Bp (segment 8): 2.704	MCP0 I250X-R	mylar mask	143 mm
Printed Bias Log Y N	MCP1 I250Y-R	mylar carbon mask	89 mm
Comments:	XFP ~ 977K.		

~~Run 856 06/10/10
⁵⁶Ni; CD₂ (2); S800+HiRA
MCP0: mylar
MCP1: mylar
ATTN: 1
Bp: 2.704~~

(continuation of Run 855)
Run 856 α (alpha) calibration
Target: Viewer

Run 857

α -calibration (alpha)

Target: Viewer Blank

Run 858

α (alpha) calibration

Target: Blank

Run 859

Pulser run on dE's

ramp 0-1V, 21 steps, 20s

Run 860, Pulser run on dE's

ramp 0-1.6V, 33 steps, 15s

Run 861 Pulser run on EB's (MB 0+1)

ramp 0-9 V, 19 steps, 10s

Run 862 Pulser run on EB's (MB 0+1)

0-9V, 27 steps, 10s
0-8.6

Run 863 Pulser run on EF (MB 0+1)

0-9 V, 19 steps, 10sec

~~Run 864 Pulser run on EF (MB 0+1)~~

~~0-2V 21 steps,~~

Run 864 Pulser ramp on EB (MB 2+3)
0-9V, 19 steps, 10 sec

Run 865 Pulser ramp on EB (MB 2+3)
0-8.6V, 87 steps, 10 sec

Run 866 Pulser ramp on EF (MB 0)
0-9V, 19 steps, 10 sec

Run 867 Pulser ramp on EF (MB 0)
0-8.6V, 87 steps, 10 sec

Run 868 Pulser ramp on EB (MB 3 & 4)
0-9V, 19 steps, 10 sec

Run 869 Pulser ramp on EB (MB 3 & 4)
0-8.6V, 87 steps, 10 sec

Run 870 Pulser ramp on EF (MB 1 & 2)
0-9V, 19 steps, 10 sec on each MB

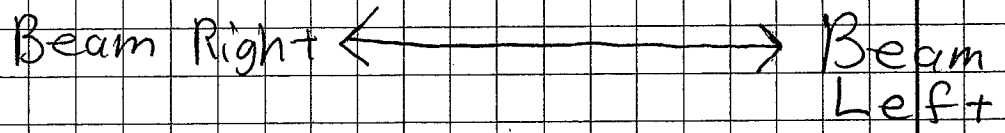
Run 871 Pulser ramp on EF (MB 1 & 2)
0-8.6V, 87 steps, 10 sec on each MB

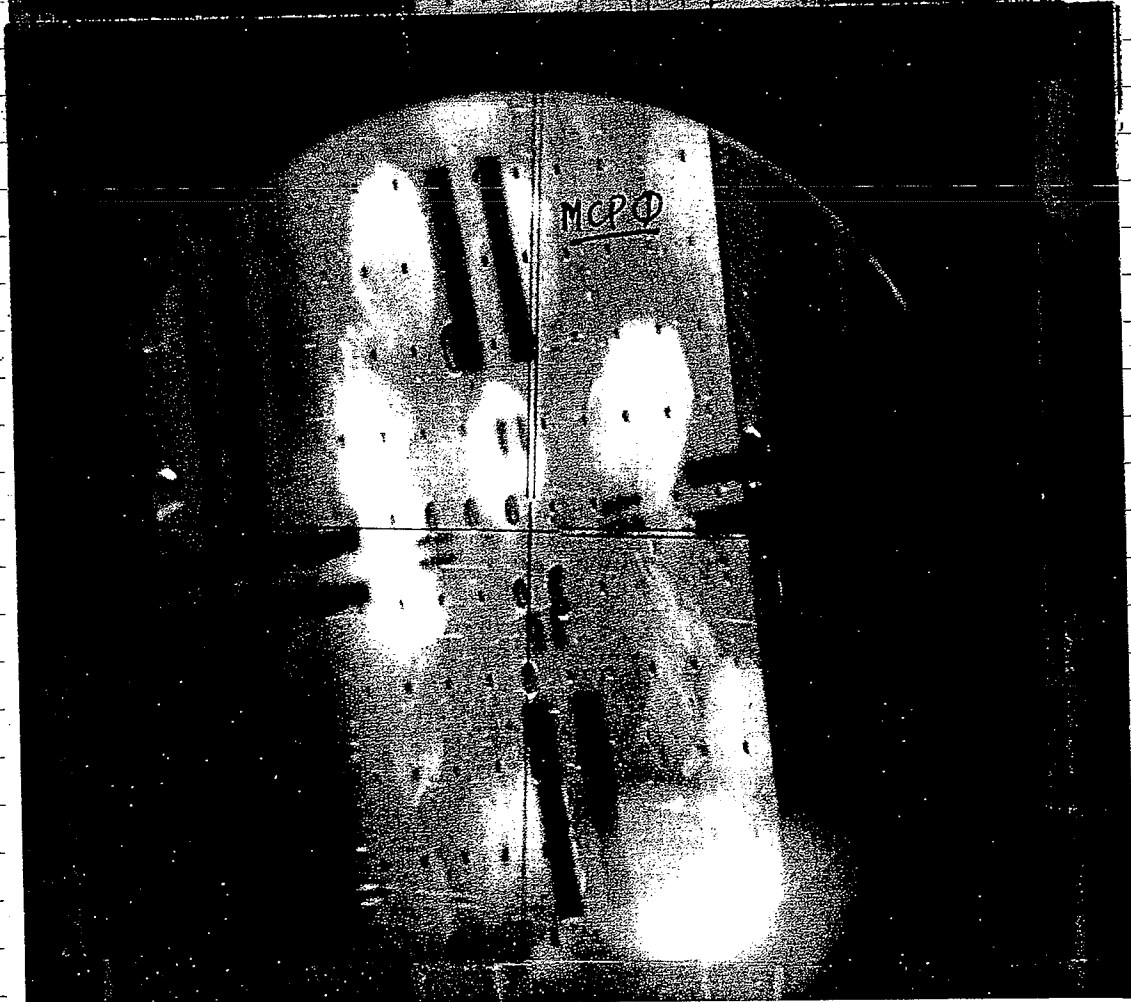
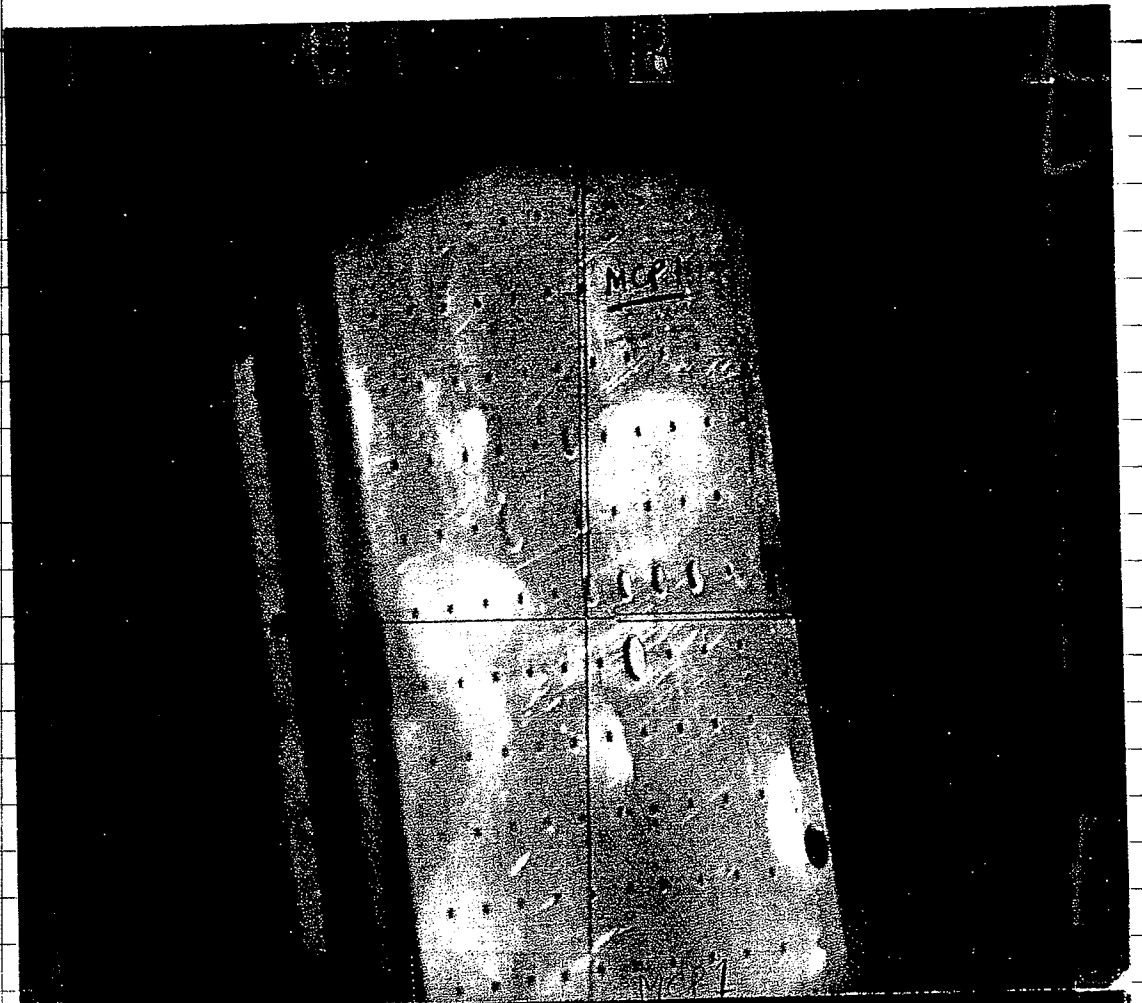
Run 872 Pulser ramp on EF (MB 3 & 4)
0-9V, 19 steps, 10 sec on each MB

Run 873 Pulser ramp on EF (MB 3 & 4)

Send 2 pulses to pulse EF at same time

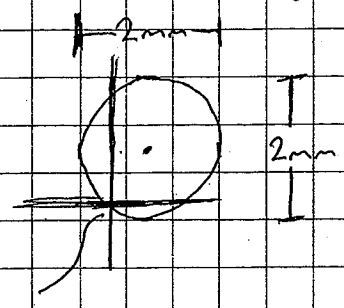
As seen through jig transit mirror





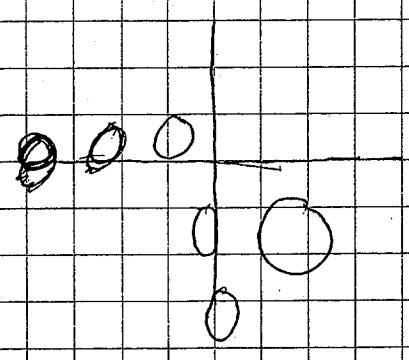
at 264.5 on target drive

Target Mark

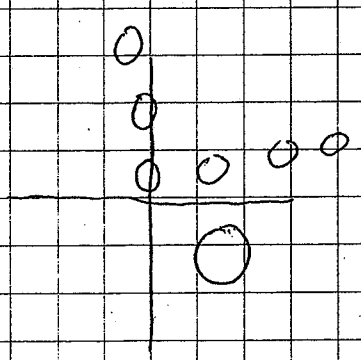


crosshair

MCP 0 Mark @ 219 on Drive



MCP 1 Mark @ 241



Measured w/ Thermo

α pin source Activity

9:30 AM

16 June 2010

CPM @ ~ 5 cm

-1	dead	190 w/ b.g. 30 P15
2		60 w/ b.g. 20 (20 e.lam) P8
3	65	
4	130	- P17
5	250	- P16
6	200	P6
7	100	P5
8	100	P4
9	245	- P3
10	70	- P2
11	90	- P1
12	90	- P0
13	1100	- P7
14	350	- P12
15	320	- P13
16	130	- P14
17	140	- P9
18	100	- P10
19	100	- P11
20		
	B.g.	~ 40 cpm
0	90	- P19
1	120	- P18
2	70	

- * P14 → Couldn't bias
- P15 → Couldn't bias - take out pin source
- * P16 → Couldn't bias.
- P1 → issue of with one clip
- P8 → Pin source - take out

		source strength	EF, EB	
P0	- 8250	90	(17, 15)	
P1	-		(15, 16)	✓ <u>2 pin</u> → chip problem
P2	- 14059	70	(17, 15)	
P3	- 15604	245	(16, 16)	
P4	- 1605	100	(16, 16)	
P5	- 6483	100	(16, 15)	
P6	- 12890	200	(17, 15)	
P7	- 109448	100	(16, 16)	
P8	-			
P9	- 1781	140	(17, 15)	✓
P10	- 1874	100	(16, 15)	
P11	- 5239	100	(16, 15)	
P12	- 62474	350	(17, 15)	
P13	- 59650	320	(18, 15)	
P14	-		(17, 15)	✓
P15	-			
P16	-		(16, 15)	✓
P17	- 4858	130	(16, 16)	
P18	- 3889	120	(17, 16)	
P19	- 3996	90	(16, 15)	

6/17/10

Measuring

Pin

Strengths

Pin #

CPM @ 5cm

CPM @ ~1cm

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 1

120
120
60
70
~~135~~
300
100

310

470
450
90
240
1700
1600
290

background = 34
45
42

80

310

Back ground = 70 cpm (@ 1 cm)

2nd Batch of Pin Sources

Measured @ ¹⁻² 1 cm w/ bg. = 35 cpm

A	490	@ 5cm 130	→ (17) Frame #
B	180		← (18)
C	125		
D	830	300	← (13)
E	1600	@ 5cm E = 370	
F	680	@ 5cm F = 270	← (19)
G			

Frame #			P5: no pin source.
(16)	115 @ 5cm		- P18
(12)	260 @ ^{1.5} 1 cm	135 @ 5cm	- (P11)
(11)	1000	280	- P13
(10)	630	130	- P4
(9)	460	170	- P10
(8)	1400	220	- P9
(7)	650	190	P3
(6)	785 1700	400 400	- P7
(5)	370	110	- P3
(4)	130	110	- P0
(3)	300	180	- P2
(2)	115	80	← P5 → not used
(1)	400	80 ⁷¹	- P6

Frame #	Cpm @ 5 cm	P
13	300	P14
14	310	P16
15	300	P17
17	130	P19
19	270	P12

228Th energies

5.42315 MeV

After loss in Au foil, mylar, 1 μ m dead layer

5.0509 MeV

5.68537 MeV

5.3268 MeV

6.28808 MeV

5.9532 MeV

6.77830 MeV

6.4616 MeV

~~8.78486~~

8.78486 MeV

8.521 MeV.

```
#####
pedestal.on: 1
gain.on: 1
deviation.on: 1
# -----
gain.log.on: 0
# -----
scale.in_MeV: false
spectrum.range.min: 1500.
spectrum.range.max: 5000.
spectrum.sigma: 5.
spectrum.chi2/NDF.4peaks: 10
spectrum.chi2/NDF.5peaks: 500
# -----
pedestal.thresh: 10
pedestal.sigma: 15.
# -----
# 228Th 5.42315 5.68537 6.28808 6.77830 8.78486
# Au window=50ug/cm^2, mylar foil=1.9um, deadlayer=1.0um
alpha.energy.level: 5.0509
+alpha.energy.level: 5.3268
+alpha.energy.level: 5.9532
+alpha.energy.level: 6.4616
+alpha.energy.level: 8.521
#####
```

loss in mylar = 152 keV

loss in Au = 8 keV

loss in dead layer = 100 keV.

MCP HG/LG MATCHING

Run 890

of MCP 0 pulser calibration
of corners, pulser range 0-1V,
atten x200, 21 values.

Run 891

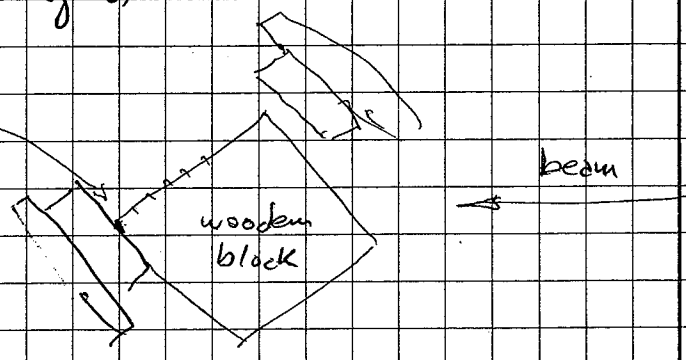
same, with MCP 1

MCP 1 Magnetic Field

18 June 2010

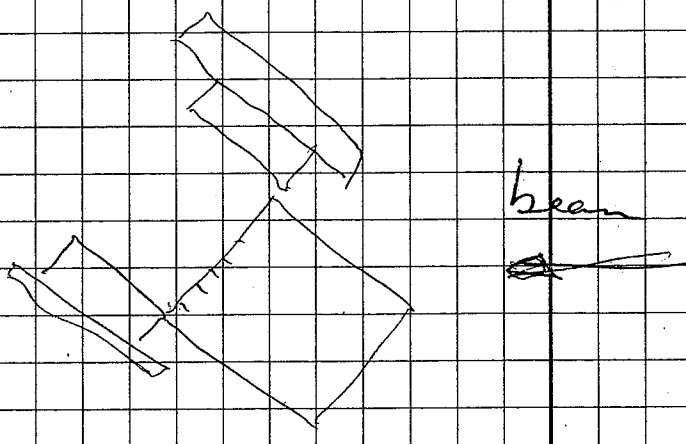
Magnet center to magnet center

⊙ 0 cm :	5.03	559
⊙ 1 cm :	4.10	
⊙ 2	2.70	
3	2.05	
4	1.55	
5	1.28	
6	1.15	
7	1.26	
8	1.23	
9	1.36	
10	1.83	
11	2.47	
12	3.50	3.40
13	4.80	
13.5 cm :	5.45	



At edge of magnet

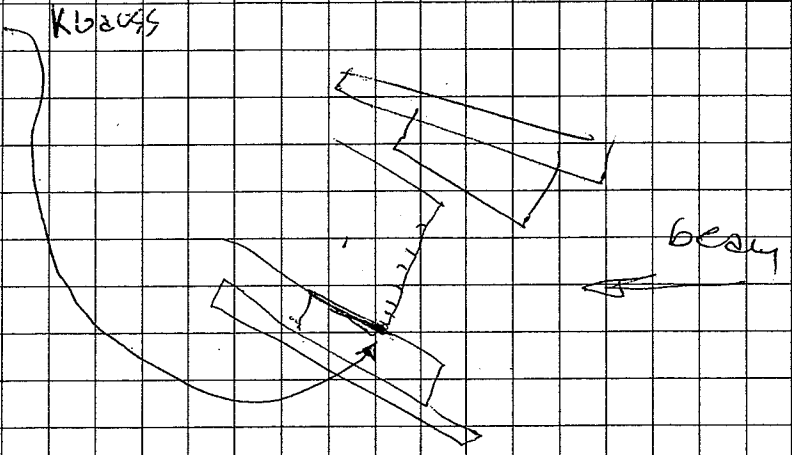
⊙ 0 cm :	3.87	K Gauss
	2.50	
	1.62	
	1.28	
	1.12	
	0.97	
	0.90	
	0.88	
	0.90	
	0.99	
	1.15	
	1.41	
	1.75	
	2.00	
	2.30	



MCPØ

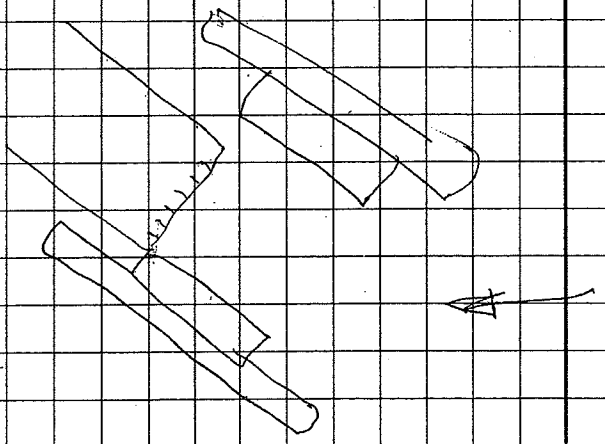
Center

@	Ø cm :	K Gauss
1	5.65	4.08
2	2.77	2.77
3	2.00	2.00
4	1.50	1.50
5	1.25	1.25
6	1.10	1.10
7	1.00	1.00
8	1.08	1.08
9	1.25	1.25
10	1.48	1.48
11	1.90	1.90
12	2.58	2.58
13	3.60	3.60
14	5.00	5.00
14.5 cm	5.90	5.90



Outer edge

@	Ø cm :	K Gauss
1	4.00	2.00
2	2.00	1.50
3	1.50	1.20
4	1.20	1.04
5	0.92	0.92
6	0.84	0.84
7	0.79	0.79
8	0.79	0.79
9	0.90	0.90
10	0.00	0.00
11	1.20	1.20
12	1.52	1.52
13	1.80	1.80
14	2.00	2.00
14.5 cm :	1.50	1.50



July 6 Pin Sources

Telescope

	@ 2m	@ 5cm
PO	675	180
PI	1,200	330
2	600	175
3	350	120
4	1,500	300
5	2000	270
6	700	180
7	400	115
8	—	—
9	1300	300
10	1400	230
11	1500	200
12	530	110
13	260	110
14	900	260
15	—	—
16	—	—
17	650	200
18	1700	240
19	500	175
20		

Runs 149 & 150
 in exp 0600
 at ag area.

July 6 Pin Sources!

Pin #	close	@ 5am	Telescope
19	900	260	14 ✓
18	1.2k	330	1 ✓
17	1.5k	300	4 ✓
16	1.25k	300	9 ✓
15	2k	270	5 ✓
14	675	180	0 ✓
13	1.4k	230	10 ✓
12	1.5k	200	11 ✓
11	650	200	17 ✓
10	530	110	12 ✓
9	300	240 *	
8	600	175'	2 ✓
7	260	110	13 ✓
6	400	115	7 ✓
5	350	120	3 ✓
4	700	180	6 ✓
3	1.7k	240	18 ✓
2	2.5k	730 *	
1	500	175	19 ✓

Lower TC, Opposite
 Tow 0 X 2 MW 4 to U? Tol
 1 MW 3 X 12L

