

Experiment: PR254

Principal researcher: Philip Adsley padsley@gmail.com

Date: May-June 2016

List of collaborators: (Name, Surname, e-mail address and Institution)

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Date	27th May
Weekend #	1

Targets	#	Material	Thickness	Thickness measurement method
1	Viewer			
2	$^{24}\text{Mg}$	230		
3	$^{24}\text{Mg}$	700		
4	DLC	500		
5	Mylar	200		
6	MT			
Target perpendicular to beam [°]				
Target perpendicular to camera [°]				

Additional Notes:

Beam	Energy [MeV]	99.9%
Pulse selection (yes/no)		Yes
Injector (SPC1 or SPC2)		SPC 2
SSC Transmission	FC 19J	
	FC 1X	
	FC 11X	
	FC 4P	
	FC 4S	
	FC Target	

Additional Notes:

Scattering chamber beamstop	In beam position	/
	Out of beam position	/

Additional Notes:

Detector Setup	Order of detectors	Detectors	Sketch
	VDC 1	X U	
	VDC 2	X <del>No</del>	
	Paddle 1	$\frac{1}{4}$ " $\frac{1}{2}$ "	
	Paddle 2	$\frac{1}{2}$ "	
Focal Plane (HD or MD)			MD
Kapton window (HD or MD)			MD

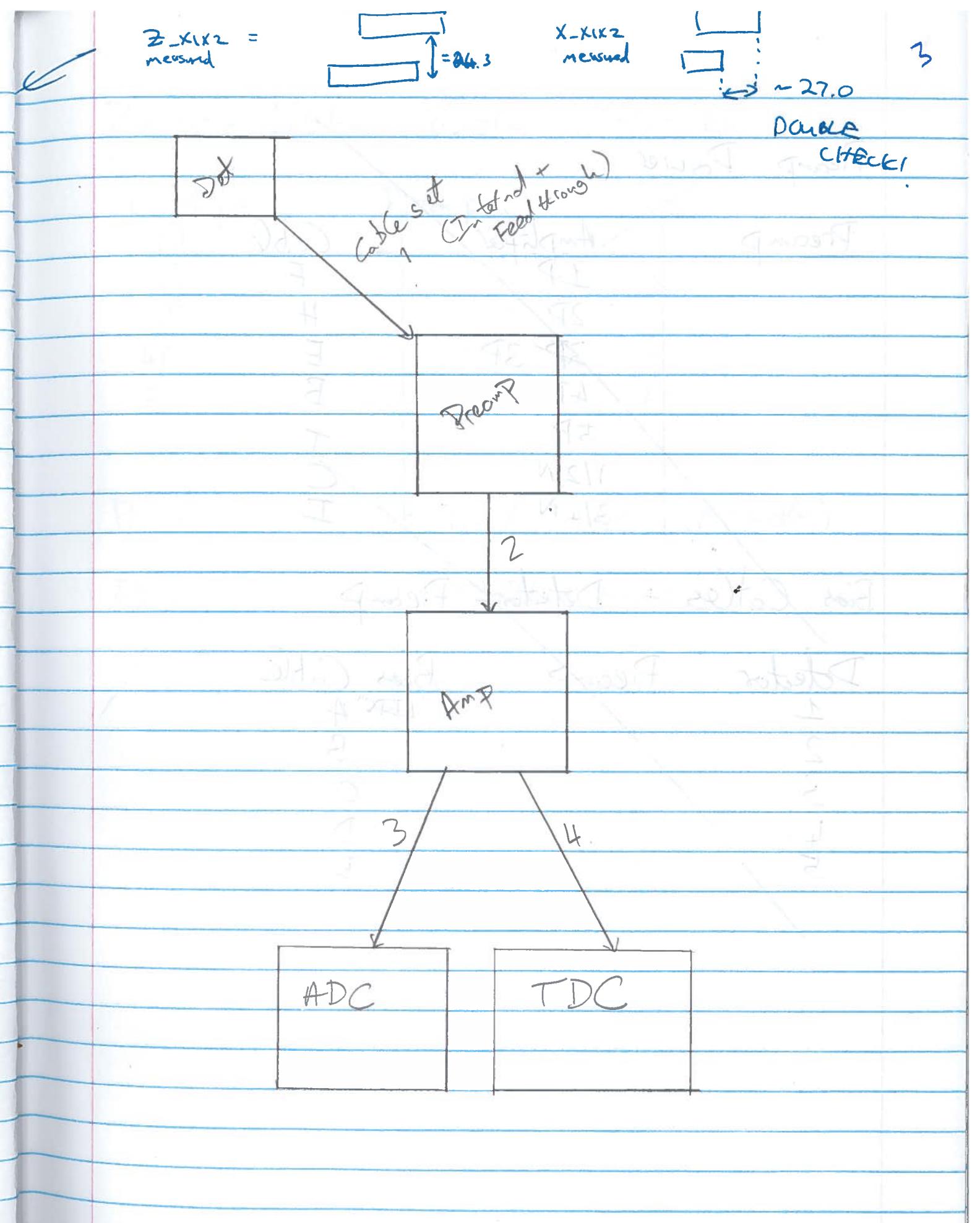
Additional Notes: X2  $\Rightarrow$  old VDC (and using old Lelroix DC preamps)

Collimator Carousel	#	In perspex	In beam
	1		
	2		
	3		
	4		
	5		
	6		
	Configuration (not 0 deg/ =0 deg)		

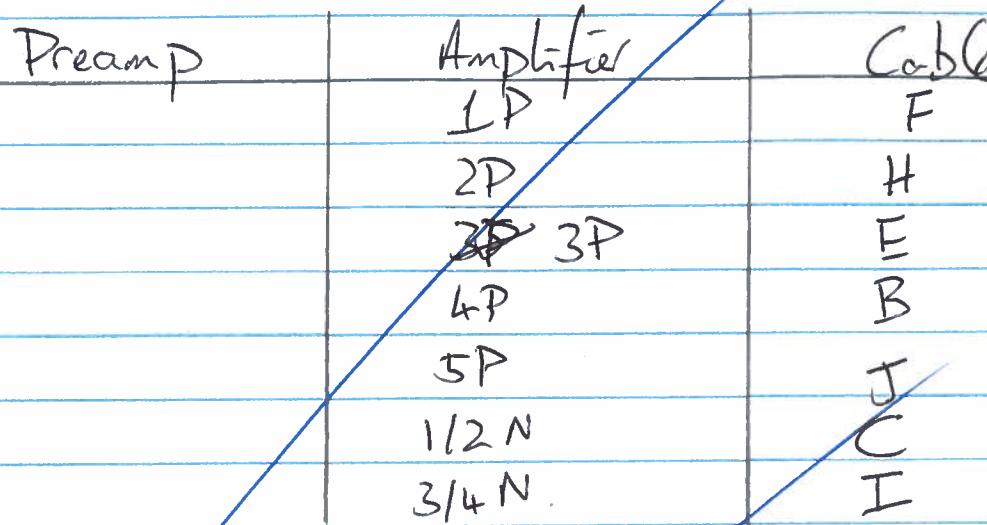
Additional Notes:

Spectrometer Parameters	Angle	0°
Magnets settings	Q	-499.172
	D1	403.930
	H	-30.255
	D2	402.441
	K	6.545
Superknob settings	Dipole 1	403.9300
	D1/D2	1.0037
	D1/Q	-0.8092
	D1/K	61.7130
	D1/H	-13.3510
SP Interlock control (Enable/ Disable)		Enable

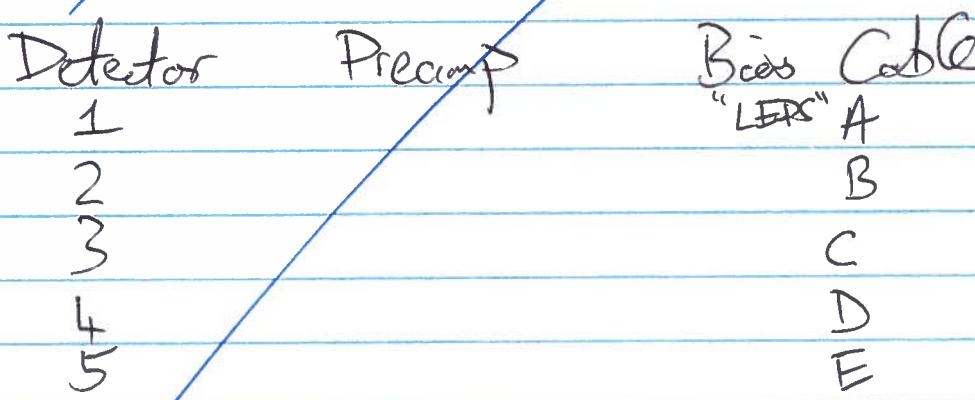
Additional Notes:



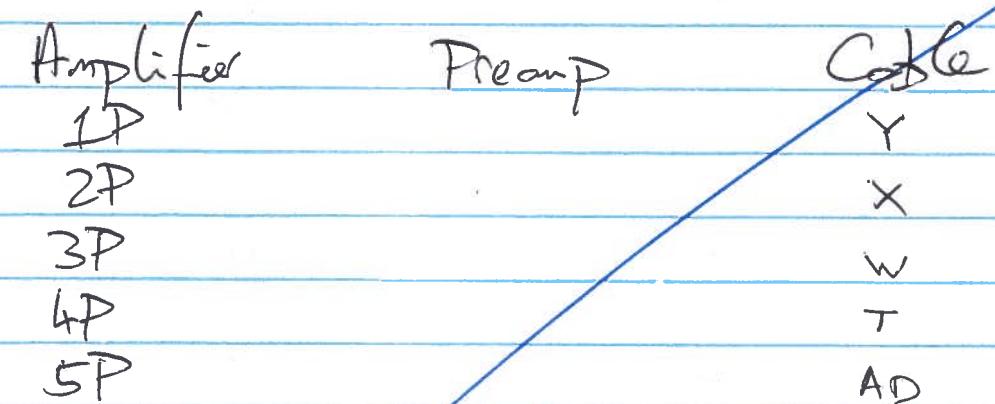
### Preamp Power



### Bias Cables + Detector- Preamp



### Preamp - Amplifier Cables (P-sides)



Preamp → Breakout board cable (N-sides)

Preamp Board Top/Bot. Amplifier

Amplifier

ADC  
Cable

TDC  
Cable

1P  
2P  
3P  
4P  
5P

S  
V  
D  
R  
A

AB  
E  
AF  
F  
Z

ADC MODULE

MEZZANINE

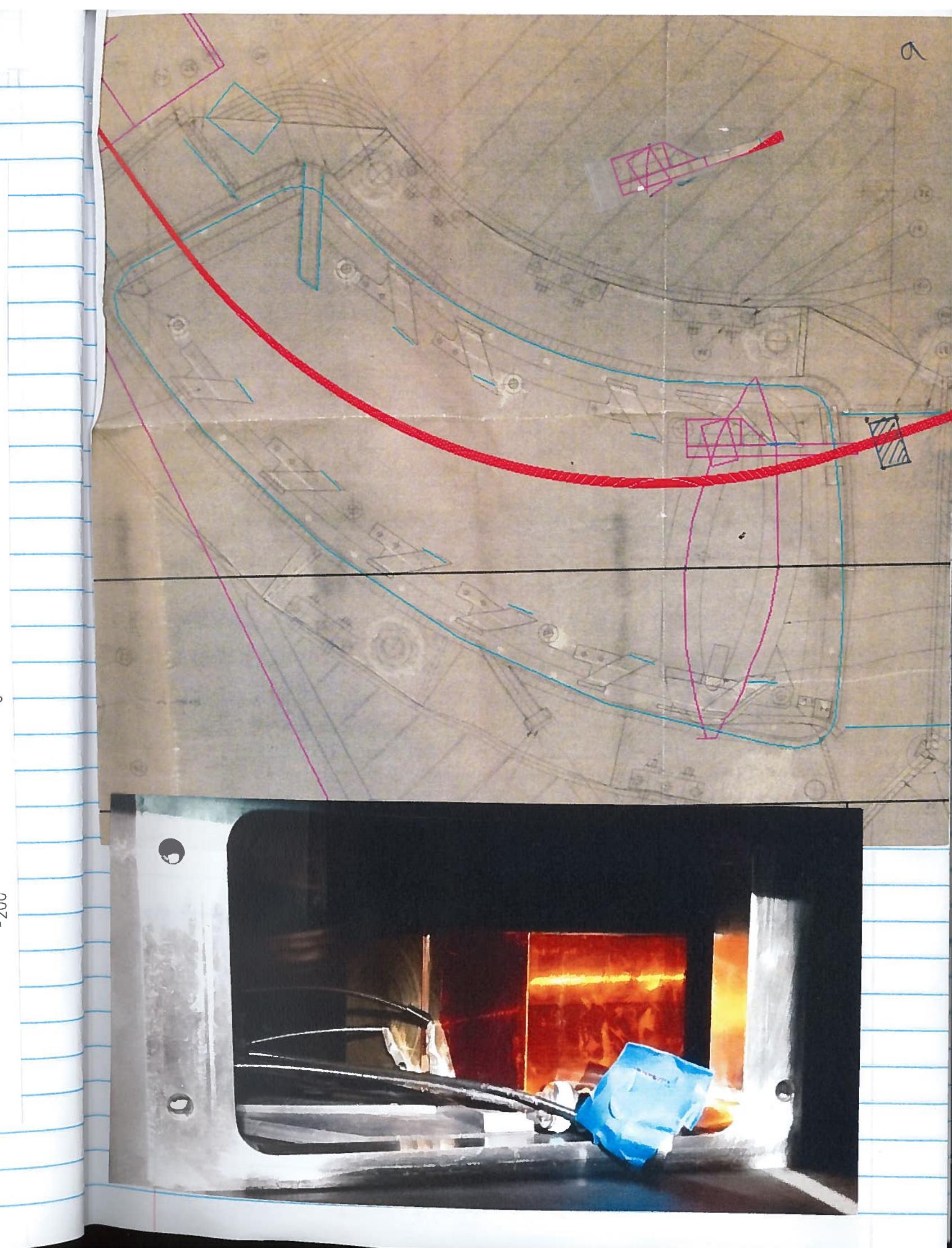
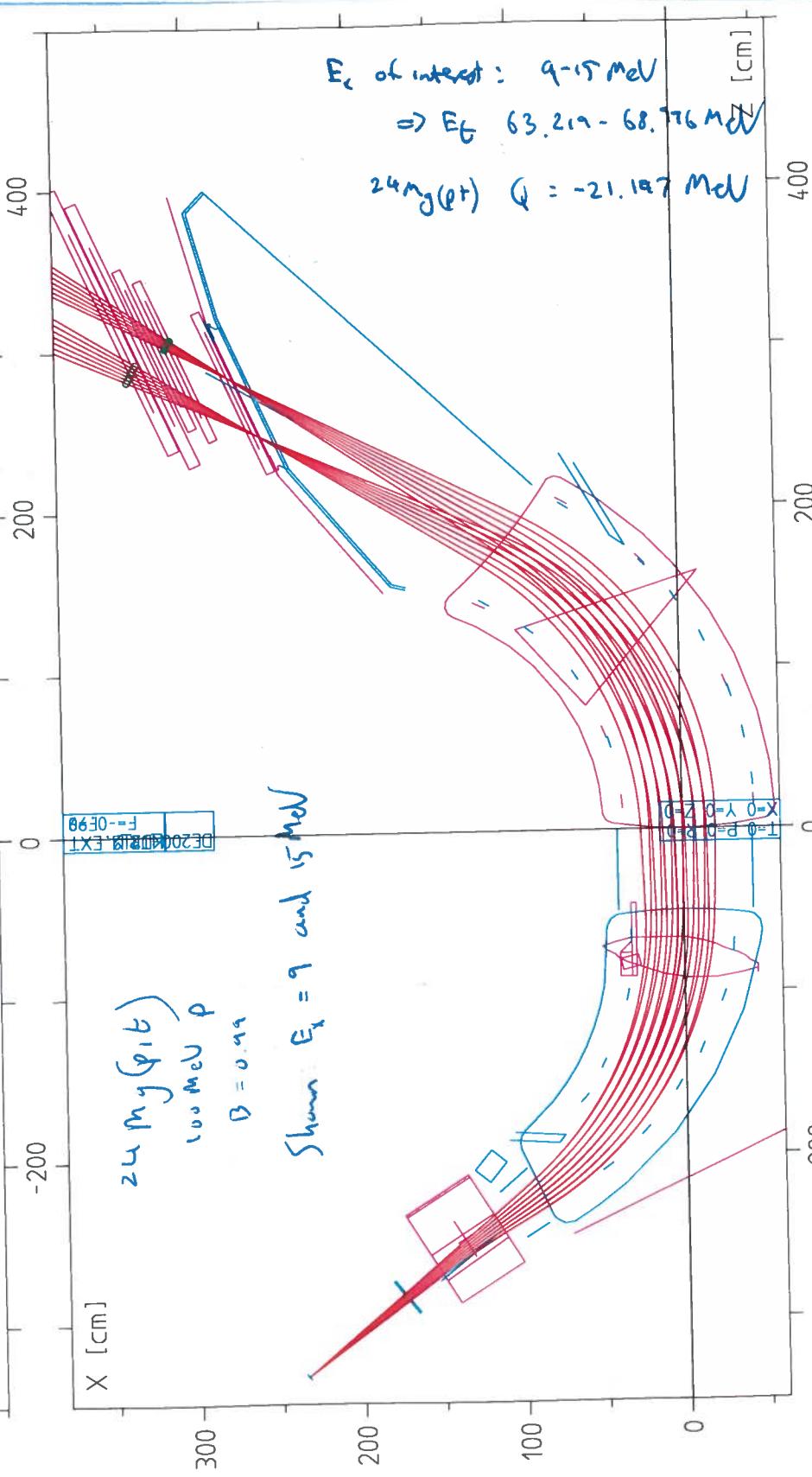
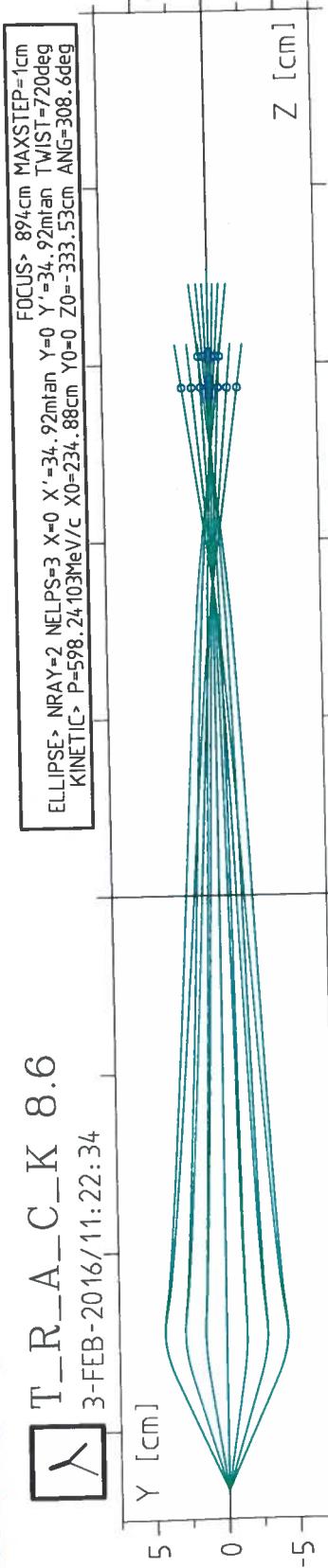
CABLE

0 1  
0 2  
1 1  
1 2  
2 1  
2 2  
3 1  
3 2  
4 1  
4 2

S  
V  
D  
R  
A

S  
V  
D  
R  
A

TDC CABLE	TDC MODULE	CONNECTOR
AB	6	B2
E	6	C1
AF	6	C2
F	6	D1
Z	6	D2



16th May 2016

Preamps

D, E, F: 32 channel. 1 Detector each



G, H → 16+16 1 Detector

I, K → 16+16 1 Detector.

All on 25 MeV max range.

Detector	1: D	Bias:	LEPS A	Pwr:	I
2: E	" B			E	
3P: I	" C			H	
3N: K	" D			B	
4: F	" E			F	
5P: H	" F			C	
5N: G.	" G.			J	

N-side Cabling

~~Code~~

17th May 2016

IN: Code ~~I.~~ I. (Q broke)

2N: P

3N: M for memory.

4N: AG

5N: Att. → Gals straight to amp.

1N+2N → One amplifier.

3N + 4N → One amplifier.

Amp → DAC

	ADC	TDC
1+2 N:	Code N.	AE
3+4 N	J	H
5N	G.	O

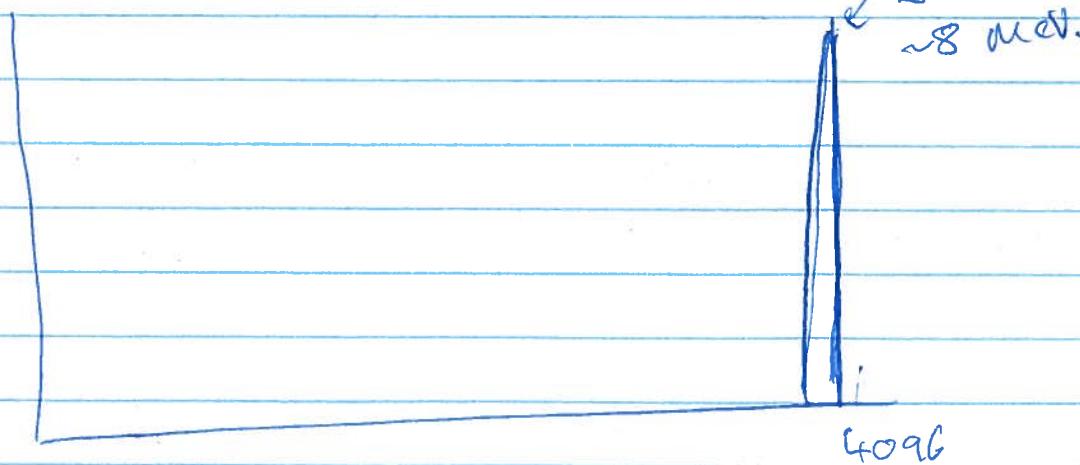
Table of Detector  $\rightarrow$  Preamp.  
Feed-through diagram.

Table of preamp  $\rightarrow$  Amp.

Preamp  
label  $\rightarrow$  Cable  
label  $\rightarrow$  Amp  
label.

Table of Amp  $\rightarrow$  ADC w/ cables.  
 $\rightarrow$  TDC

Table of detector  $\rightarrow$  ADC channels.  
TDC



18th May 2016

## To Do List

- 1) Make chamber light-light.
- 2) Do groundings of electronics tower  $\rightarrow$  DRC. ~~(PT)~~
- 3) Ground preamps  $\rightarrow$  ET ~~(WA.)~~  
+ chamber.
- 4) Si trigger.
- 5) Si rates  $\rightarrow$  Data room. ~~(\*)~~
- 6) Si pulser test. ~~(wed Att.)~~
- 7) Install CAKE
- 8) Test CAKE biases.  $\rightarrow$  V-I curves. ~~(wed Att.)~~
- 9) CAKE gain-matching. ~~(wed Att.)~~
- 10) CAKE asymmetric calibration.  $\checkmark$
- 11) CAKE pulser walkthrough  $\times$   $\checkmark$
- 12) Table of patch-panel things. ~~(\*)~~
- 13) Check Si in ADC gate/window?

18th May 2016

## Setup Notes

We were having problems with the preamp LEDs flickering when plugged into the detectors.

This was because Phil is stupid.

The breakout boards have a different ground → We need to use the swapped-over cables to make sure that

PR226

We have 3 CAEN N565bs  
for 5<sup>th</sup> sets of sectors, with only APC data.  
NOTE: ribbon cables from preamp to CAEN  
is modified according to logbook PR-211a(1)  
page 10, 11

Replaced these cables with the cross over ones and now everything is fine.

Thursday

CAKE V-I curves.

~~no detector~~

Signal cables for CAKE. N-sides.

Plugging signal cables in → still having problem.

Trying with good cables → No problem.

! Some cables are bad!

X T M

New cutting

HP

I<sub>1</sub>

2P

2N

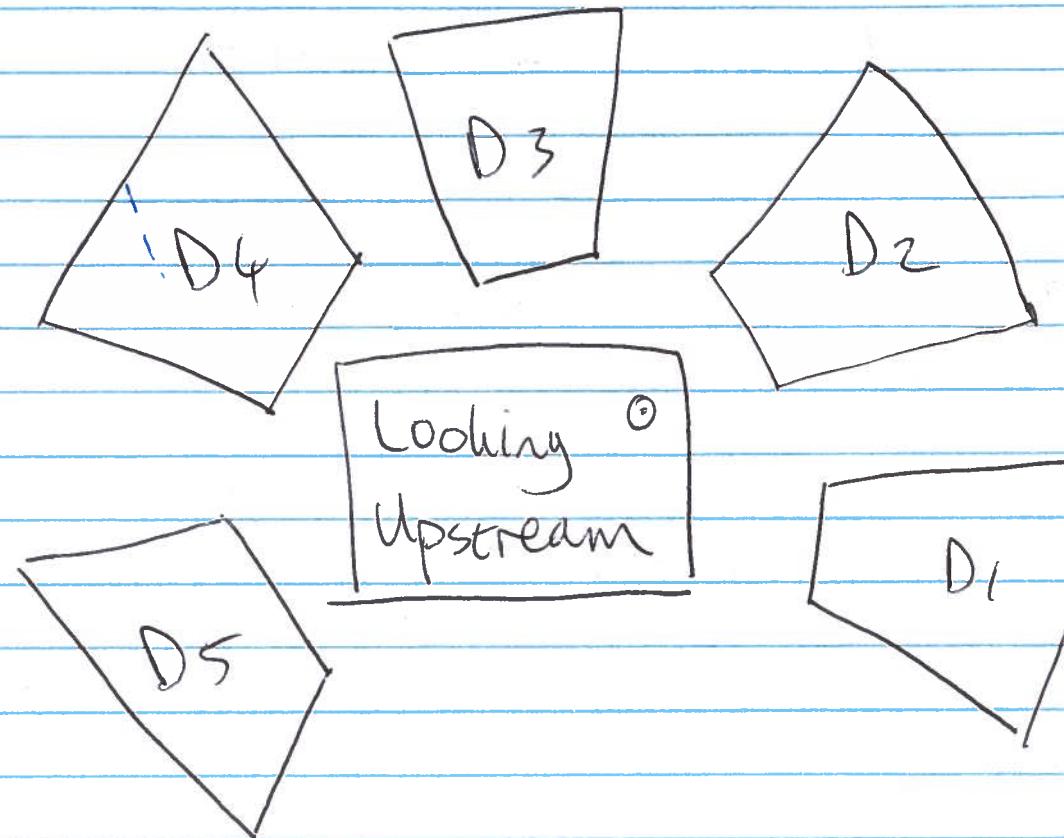
3P

3N

4P

EN

5P



5N. Chamber feedthroughs:

Top: upstream ④ ① ③ ① ② junction

downstream ④ ① ③ ① ② ohmic

Bottom:

upstream ⑤ ① ① ① ① junction

downstream ⑤ ① ① ① ① ohmic

Si. Detector Leaks

Detector 1:

Bias (V)	Current ( $\mu$ A)
1.00	0.406
2.01	0.487
5.00	0.721
10.01	0.860
15.01	0.951
20.00	1.018
25.03	1.067
30.00	1.106
35.10	1.141
40.01	1.172
45.01	1.202
55.00	1.264
64.98	1.322
75.00	1.379
85.01	1.436

D2

D3

<u>Bias (V)</u>	<u>Current (<math>\mu</math>A)</u>	<u>Bias (V)</u>	<u>Current (<math>\mu</math>A)</u>
1.00	0.254	1.01	0.242
2.00	0.309	2.00	0.294
3.01	0.352	5.02	0.404
5.00	0.416	10.01	0.521
7.02	0.468	15.00	0.608
10.00	0.526	20.01	0.667
15.02	0.599	25.05	0.699
20.00	0.649	30.10	0.724
25.00	0.680	40.00	0.763
30.01	0.706	50.17	0.798
40.00	0.744	60.05	0.829
50.00	0.775	70.06	0.861
60.00	0.805	80.01	0.879
70.00	0.833	90.00	0.908
80.02	0.861	100.0	0.937
		110.0	0.966
		120.0	0.998

D4

D5

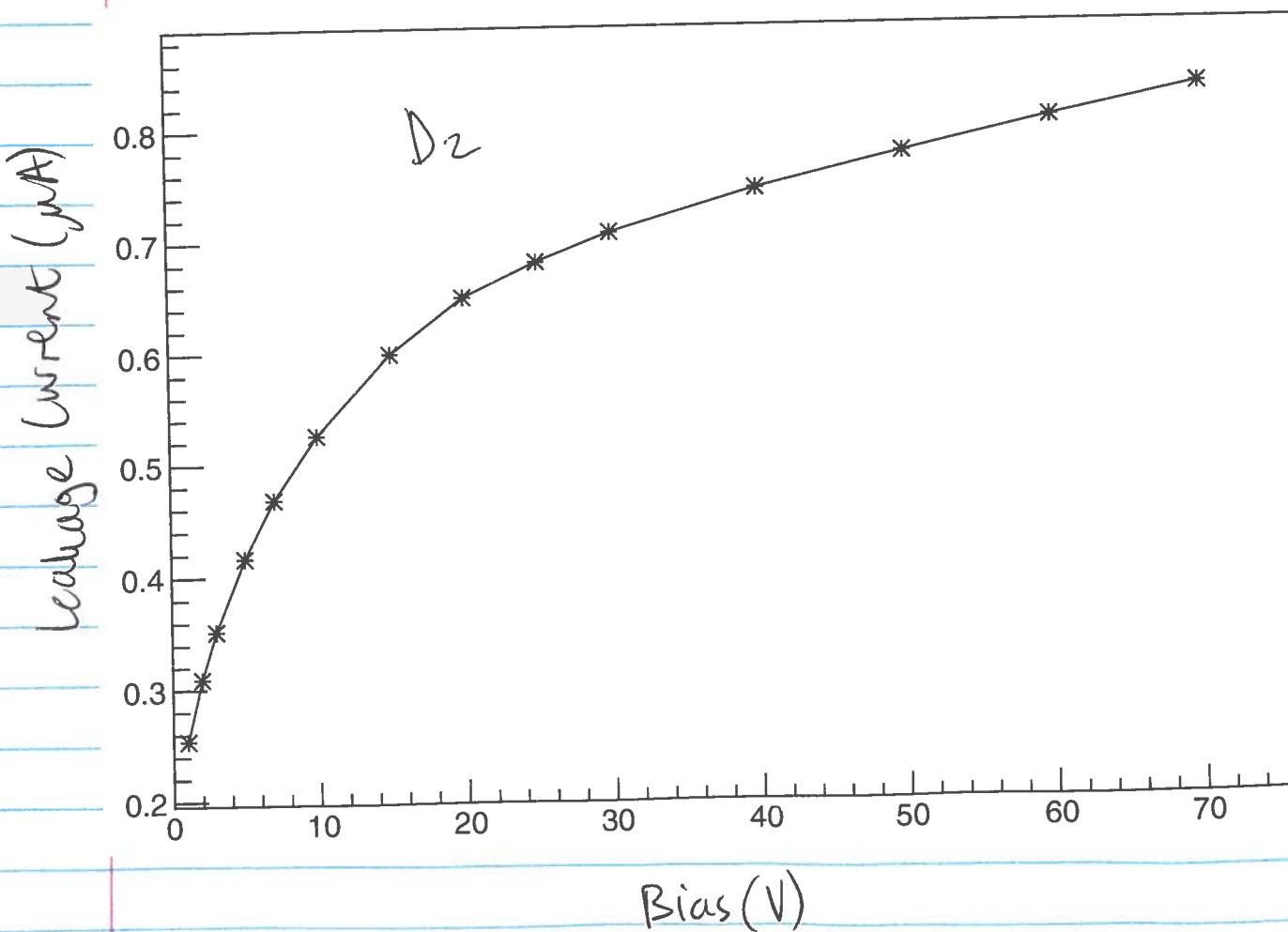
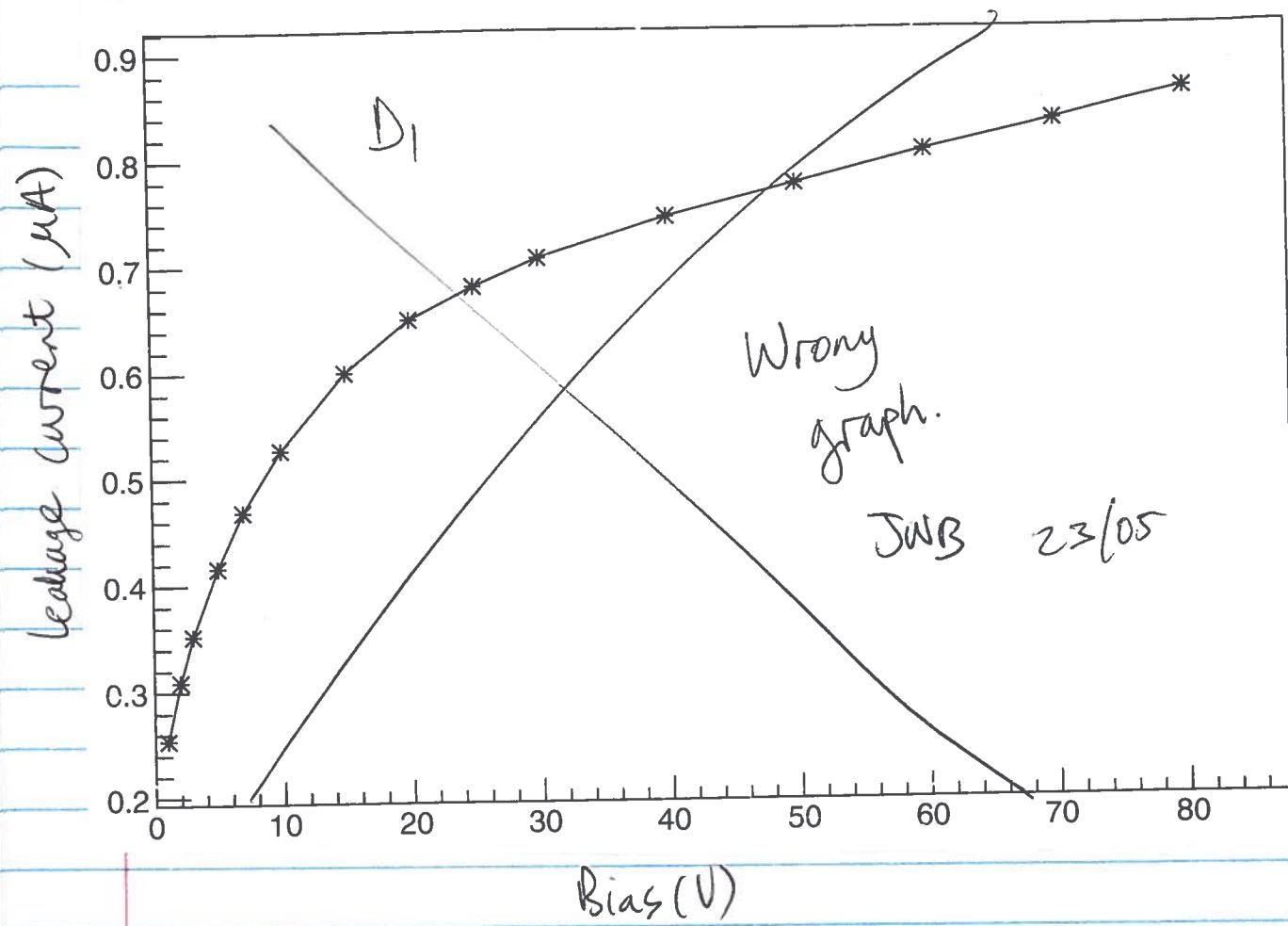
<u>Bias (V)</u>	<u>Current (<math>\mu</math>A)</u>	<u>Bias (V)</u>	<u>Current (<math>\mu</math>A)</u>
1.02	0.255	1.00	0.344
2.01	0.307	2.00	0.420
3.00	0.349	5.00	0.536
5.01	0.416	10.02	0.641
10.00	0.529	15.01	0.709
15.00	0.602	20.01	0.756
20.06	0.660	25.00	0.742
25.00	0.699	30.01	0.826
30.02	0.728	40.01	0.866
40.01	0.765	50.01	0.951
50.02	0.800	60.00	1.007
60.01	0.832	70.02	1.066
70.02	0.865	80.00	1.122
80.00	0.891		

Fri

Ground - Droid ✓ Done. JWB

Find n-side channels. ✓

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21<sup>st</sup> May 2016

## DAQ / Gains

The DAQ problems (argy!) have originated from one of the busy signal twisted-pair cables from the ADC modules.

Causis a constant busy

Swapped this around and everything seems fine.

Pics of gains on following pages.

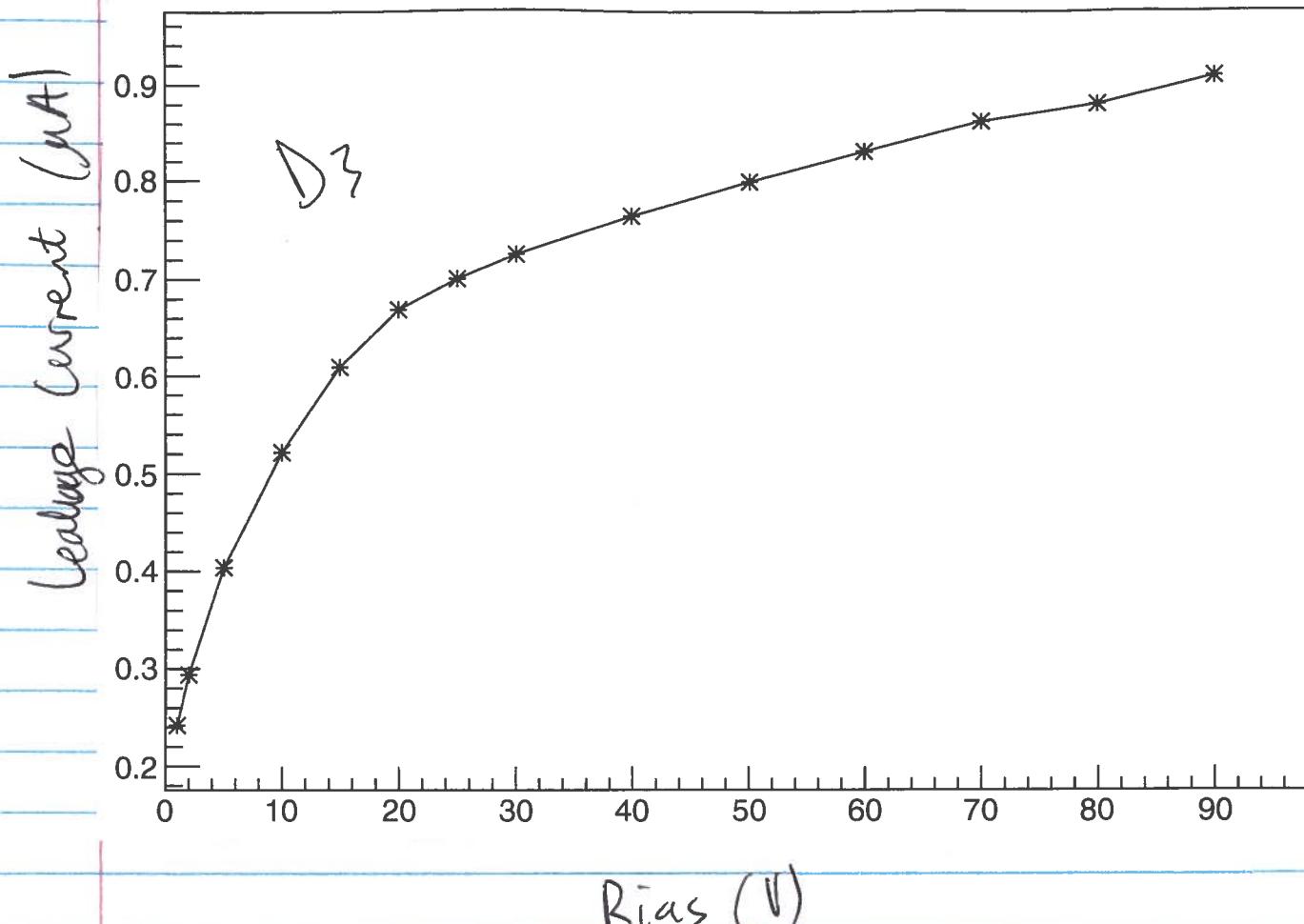
D4 pBump on wrong setting ??

100 mEV max.

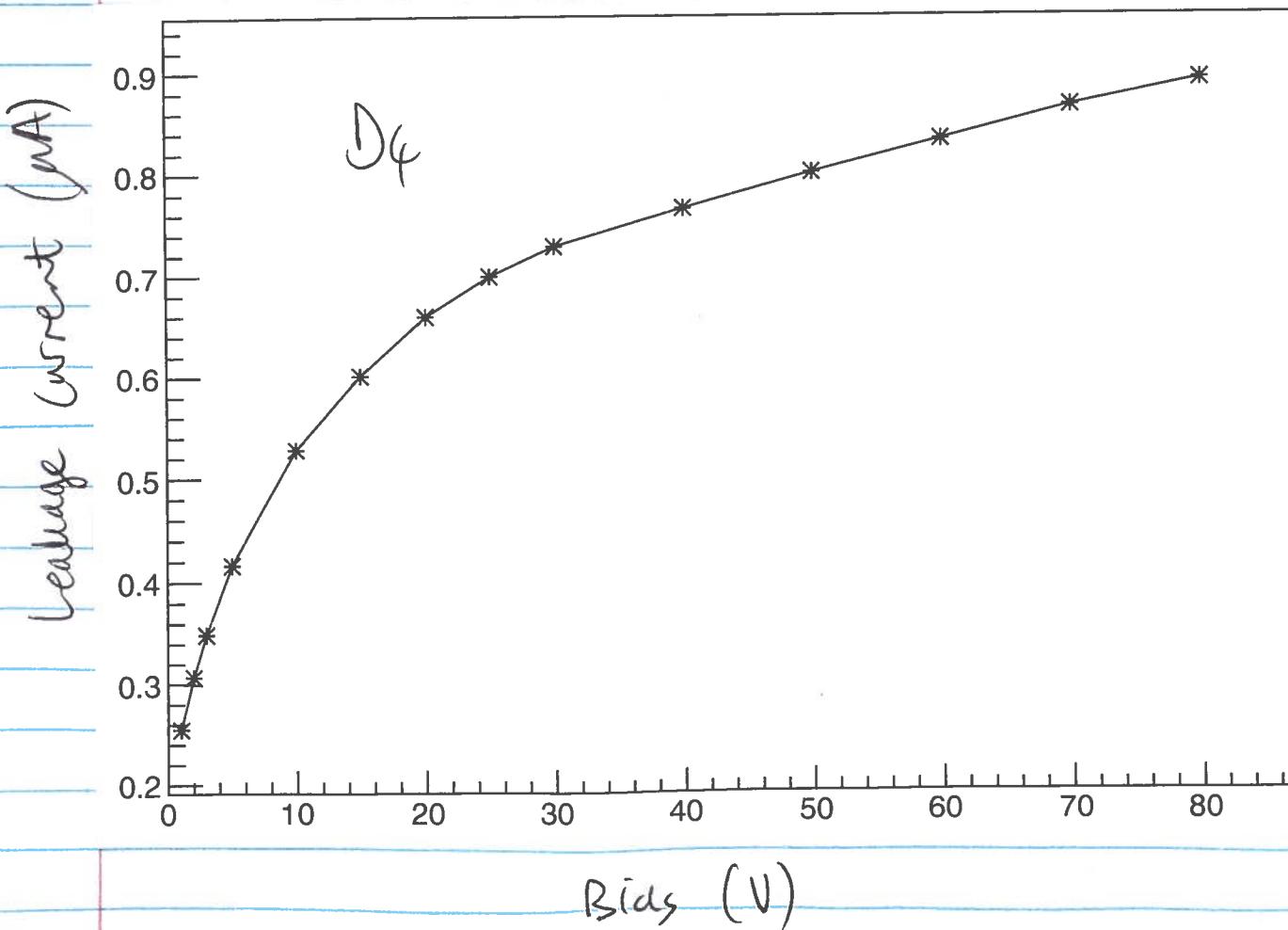
↳ Changed to 20 mEV max when I turned stuff off.

D1 N too bw. Can't get higher?

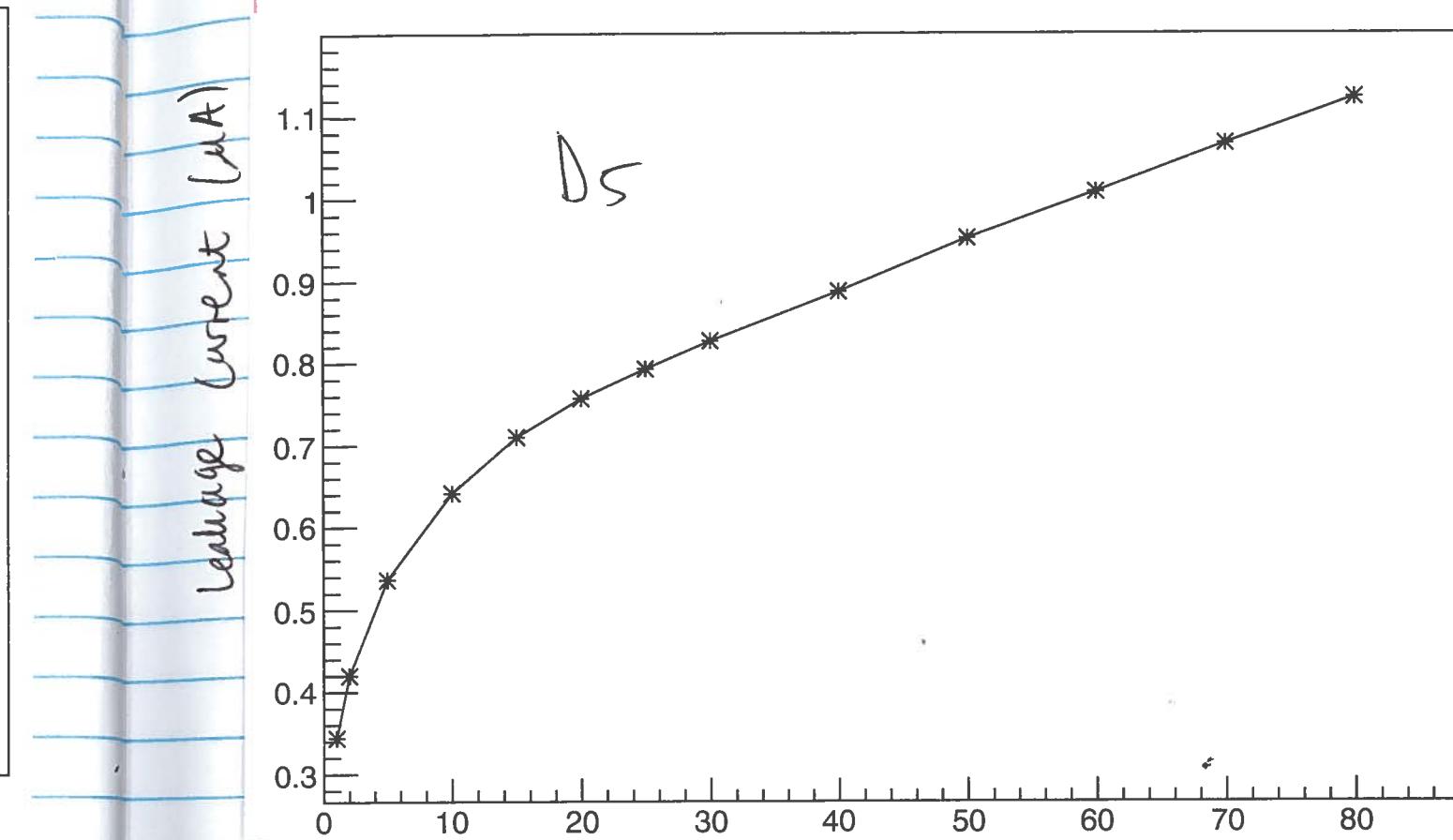
Was OK but I messed it up.



Bias (V)



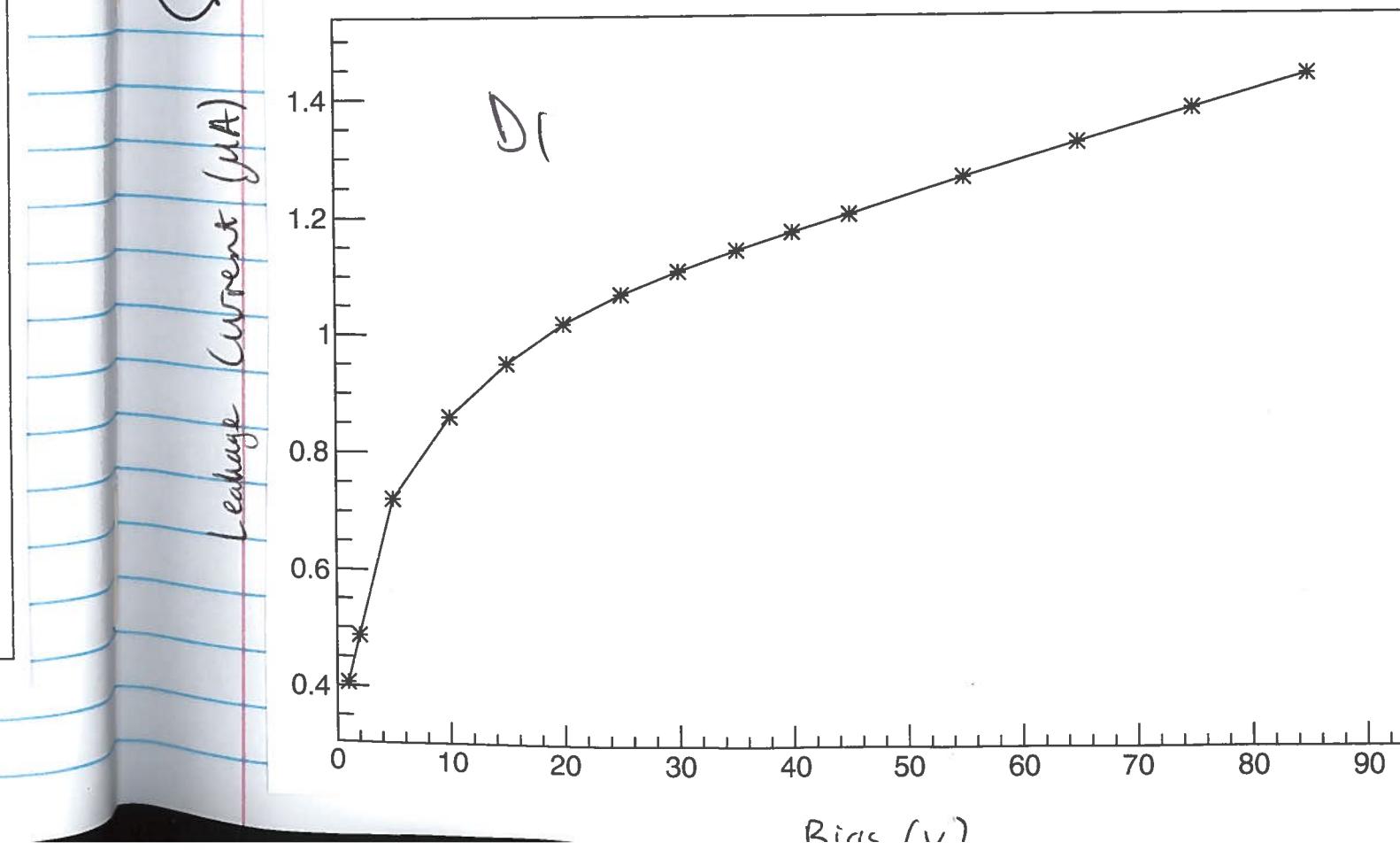
Bias (V)



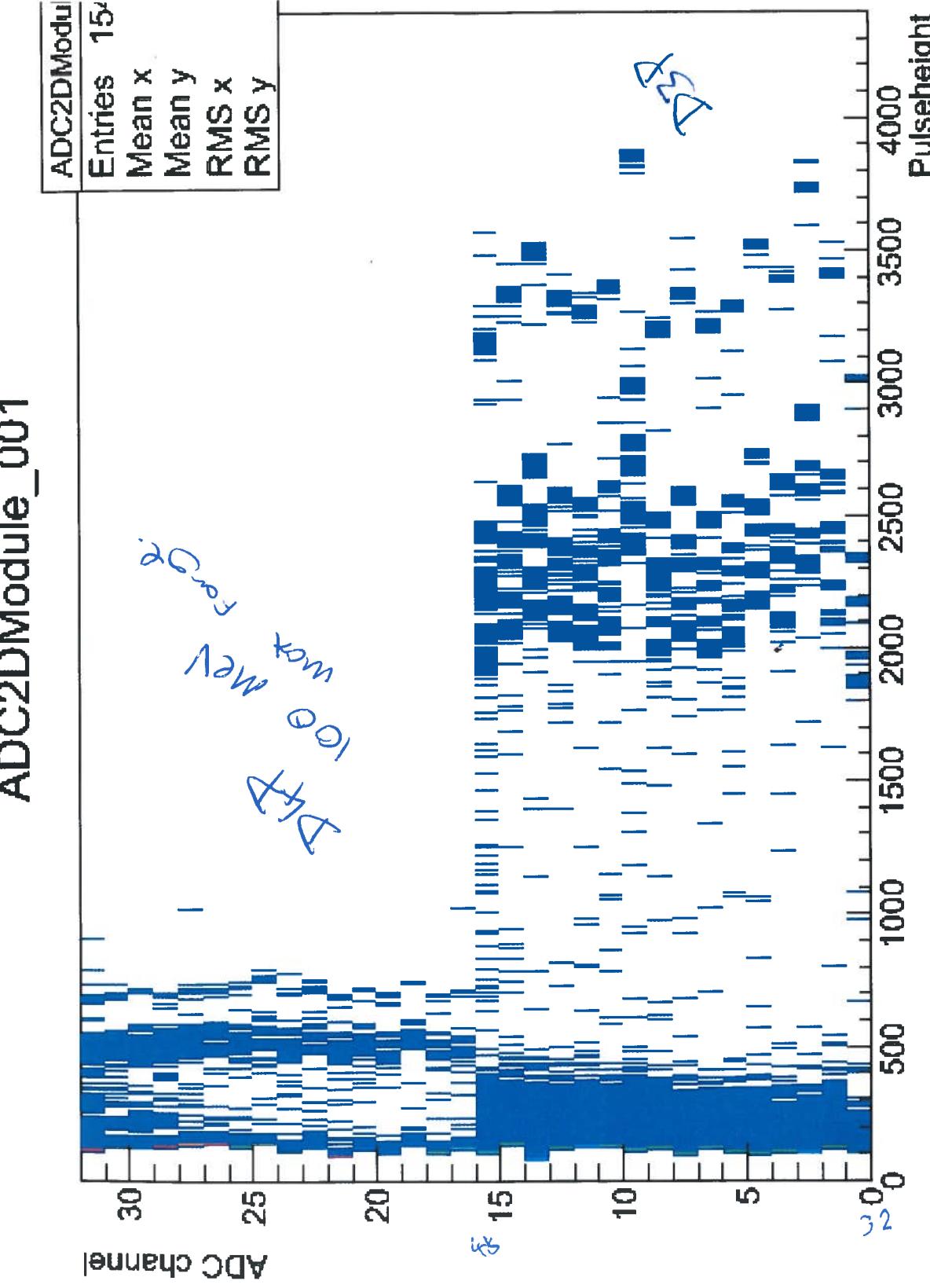
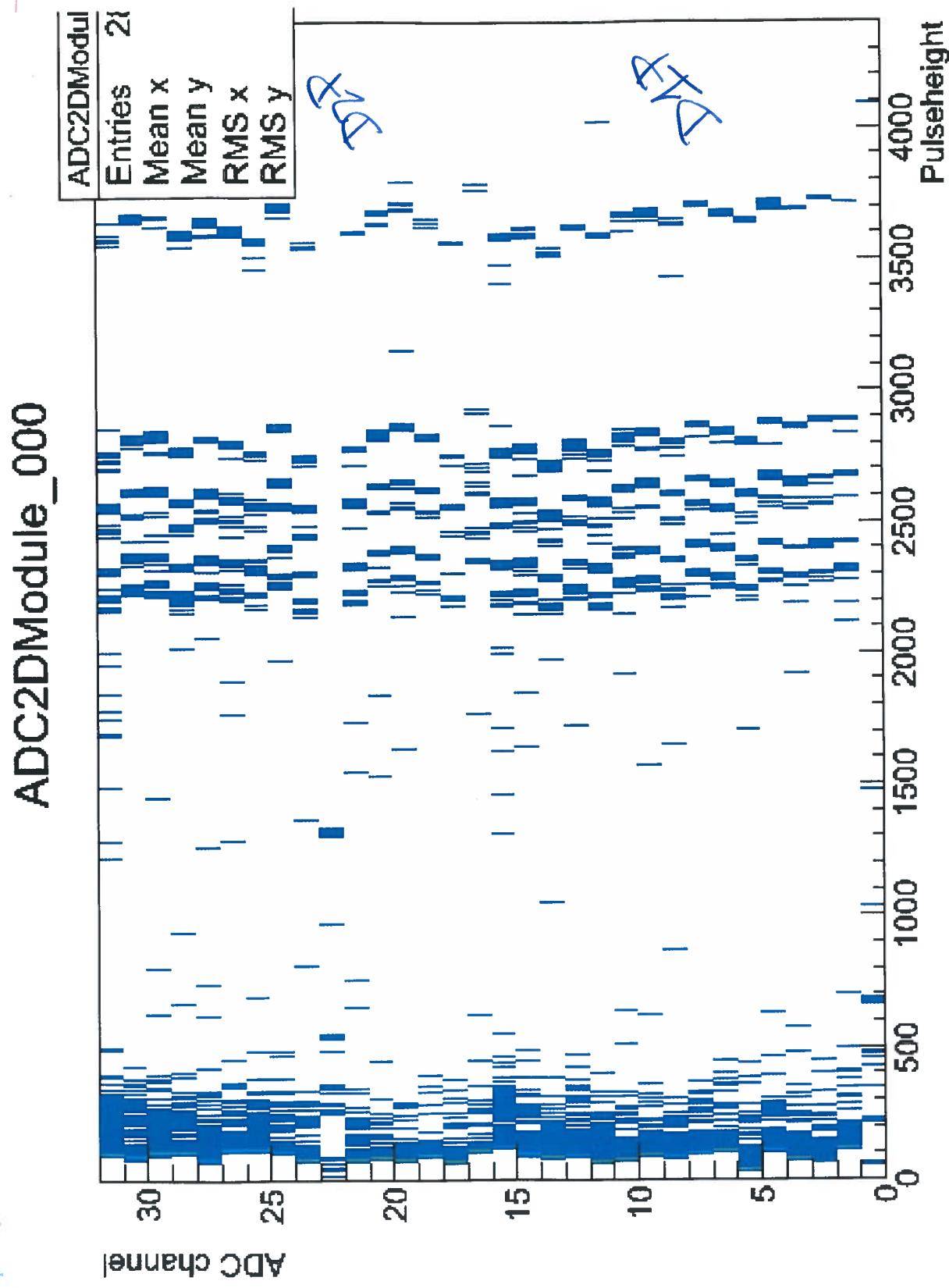
Bias (V)

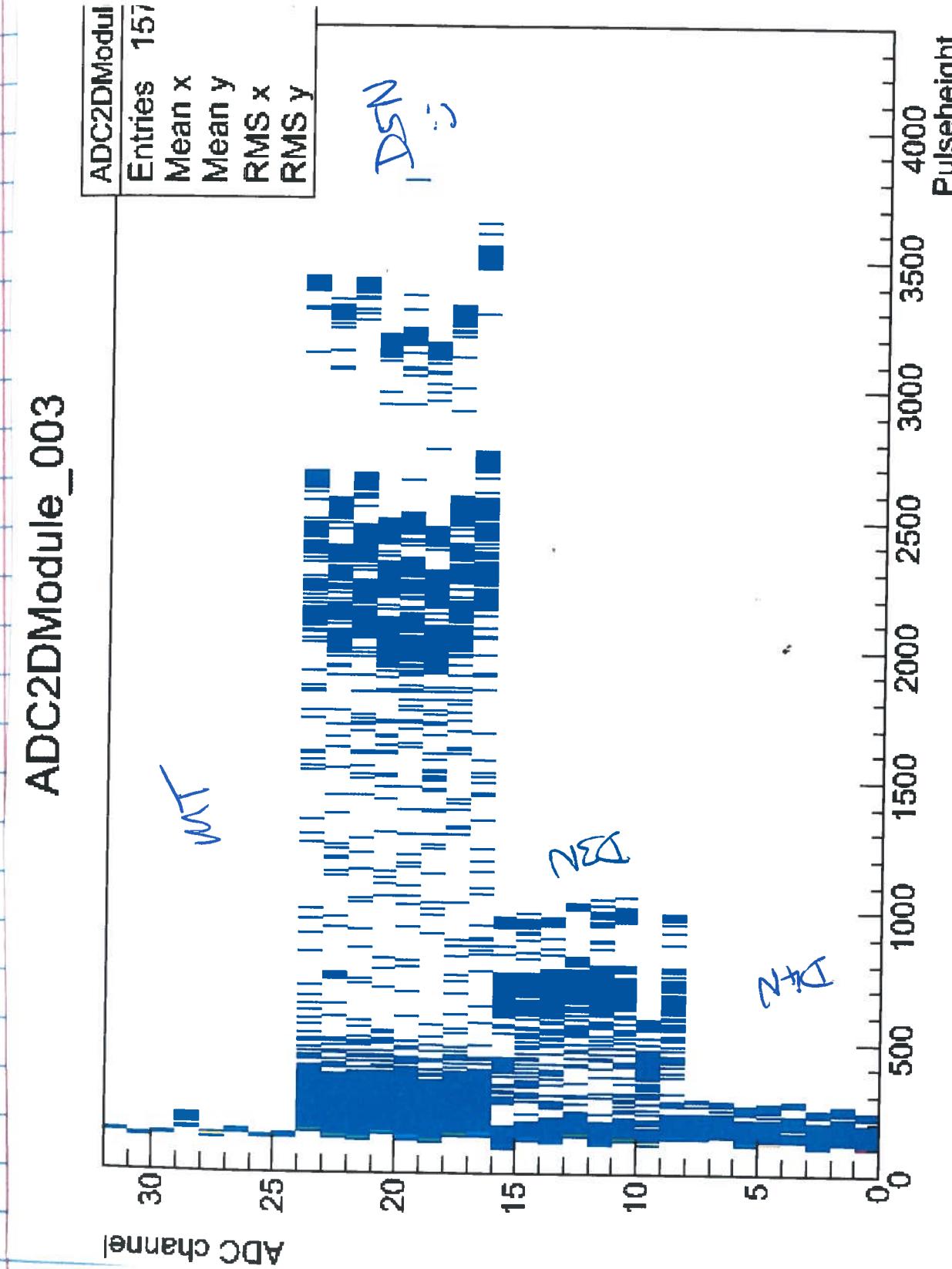
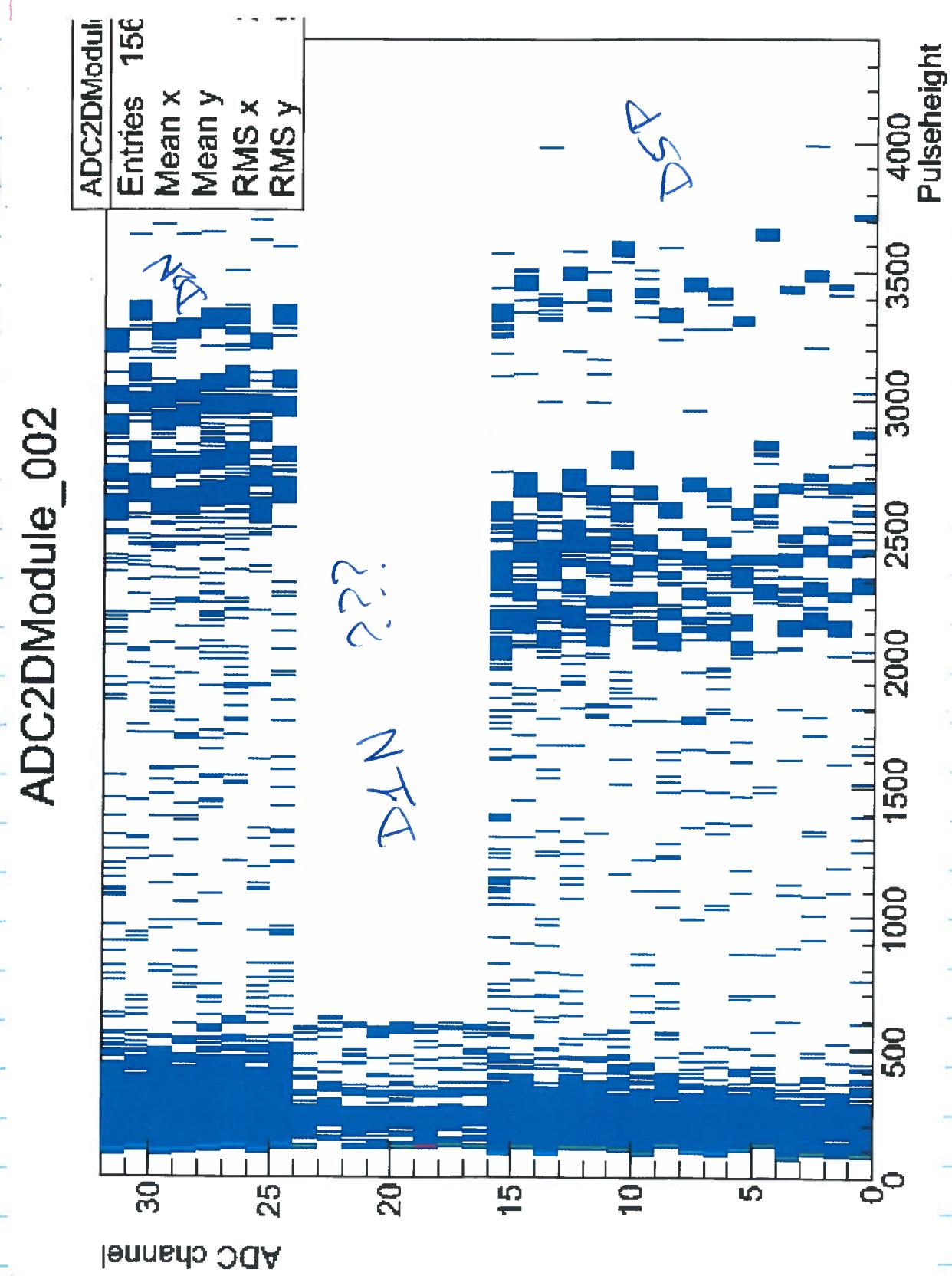
(X) - A detector bias of -60 V was chosen for experiments

for duration of



Bias (V)

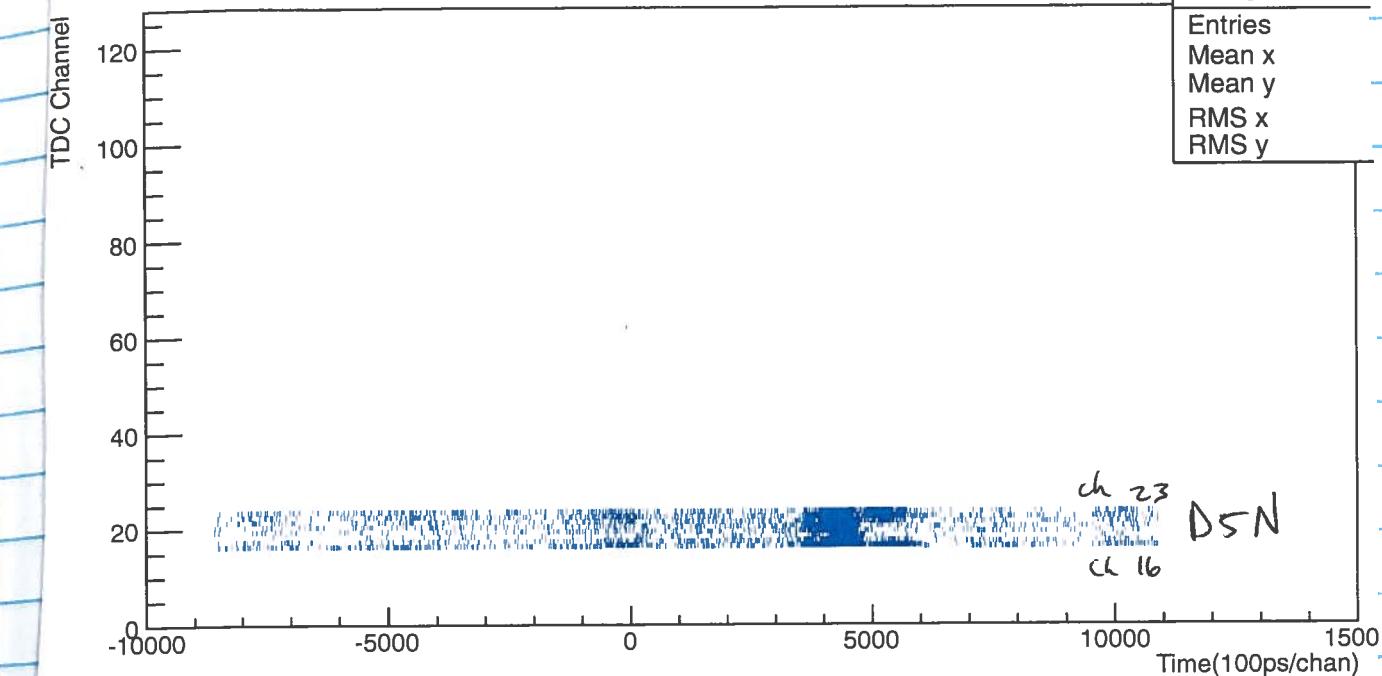
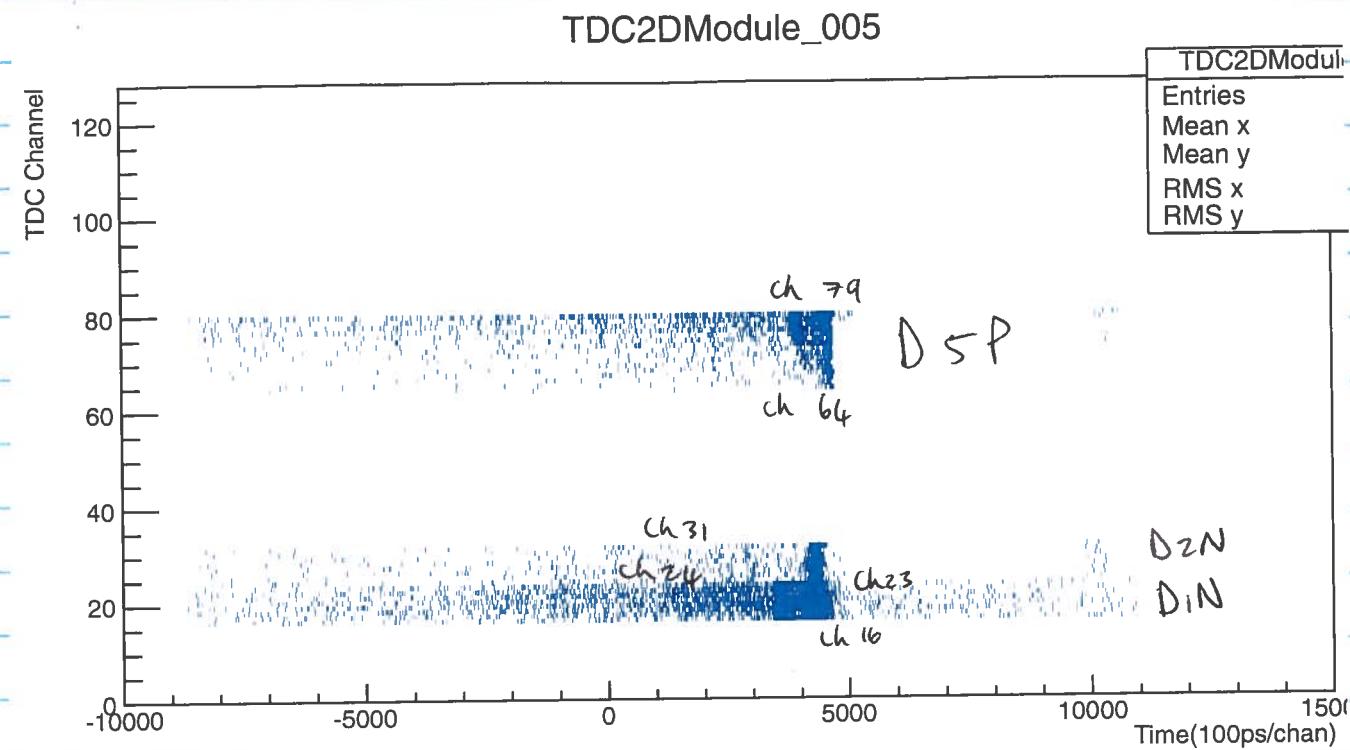




23/05 : Gain matching fixed, but:  
DzN : gain still a bit too low.  
DsN : Resolution not great (same for DsN-DsN)

23/05 (11:00 AM) Starting  $^{228}\text{Th}$  calibration  
run # 63 (4h long). Will take 3h-long  
C-symmetric run after.  
Target (adder in very lowest position: 0.00 mm  
A-symmetric calibration: run # 64

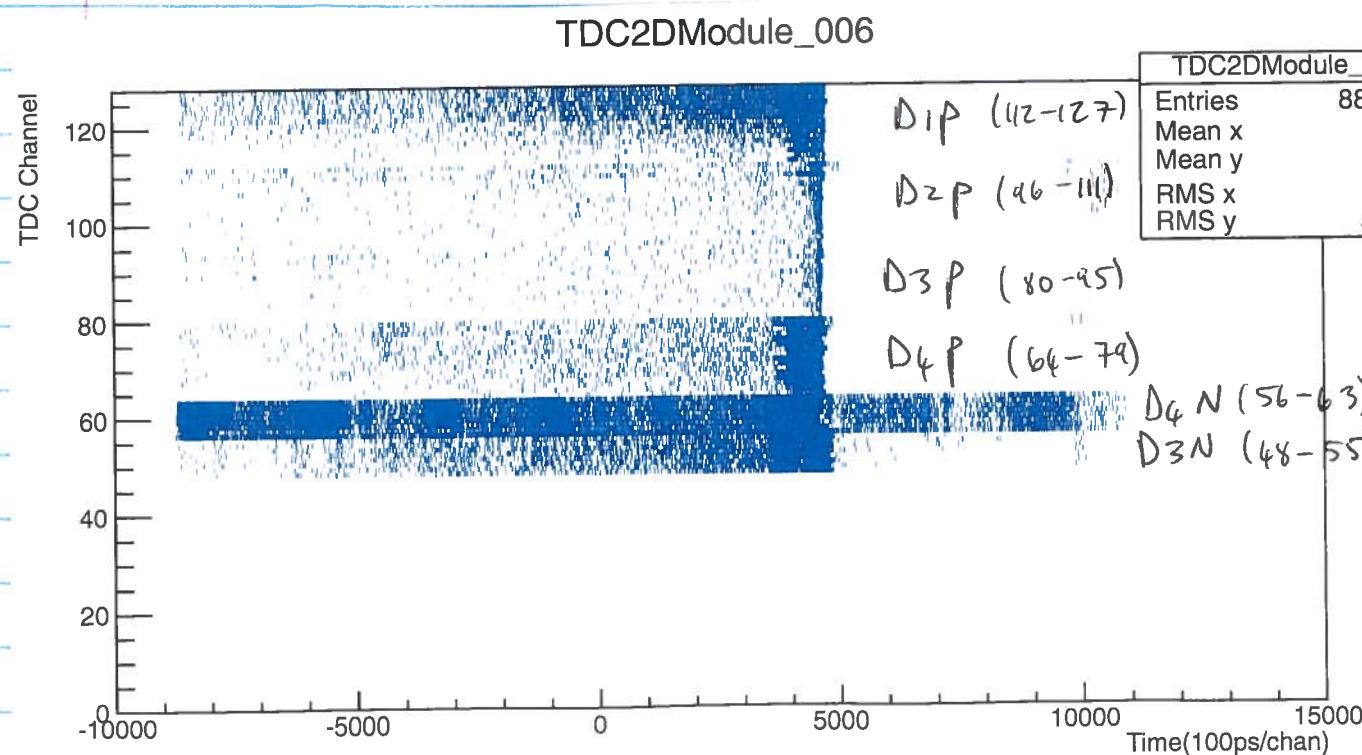
- For future reference as to where each detector is located within the TDC spectra:



24 May 2016

- Pulser walkthrough time (ADC spectra incoming).
- Do n- & p-side simultaneously.

Pulse-height table (mV)



Entry #	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>
1	-52.5	-50.00	-56.750	-750.750	-66.500
2	-100.625	-150.625	-151.875	-335.750	-151.375
3	-203.125	-240.000	-294.375	-444.500	-261.375
4	-295.000	-490.000	-454.375	-555.750	-427.000
5	-360.000	-600.000	-667.00	-613.250	-567.000
6	-471.250				
(1)					-66.500
(2)					-124.000
(3)					-227.000
(4)					-344.500
(5)					-490.750
(6)					-589.500

- pulser walkthrough in run # 66 for DL

- D<sub>2</sub> → run # 68.

- D<sub>3</sub> → run # 69.

- D<sub>4</sub> → run # 71.

? pulser didn't want to go below above -250 mV  
for D<sub>4</sub>. Redo D<sub>4</sub> walkthrough.

- D<sub>4</sub> → run # 72.

- D<sub>5</sub> → run # 73.

### threshold tests:

2 min intervals

D<sub>1P</sub> 20 Hz - 10 mV run 75

Measured threshold:

20 Hz - 20 mV run 76

-0.028 V

20 Hz - 40 mV run 77

20 Hz - 80 mV run 78

19.6 Hz - 200 mV run 79 (10 min run)

Rate (Hz)	Pulse Height (mV)	Run	Time (min)
19.6	- 10	80	2
19.6	- 20	81	2
19.6	- 40	82	2
19.6	- 80	83	2
19.6	- 200	84	10

⇒ D<sub>2P</sub> measured threshold: -0.023 V

Rate (Hz)	Pulse Height (mV)	Run	Time (min)
19.6	- 10	85	2
19.6	- 20	86	2
19.6	- 40	87	2
19.6	- 80	88	2
19.6	- 200	89	10

⇒ D<sub>3P</sub> measured threshold: -0.020 V

D <sub>4P</sub>	Rate (Hz)	Pulse height (mV)	Run	Time (min)
	19.6	- 10	90	2
	19.6	- 20	91	2
	19.6	- 40	92	2
	19.6	- 80	93	2
	19.6	- 200	94	10

⇒ D<sub>4P</sub> measured threshold: -0.024 V

D <sub>5P</sub>	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	19.6	- 10	95	2
	19.6	- 20	96	2
	19.6	- 40	97	2
	19.6	- 80	98	2
	19.6	- 200	99	10

⇒ D<sub>5P</sub> measured threshold: -0.039 V

- Positive pulser signal into p-sides. Now switched to negative pulse-height for n-sides.

D <sub>1N</sub>	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	20.4	- 10	100	2
	20.4	- 20	101	2
	20.4	- 40	102	2
	20.4	- 80	103	2
	20.4	- 200	104	10

⇒ D<sub>1N</sub> measured threshold: -0.027 V (= D<sub>2N</sub>)

D <sub>2</sub> N	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	20.4	-10	105	2
	20.4	-20	106	2
	20.4	-40	107	2
	20.4	-80	108	2
	20.4	-200	109	10

→ poor ADC resolution.

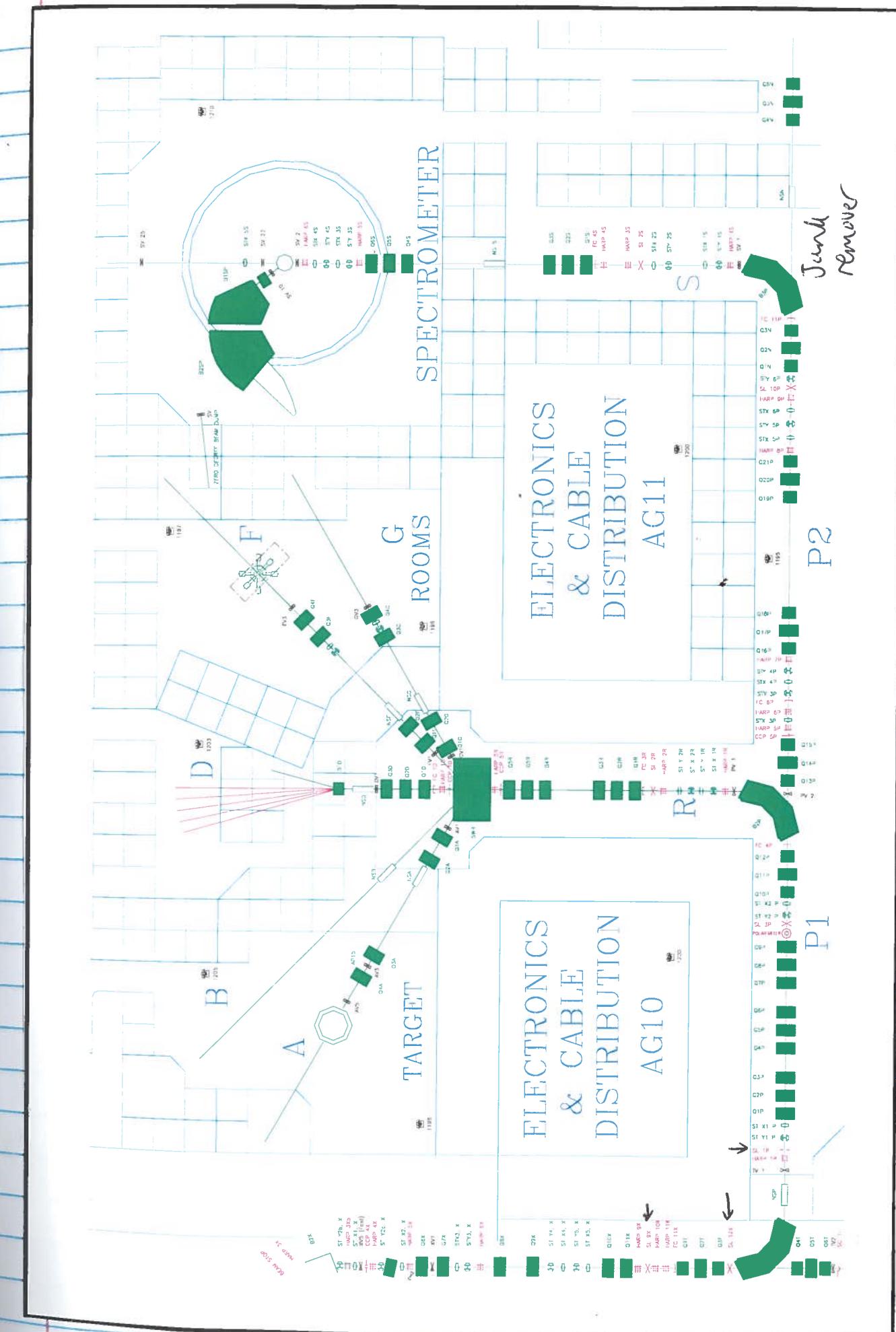
D <sub>3</sub> N	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	20.4	-10	110	2
	20.4	-20	111	2
	20.4	-40	112	2
	20.4	-80	113	2
	20.4	-200	114	10

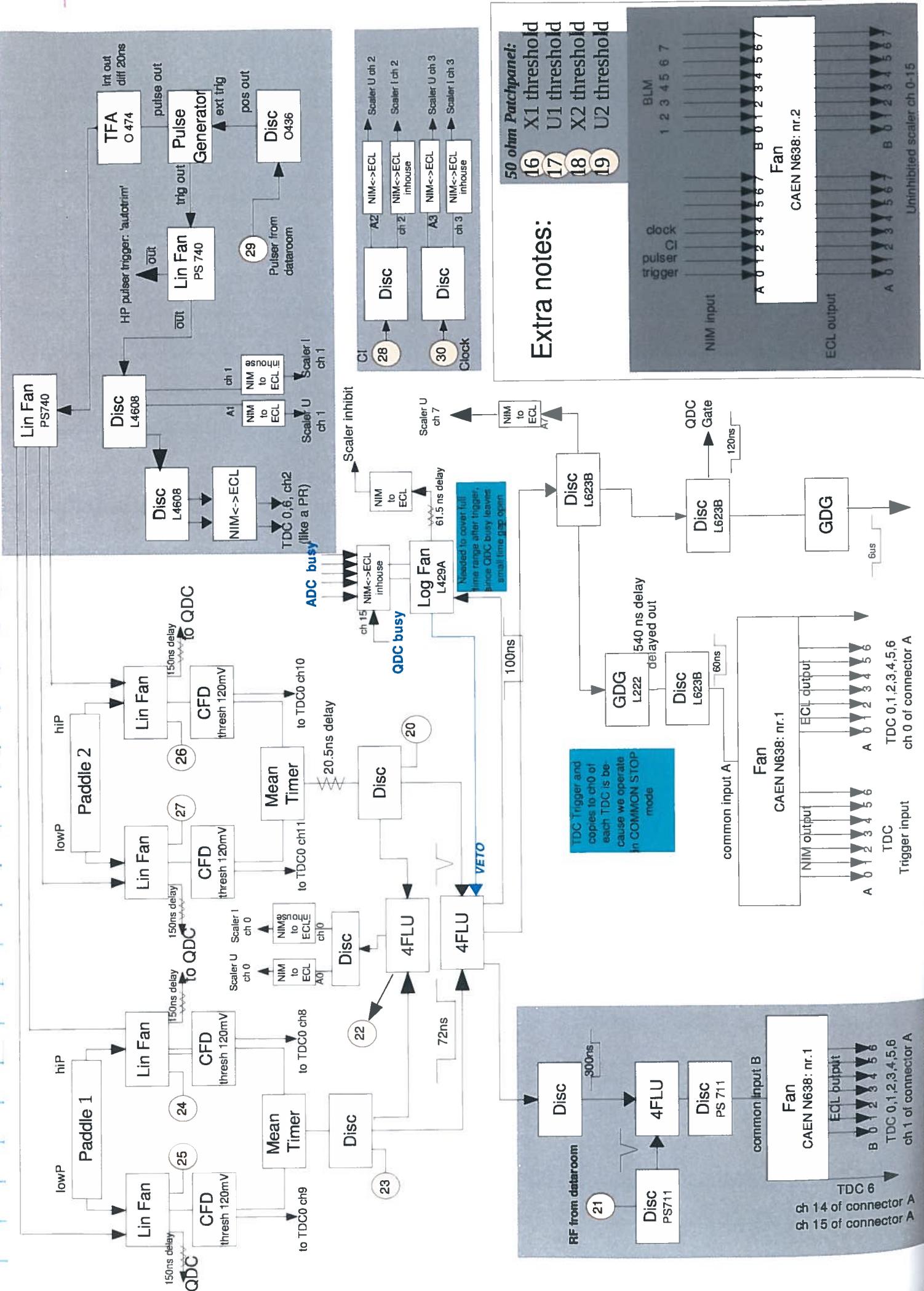
⇒ D<sub>3</sub>N measured threshold : -0.021 V (= D<sub>4</sub>N)

D <sub>4</sub> N	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	20.4	-10	115	2
	20.4	-20	116	2
	20.4	-40	117	2
	20.4	-80	118	2
	20.4	-200	119	10

D <sub>5</sub> N	Rate (Hz)	Pulse Height (mV)	Run	Time (min)
	20.4	-10	120	2
	20.4	-20	121	2
	20.4	-40	122	2
	20.4	-80	123	2
	20.4	-200	124	10

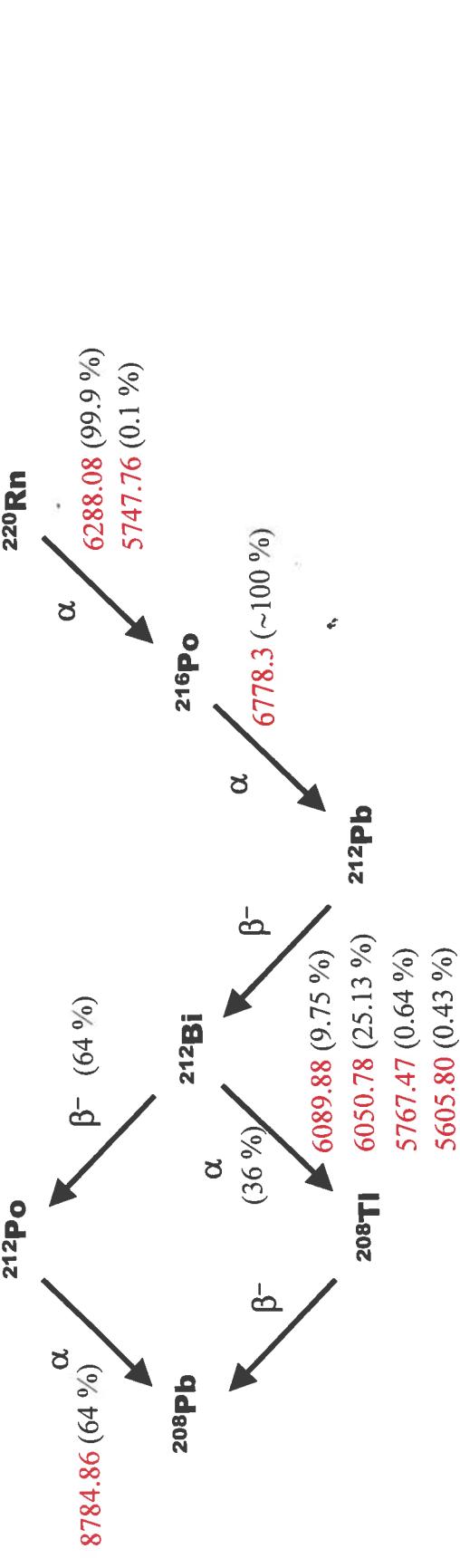
⇒ D<sub>5</sub>N measured threshold : -0.025 V

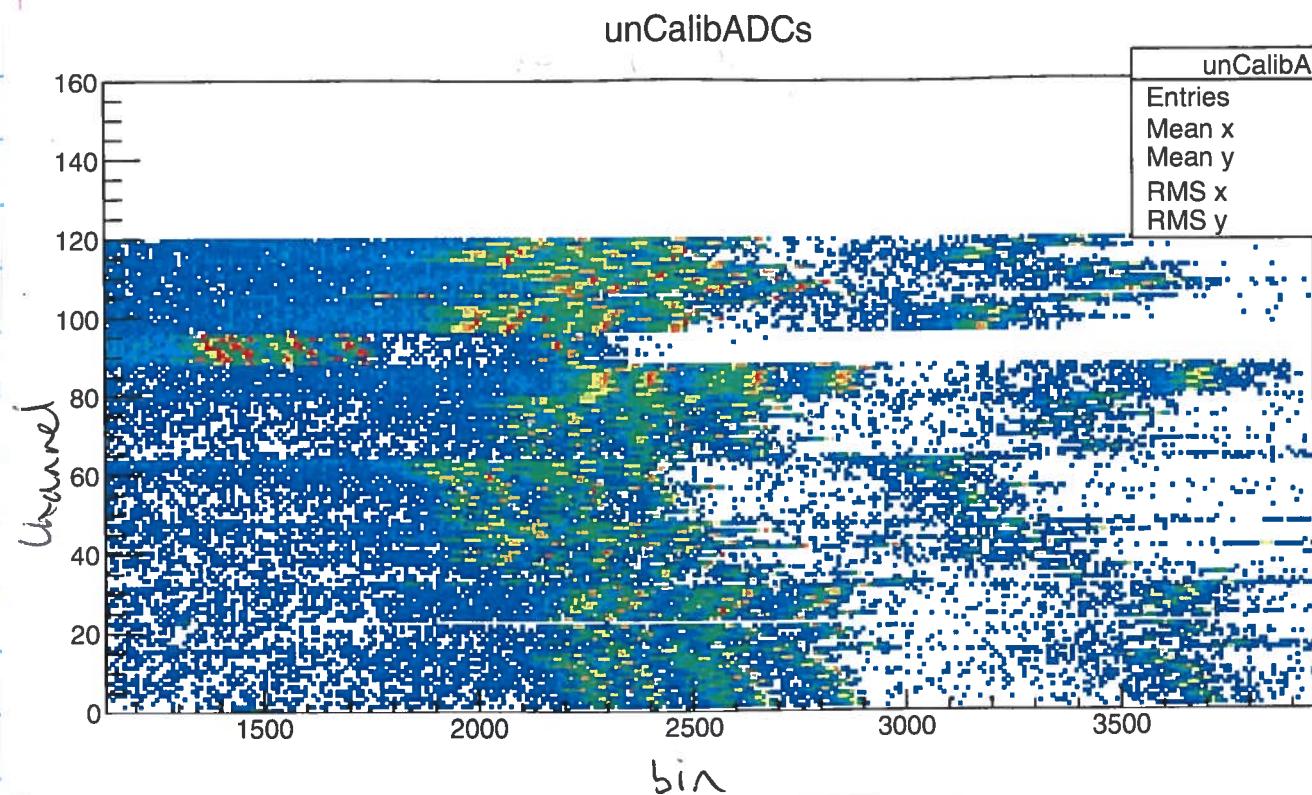




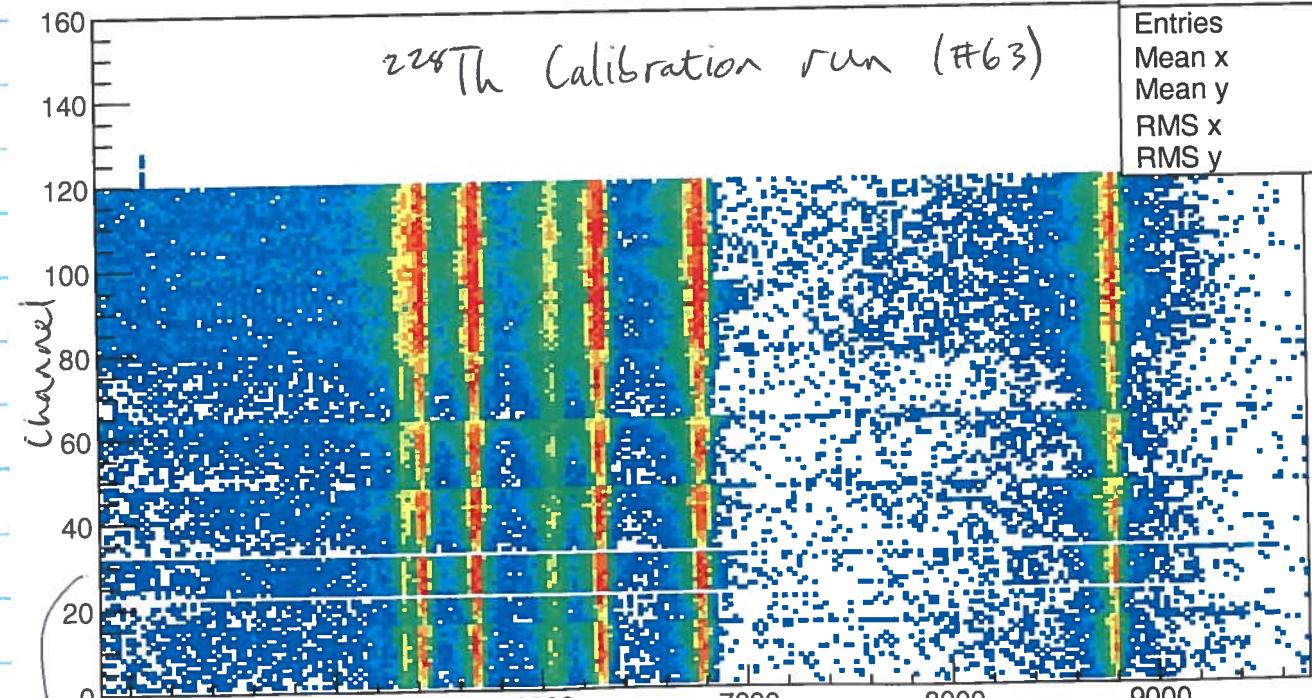
228th decay chain

### Energies of main $\alpha$ lines in keV





## CalibADC:



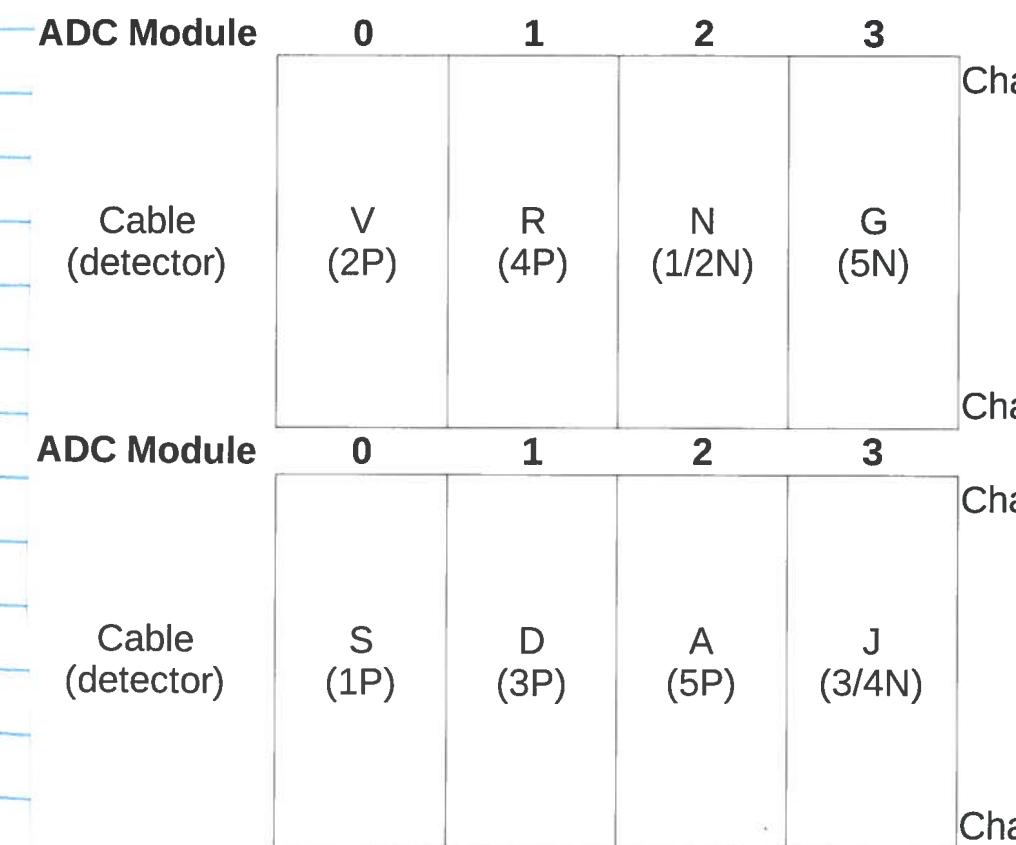
→ (Ch 22 & 32 dead) x Energy (keV)

## Cabling scheme

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<b>Detector #</b>	<b>Preamp</b>	<b>Side</b>	<b>Cable</b>
1	D1	Junction	W
	D2	Ohmic	Breakout
2	B1	Junction	Y
	B2	Ohmic	Breakout
3	I	Junction	P
	K	Ohmic	BA
4	C1	Junction	AG
	C2	Ohmic	Sw1
5	H	Junction	I
	G	Ohmic	AD

<b>Amplifier</b>	<b>Input Cable</b>	<b>ADC Cable</b>	<b>TDC Cable</b>
1P	W	S	AB
2P	Y	V	E
3P	P	D	AF
4P	AG	R	F
5P	I	A	Z
1N/2N	Breakout	N	AE
3N/4N	BA/SW1	J	H
5N	AD	G	O



TDC Cabling

TDC Module	D2	D1	C2	C1
005			Z (5P)	

Cable name (detector)

TDC Module	B2	B1	A2	A1
005			AE (1/2N)	

Cable name (detector)

TDC Module	D2	D1	C2	C1
006			AB (1P)	F (4P)

TDC Module	B2	B1	A2	A1
006			E (2P)	AF (3P)

H  
(3/4N)

TDC Module	B2	B1	A2	A1
007			O (5N)	

Detector #	ADC Channel	TDC  Channel	TDC Module	Module Channel
1P	0-15	880-895	006	112-127
1N	80-87	656-663	005	16-23
2P	16-31	864-879	006	96-111
2N	88-95	664-671	005	24-31
3P	32-47	848-863	006	80-95
3N	96-103	816-823	006	48-55
4P	48-63	832-847	006	64-79
4N	104-111	824-831	006	56-63
5P	64-79	704-719	005	64-79
5N	112-119	912-919	007	16-23

## For fieldset with $^{22}\text{Mg}$ $\text{Ex} = 9\text{-}15 \text{ MeV}$ ( $63\text{-}69 \text{ MeV t}$ )

ITLABS K600 Spectrometer Excitation Currents Ver AF

**Particle:** Fritton **Charge State:** 1

**Energy MeV:** 200 **Rigidity T.m:** 2.14964 **Momentum MeV/c:** 644.447

**CURRENT [A]** **B\_nmr[T]** **B\_real[T]**

DIPOLE D1	391.99	0.98638	0.98562
DIPOLE D2	389.71	1.00308	1.00115
QUAD	-484.59	OLD	X 0.99

**RESOLUTION MODE:** C LOW **G MEDIUM** **H HIGH**

Quad	0.9900	1.0000	D1/D2 0.9900
------	--------	--------	-----------------

Dipole Factors are applied to Breal of the Medium Resolution Mode

**UPDATE MAGNET VALUES** **Print** **EXIT**

Target Type/Description

ITLABS K600 Spectrometer Excitation Currents Ver AF

**Particle:** Fritton **Charge State:** 1

**Energy MeV:** 196.4 **Rigidity T.m:** 2.12836 **Momentum MeV/c:** 638.067

**CURRENT [A]** **B\_nmr[T]** **B\_real[T]**

DIPOLE D1	388.12	0.97662	0.97586
DIPOLE D2	385.91	0.99315	0.99126
QUAD	-479.77	OLD	X 0.99

**RESOLUTION MODE:** C LOW **G MEDIUM** **H HIGH**

Quad	0.9900	1.0000	D1/D2 0.9900
------	--------	--------	-----------------

Dipole Factors are applied to Breal of the Medium Resolution Mode

**UPDATE MAGNET VALUES** **Print** **EXIT**

Target Type/Description

For fieldset with  $^{14}\text{O}$  groundstate ( $74.366 \text{ MeV t}$ )

ITLABS K600 Spectrometer Excitation Currents Ver AF

**Particle:** Fritton **Charge State:** 1

**Energy MeV:** 203.6 **Rigidity T.m:** 2.17078 **Momentum MeV/c:** 650.784

**CURRENT [A]** **B\_nmr[T]** **B\_real[T]**

DIPOLE D1	395.91	0.99608	0.99532
DIPOLE D2	393.60	1.01293	1.01101
QUAD	-489.38	OLD	X 1.01

**RESOLUTION MODE:** C LOW **G MEDIUM** **H HIGH**

Quad	0.9900	1.0000	D1/D2 0.9900
------	--------	--------	-----------------

Dipole Factors are applied to Breal of the Medium Resolution Mode

**UPDATE MAGNET VALUES** **Print** **EXIT**

Target Type/Description

ITLABS K600 Spectrometer Excitation Currents Ver AF

**Particle:** Fritton **Charge State:** 1

**Energy MeV:** 200 **Rigidity T.m:** 2.14964 **Momentum MeV/c:** 644.447

**CURRENT [A]** **B\_nmr[T]** **B\_real[T]**

DIPOLE D1	391.99	0.98638	0.98562
DIPOLE D2	389.71	1.00308	1.00115
QUAD	-484.59	OLD	X 1.01

**RESOLUTION MODE:** C LOW **G MEDIUM** **H HIGH**

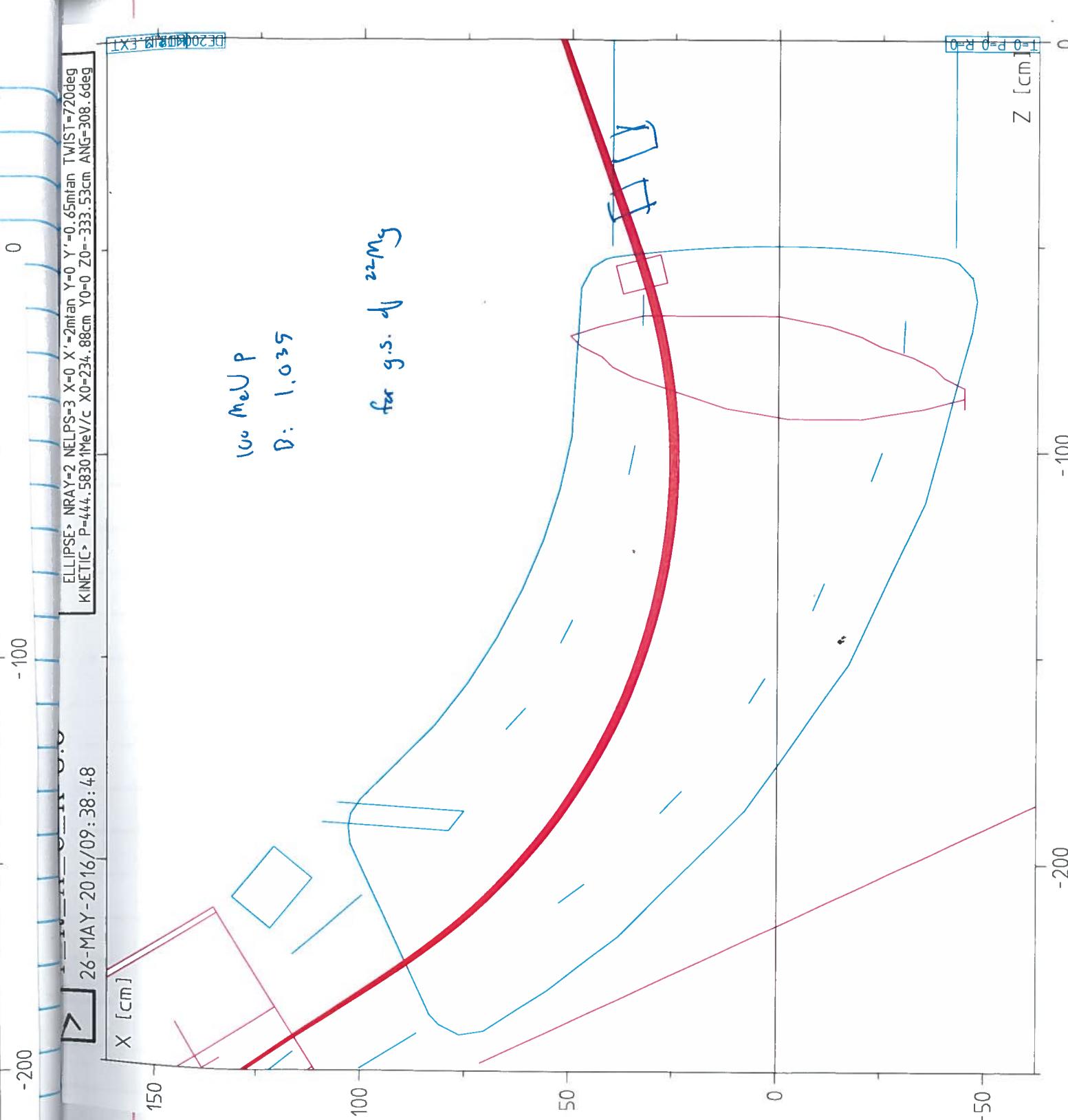
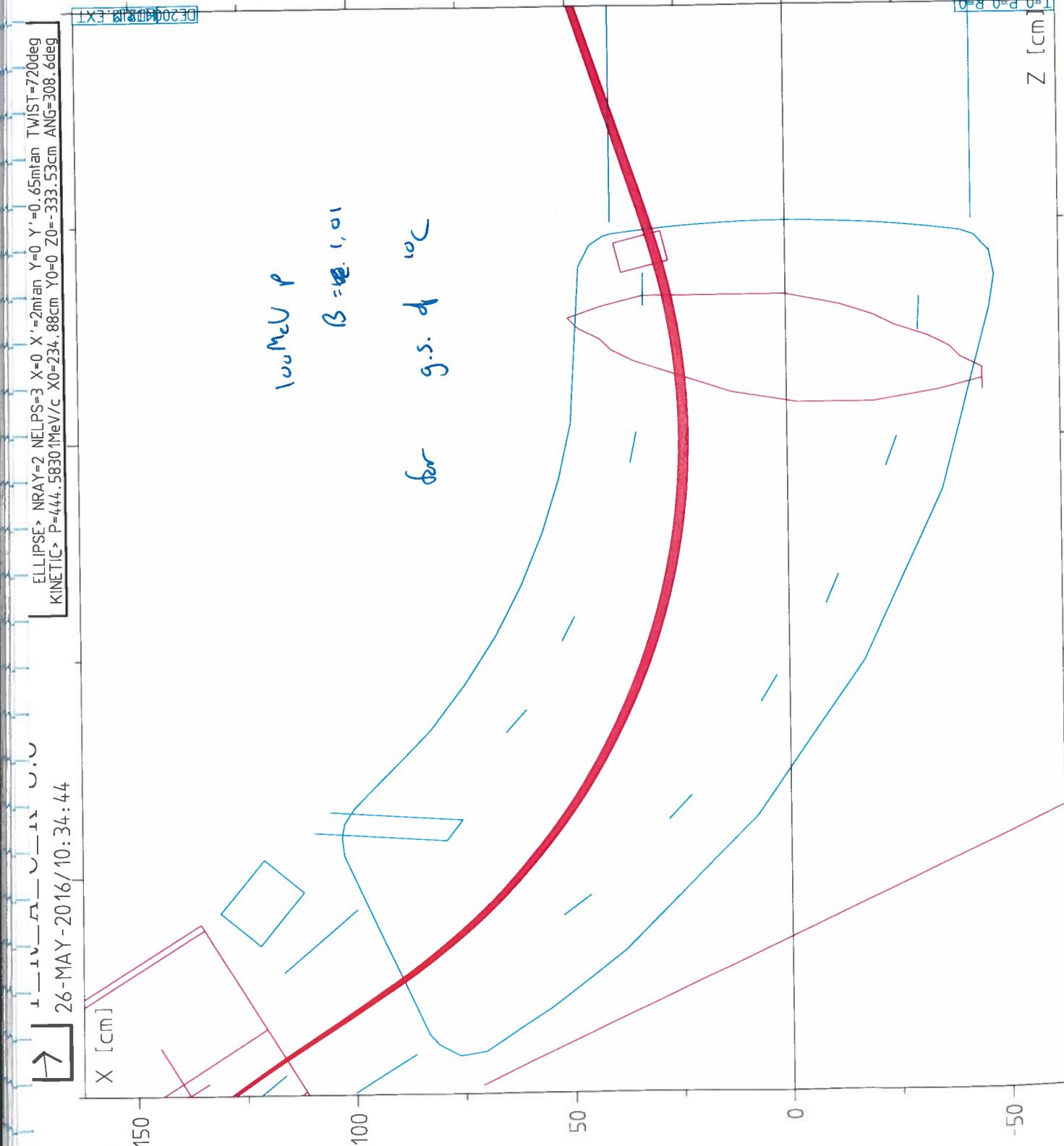
Quad	0.9900	1.0000	D1/D2 0.9900
------	--------	--------	-----------------

Dipole Factors are applied to Breal of the Medium Resolution Mode

**UPDATE MAGNET VALUES** **Print** **EXIT**

Target Type/Description





Feb 03, 16 11:12      notes.txt      Page 1/1

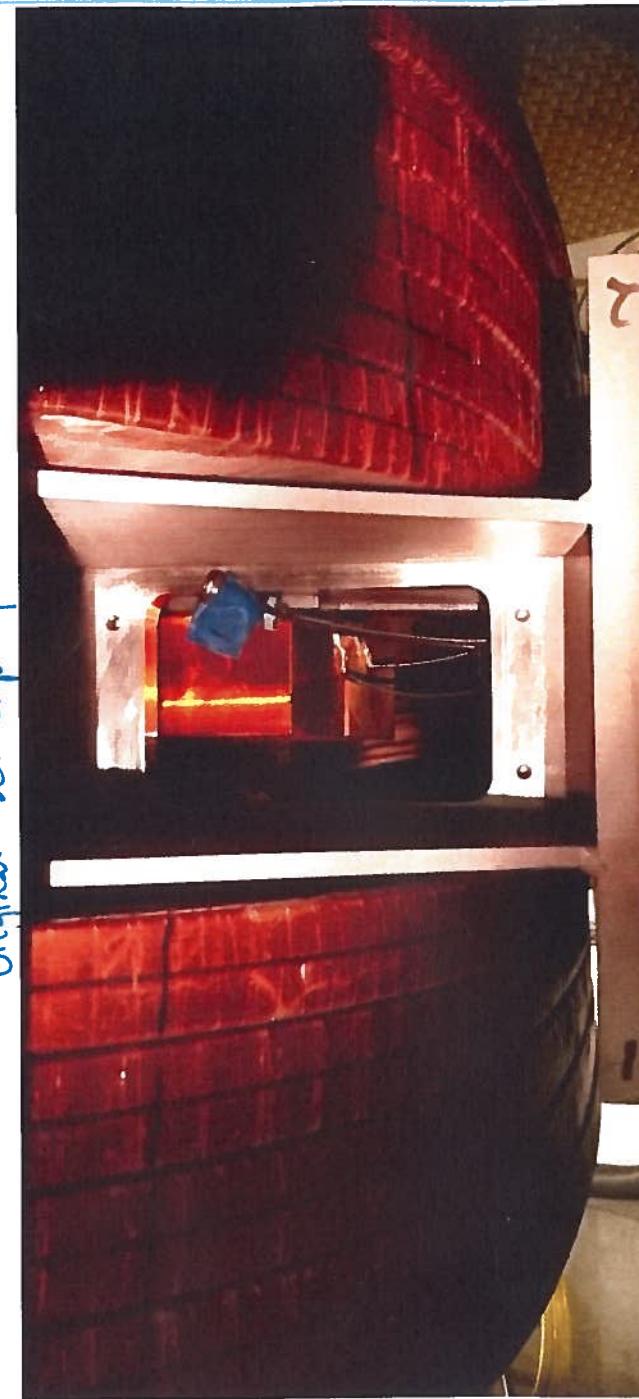
Assuming pt at 100 MeV and 0 degrees.  
 Target 24Mg:  
 gs of 22Mg at 77.618 MeV kinetic energy for t  
 Region of interest with 24Mg(p,t):  
 Ex 10 - 13 MeV  
 which I enlarge to  
 Ex 9-15 MeV  
 thus Et range from approx 63-69 MeV

$\alpha = -21.197$

So lets say we want to see from 63 MeV to 69 MeV for tritons...

B-Rho of a 63 MeV triton (momentum 598.241 MeV/c) = 1995.469 kG cm  
 For B-Rho of the triton = 1995.469 kG cm, what is proton energy?  
 from momentum = 598.241 MeV/c

B-Rho of a 69 MeV triton (momentum 626.412 MeV/c) = 2089.433 kG cm  
 For B-Rho of the triton = 2089.433 kG cm, what is proton energy?  
 from momentum = 626.412 MeV/c



Original beamstop position. Used since then.



~~X reserved  
space~~

~~1600~~ 1600 vault: patch panels

(a) beam 50 ohm

#1 Si rate #1

#2 2

#3 3

#4 4

#5 5

#6

(a) 1600

#16 X1 thresh

#17 U1 thresh

#18 X2 thresh

#19 U2 thresh

#20 P2 disc

#21 RF

#22 trig copy

camera on HV

#24 P2 low In Fan P1 high Fan

#25 P1 low In Fan

#26 P2 hi In Fan

#27 P2 low In Fan

#28 CI

#29 to pulse (tail pulse)

#30 clock.

Friday 27 May 2016

16:10 Target ladder in chamber

#6 viewer

$^{24}\text{Mg}$   $0.23 \text{ mg cm}^{-2}$

$^{24}\text{Mg}$   $0.7 \text{ mg cm}^{-2}$

$^{12}\text{C}$  diamond-like-carbon  $\sim 0.5 \text{ mg cm}^{-2}$

Mylar  $2 \text{ mg cm}^{-2}$

#7 copy



For 1<sup>st</sup> weekend of this experiment

Beam from SPC2

Pulse selection ~~1 in 5~~

~~main~~ SSC frequency 19.66 MHz

Safety interlock for K600 fields enabled.

K600 fields: used set-field procedure

Q	-499.172	
D1	403.930	← setting for $^{22}\text{Mg}$ gs.
H	-30.255	
D2	402.441	
K	6.545	

Supertabs ratios (same as PR2L2)

D2	1.0037	
Q	-0.8092	should be -0.8907 PR2L2 layout p27
K	61.7130	
H	-13.3510	

Until otherwise noted, please use supertabs to change fields.

Dink says:

$$E_{beam} = 99.94 \text{ MeV}$$

~~Using  $E_P = 99.94 \text{ MeV}$ .~~

~~D1: 269.93 A~~  
~~D2: 268.88 A~~  
~~Q: -334.15 A~~

Wrong.  
Ignore.

The fields were being set for 00-MeV protons onto the FP!

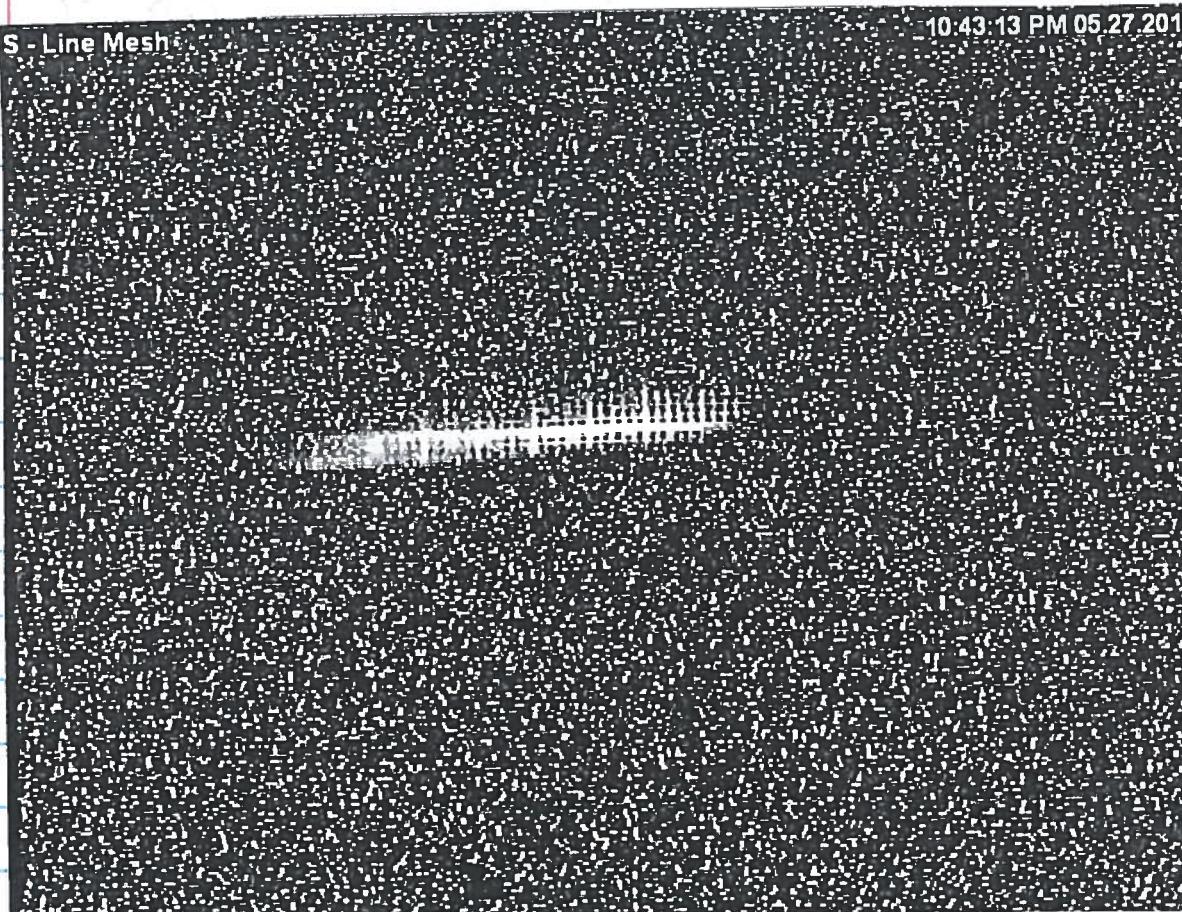
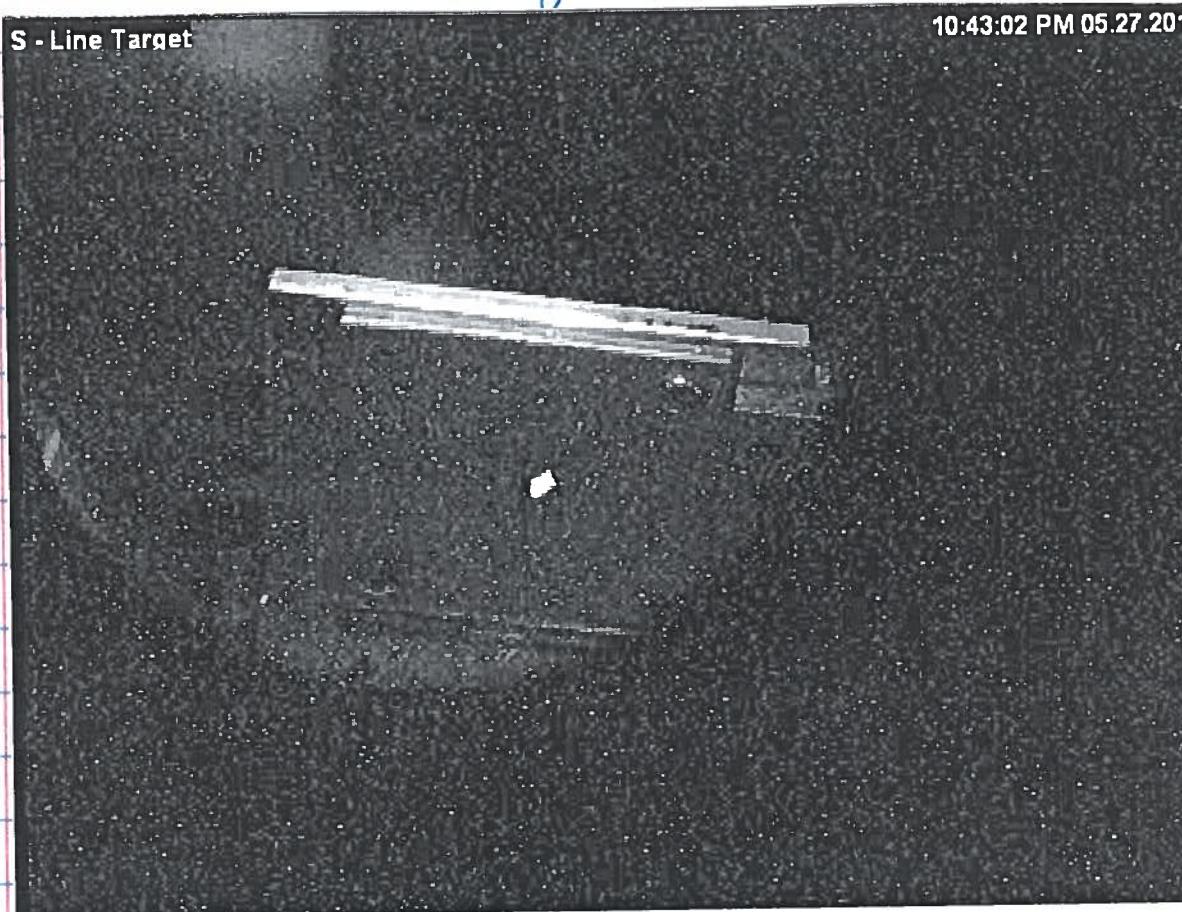
This is wrong.

These #s are right for (P,t)

In PR2L2 → Careful about pepperpot settings vs triton settings. That was the mistake that I was making. Sorry.

Fin 23:05

Beam on target



We see 100% of the beam on AC4S on D1PC.

Switch on paddles, based on PR262 layout 2 p 70

$$P1hi = -1525$$

$$P1lo = -1500$$

$$P2hi = -1320$$

$$P2lo = -1520$$

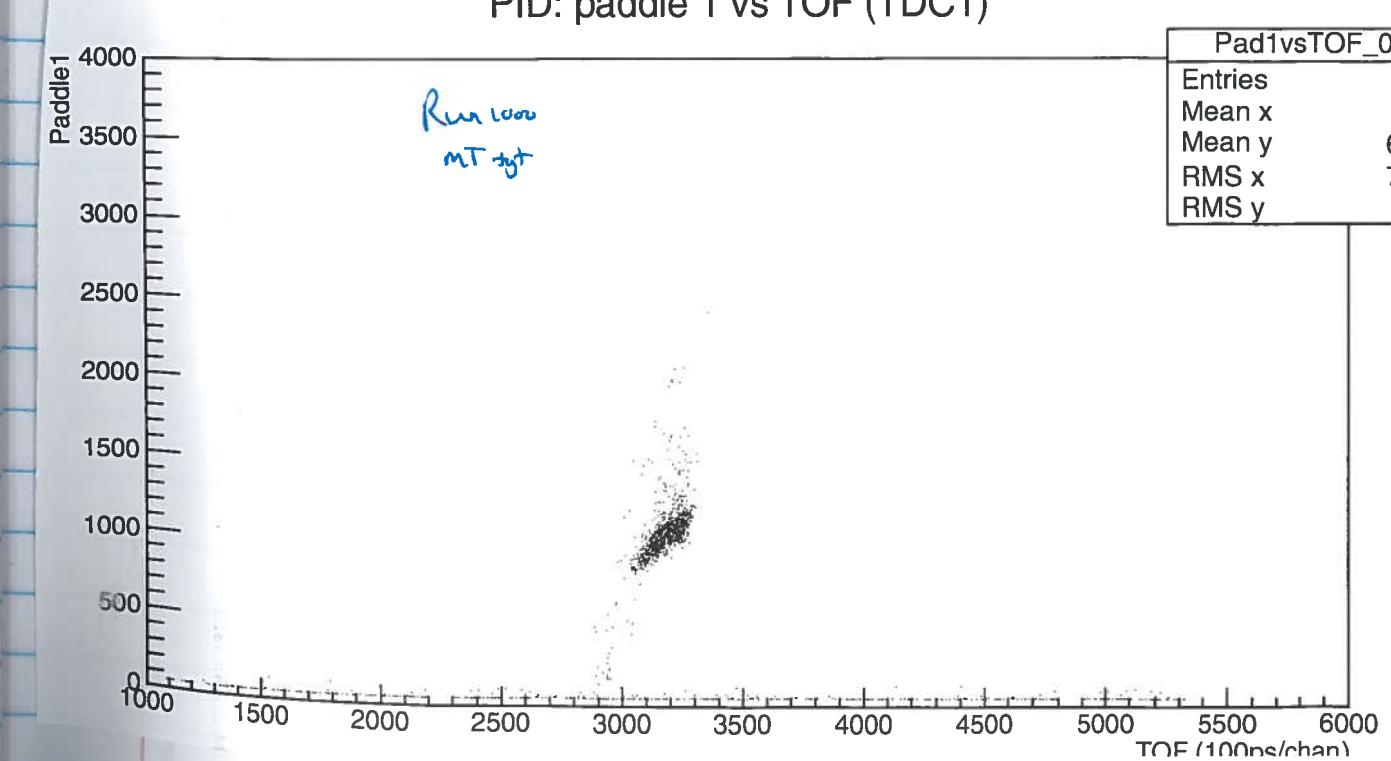
Run 130 JUNK

Reset run# to 1000

Run 1000 MT tgt - 26 Hz @ 0.7 nA

Only paddles on.

PID: paddle 1 vs TOF (TDC1)



Note: CT Range = 6nA

Run 1001  $^{24}\text{Mg}$  0.7  $\text{mg/cm}^2$

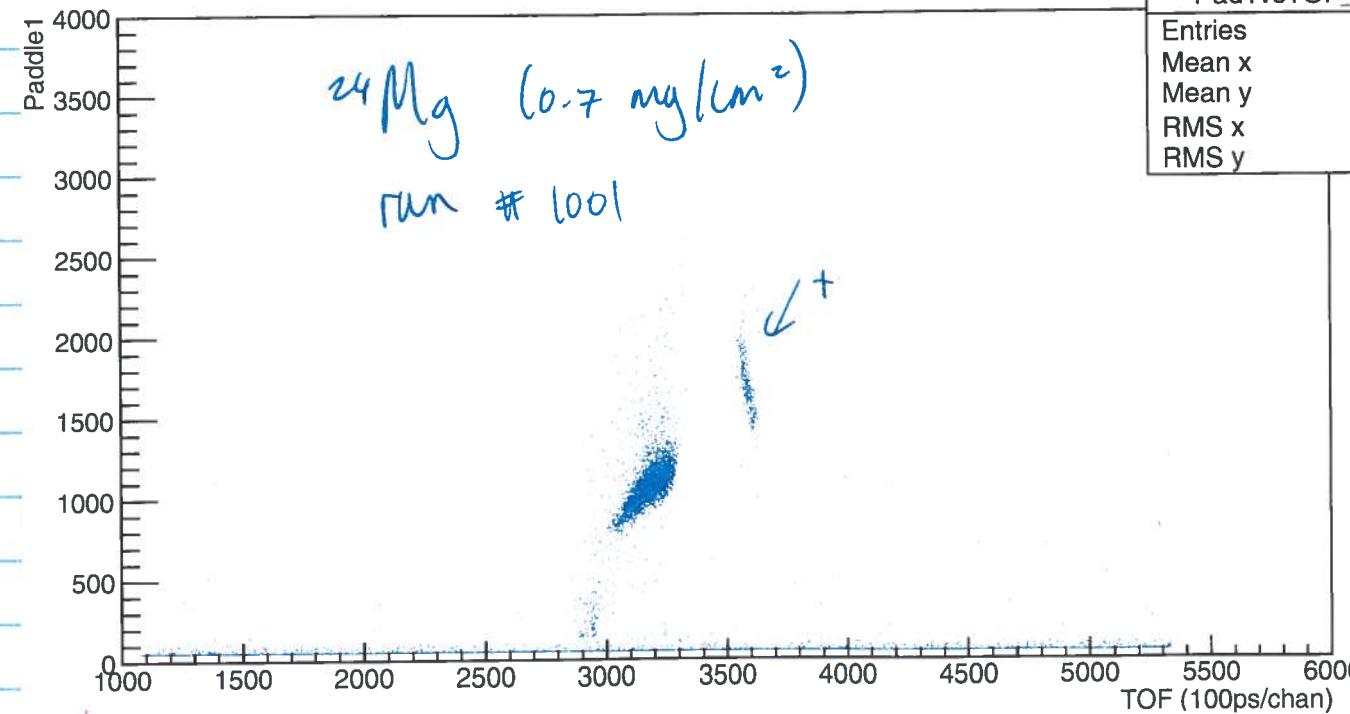
10Hz (a) 0.6nA

Switched VDC's

VDC1 = -3.5 kV  
VDC2 = -3.6 kV

in result

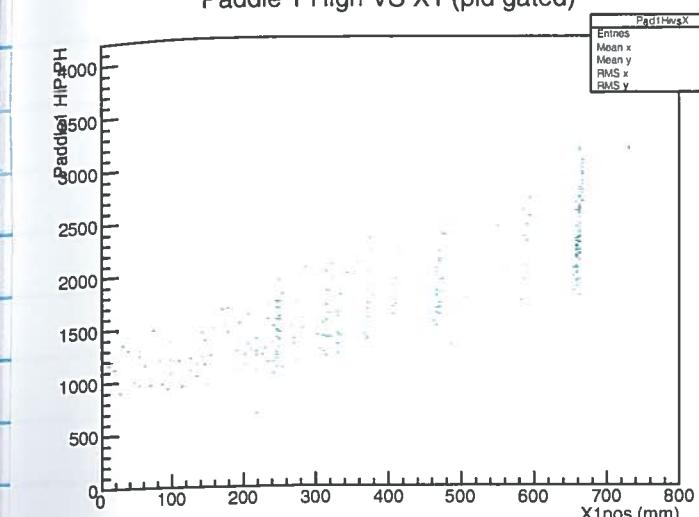
PID: paddle 1 vs TOF (TDC1)



Compare with p7c of PR262  
(laybook)

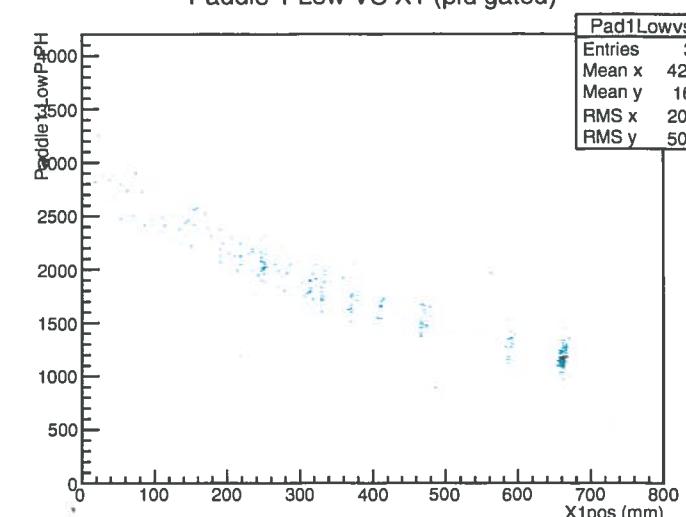
Eff: X1 ~92% W1 ~95%  
X2 ~96%

Paddle 1 High VS X1 (pid gated)

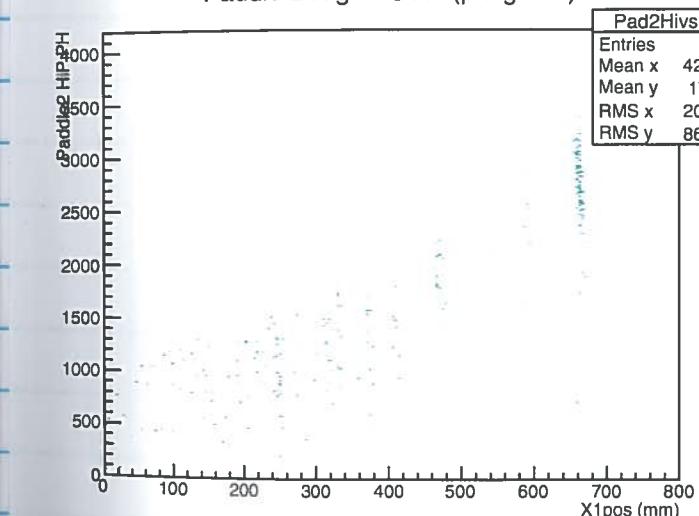


$^{24}\text{Mg}$

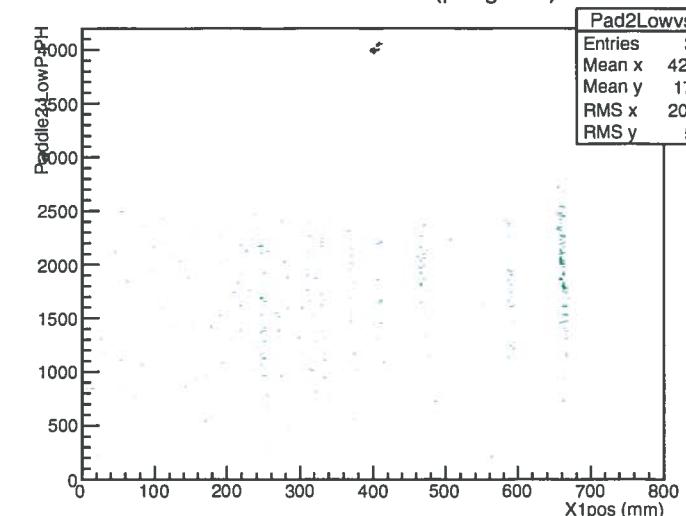
Paddle 1 Low VS X1 (pid gated)



Paddle 2 High VS X1 (pid gated)



Paddle 2 Low VS X1 (pid gated)



Sat:

So far it looks like the DAQ and detectors are working

Plan of action 1) improve halo slightly  
2) Do faint beam

Run 1002 Empty target. 20Hz (a) 0.3 nA  
Thulani tuned slits: end with 10Hz @ 2.2nA

00:30 Now attempt faint beam mode  
with  $D1 = 270.0$  (Specct 100 MeV/p setting.)

So change with Superkicks from  $D1 = 403.93$   
to 270.0

Run 1003, faint beam.

Decide to increase pad 1 HV.

for faint beam: pad 1 hi 1525  $\rightarrow$  1625  
pad 2 lo 1500  $\rightarrow$  1600

Run 1004, faint beam

increase  $D1$  to 275 A

Rate still only few Hz.

Why so low?

Change back to  $D1 = 403.93$ . Take out meshes

Check beam intensity. on FC L6S 1.3 nA

Asked for more beam.

Best at present is 2.6 nA

Back to faint beam.  $D1 = 275.0$

Run 1005, faint beam. 3-5 Hz, bad res,  $Q_{BS} = 22.7$   
 1006  $Q_{BS} = 23.2$  5mm wide base of peak  
 1007  $Q_{BS} = 22.7$  ~7mm wide at base. 193 cts.  
 1008  $Q_{BS} = 22.2$  ~7mm wide at base.  
 1009  $Q_{BS} = 22.7$

Faint beam not so useful.  
Rates too low for unknown reason. ( $\sim 3$  Hz)  
We did make a rough adjustment to  $Q_{BS} = 22.7$  A  
but for further improvements we will have to go to the  
 $^{22}\text{Mg}$  g.s.  $\rightarrow$  Maybe all f.b. conclusions are rubbish  
as timeframe similar to field drift.

Back to  $D1 = 403.93$ . Paddles back to pil 1525.  
 $\rightarrow$  Halo check.

Run 1010 Empty tgt. 70 Hz (g) 2.6 nA.

Ask for halo tuning.

FC 11X 12 nA

FC 6P 2 nA

6P X not ready

11P 1.9 nA

4S 1.9 nA

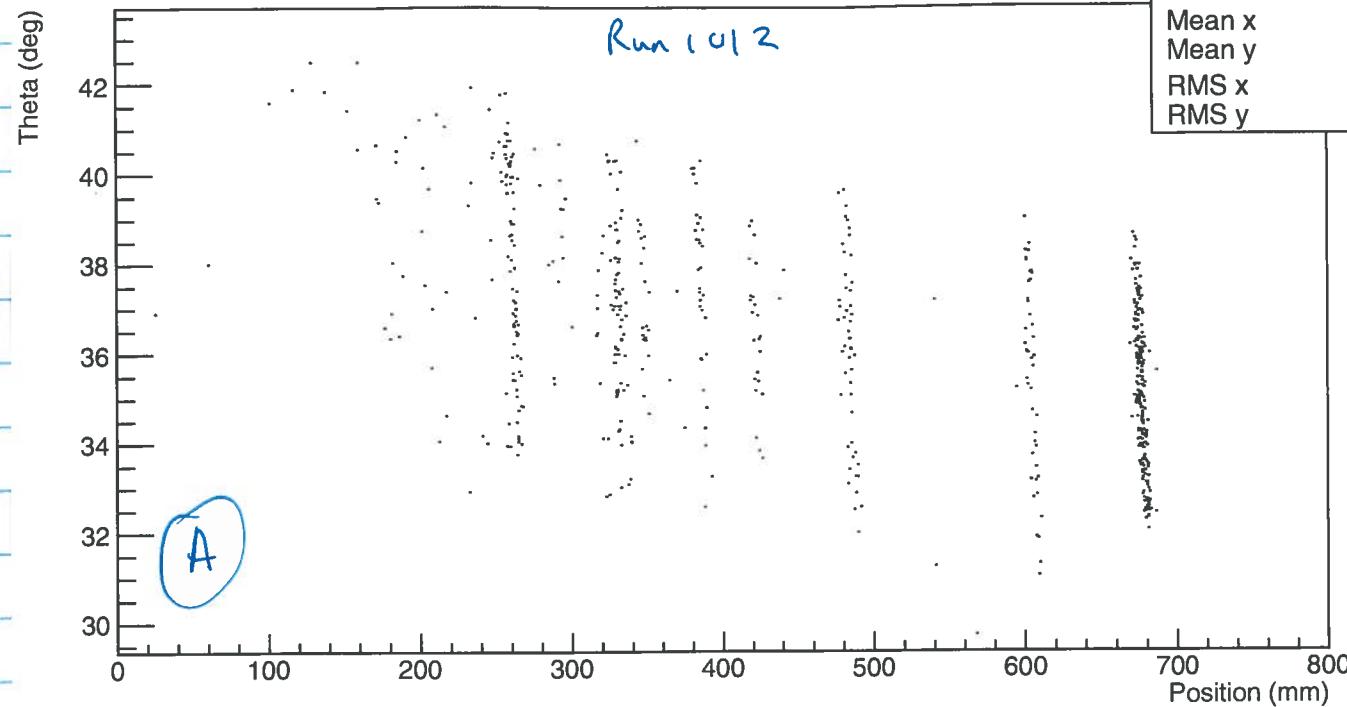
01:32 Struggling to get halo down.  
now 146 Hz (g) 2 nA.

Run 1011 Still halo true  
end with 20 Hz (g) 1.6 nA.

Run 1012  $^{22}\text{Mg}, 0.7 \text{~g}$ , 22 Hz (g) 1.6 nA

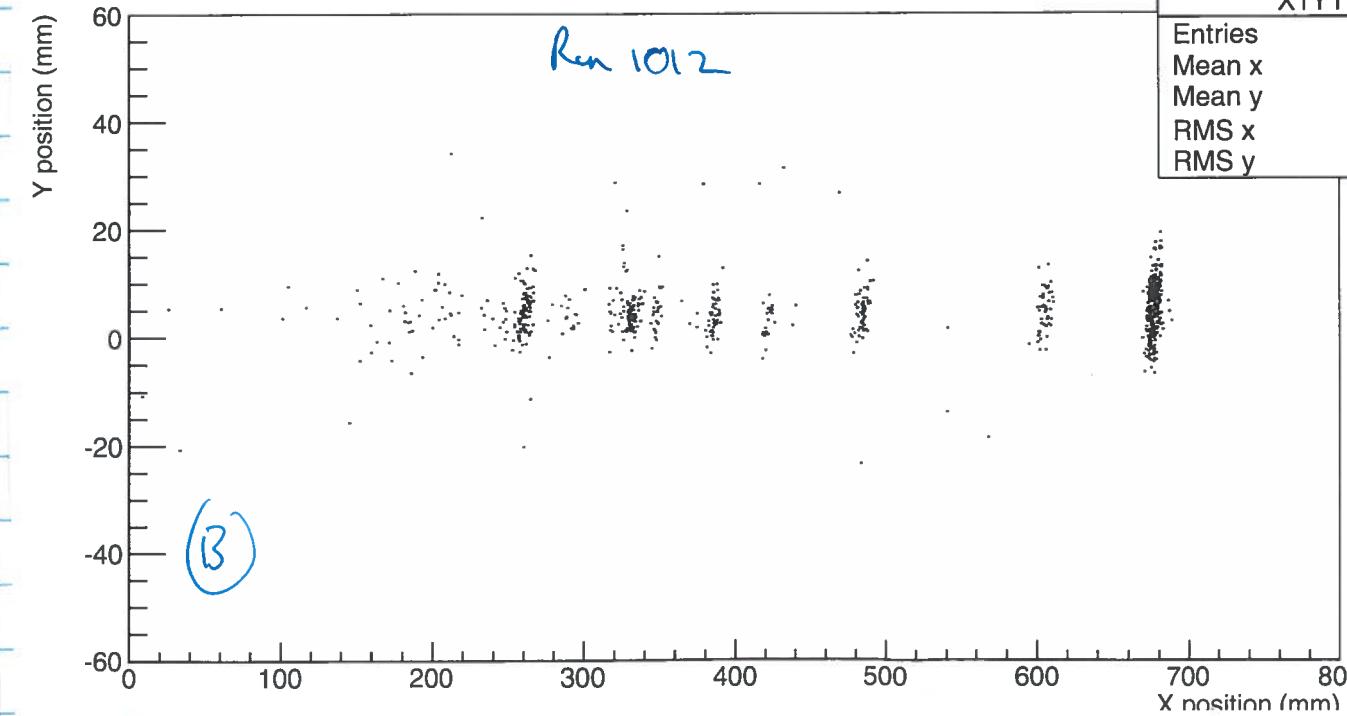
ThFP vs X1 (chisq&lt;0.2)

Run 1012



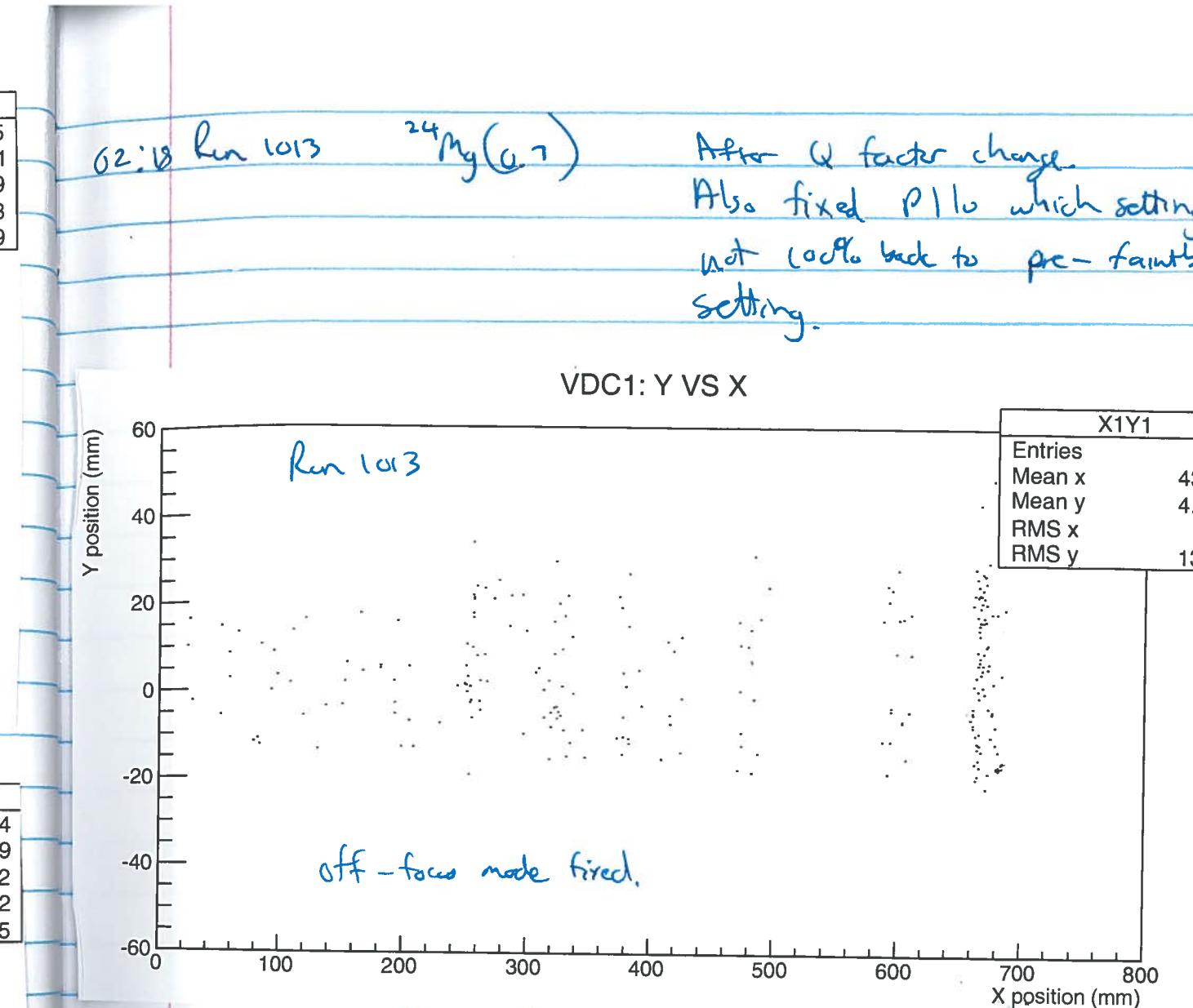
VDC1: Y VS X

Run 1012



(A) → resolution not good

(B) → does not look like off-face.  
 ↪ change Q (superlens)  
 from -0.8092  
 to -0.8107

02:18 Run 1013  $^{24}\text{Mg}(\alpha, \gamma)$ 

After Q factor change.  
 Also fixed P110 which setting was  
 not 100% back to pre-faint-beam  
 setting.

VDC1: Y VS X

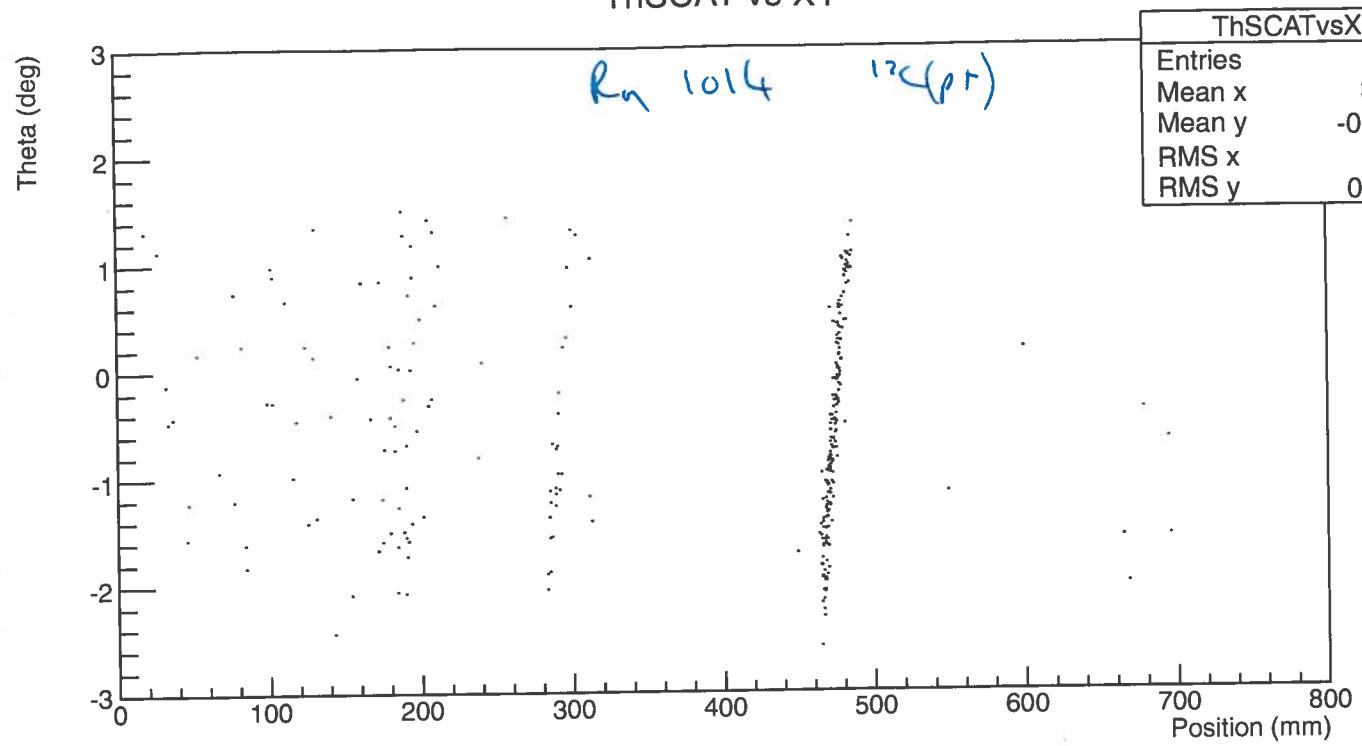
off-face mode fired.

∴ problem B of p58 fixed.  
 Now do resolution...

02:26 Run 1014

 $^{12}\text{C}$  (OLC) 1, A 8 Hz.

No, it does not count factor than  $^{24}\text{Mg}$ .  
 So getting resolution optimized stays problematic...

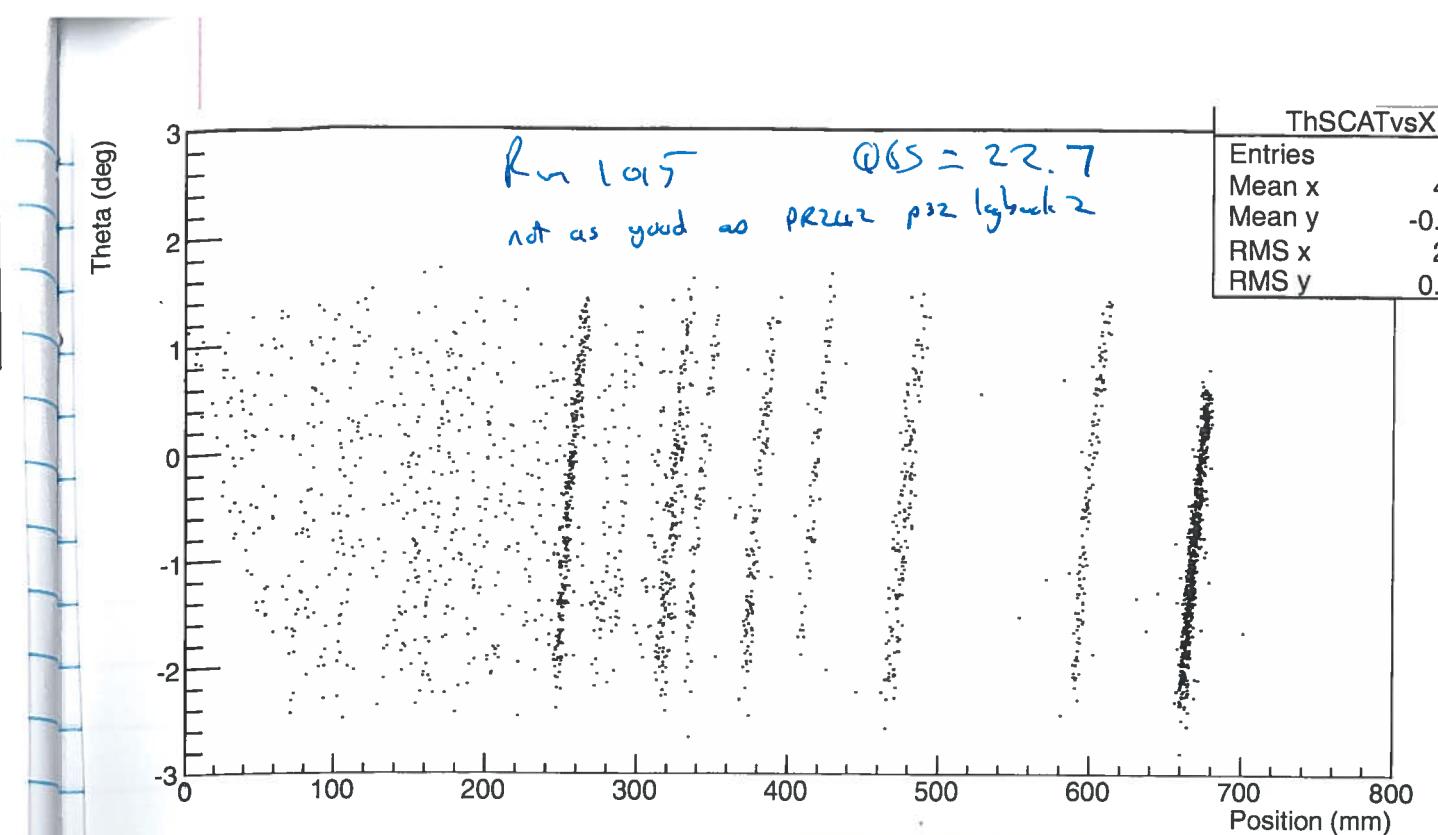


02:35 Run 1015  $^{24}\text{Mg}(0,1)$   $Q_{6S} = 22.7$   
 $6\text{ Hz (c)} 1\text{ nA}$

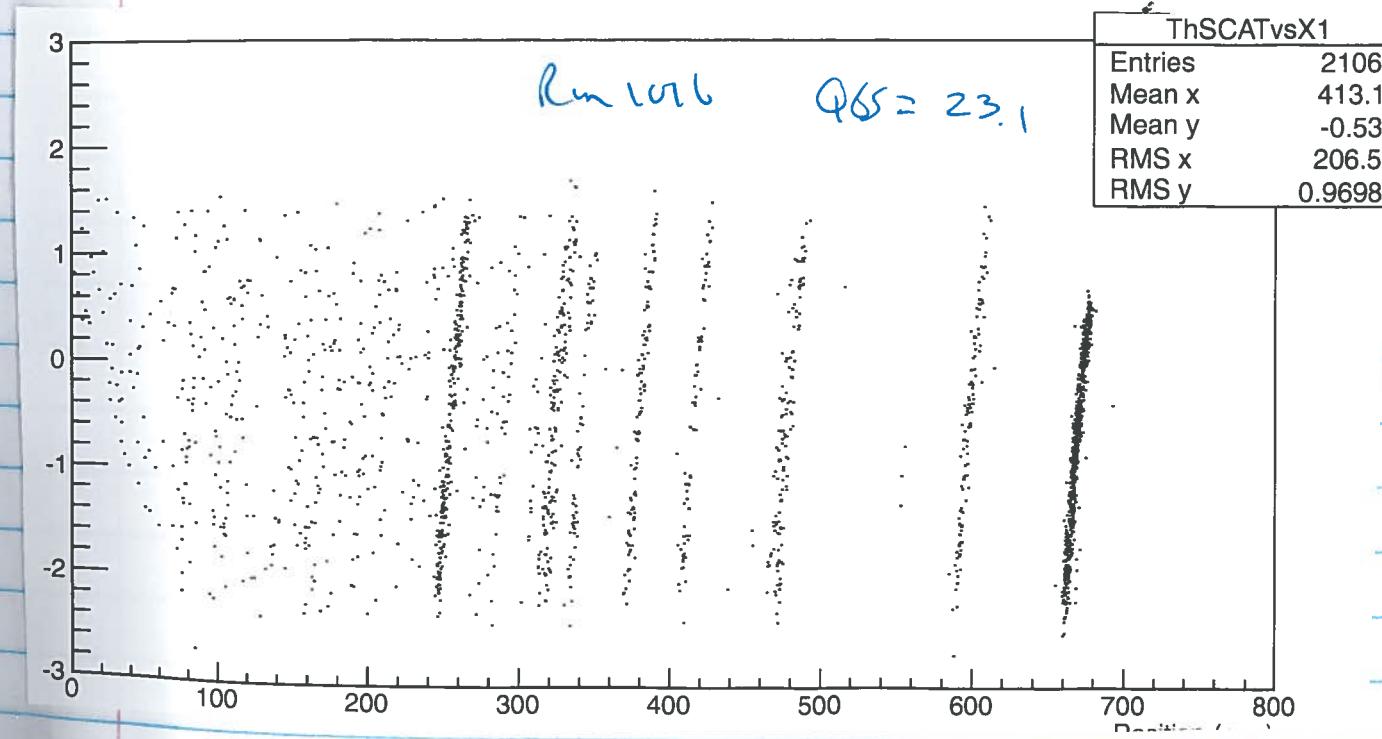
not good... ask for pulse selection to be  
temporarily switched off....

maybe don't do it... at least Ben could give  
me 3nA.  $25\text{ Hz (c)} 3.6\text{ nA}$

operators ~~were~~ scared to switch off for  
fear of not getting it back on.

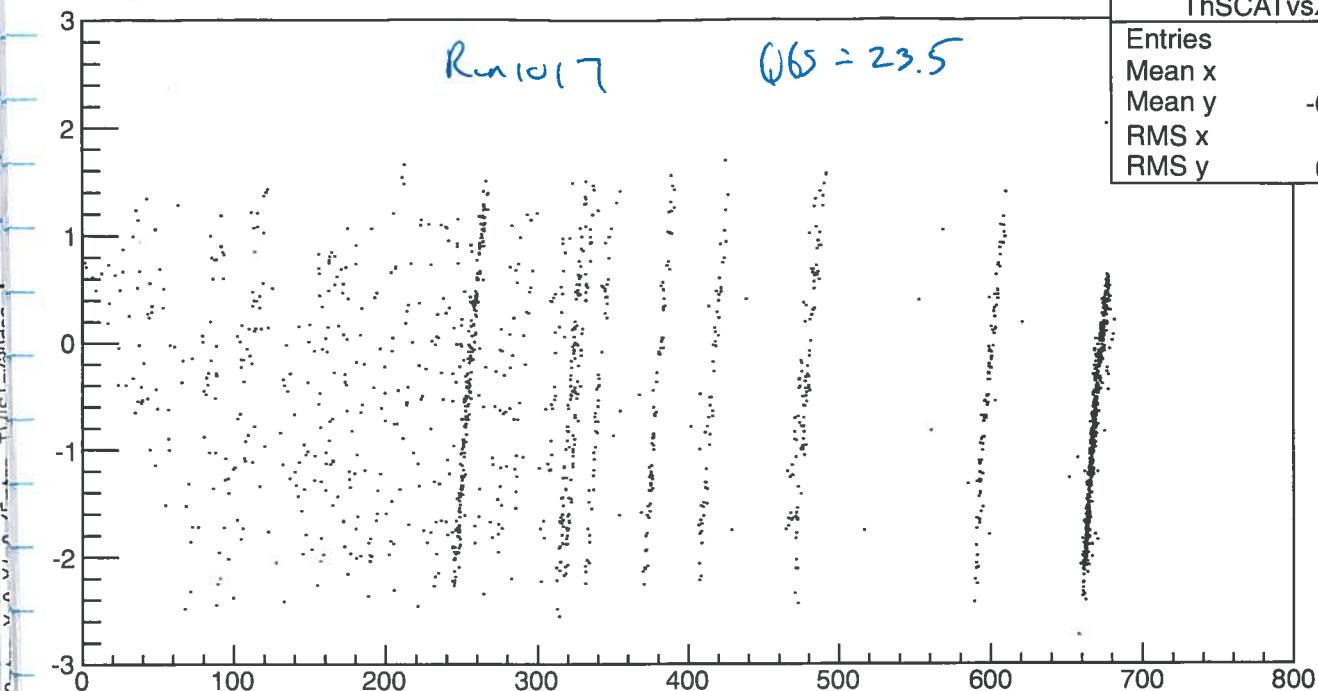


03:08 Run 1016  $Q_{6S} = 23.1$   $15\text{ Hz (c)} 2.1\text{ nA}$   $^{24}\text{Mg}$

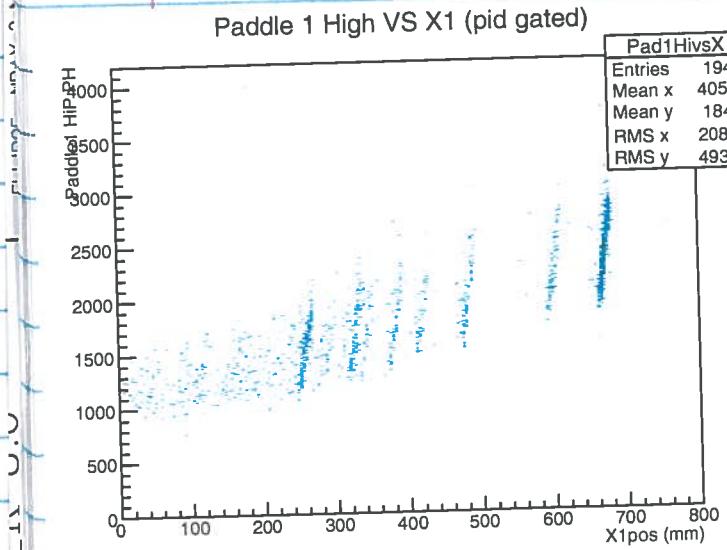


03:46 Run 1017  $Q_{6S} = 23.5$   $10\text{ Hz (c)} 1.2\text{ nA}$   $^{24}\text{Mg}$

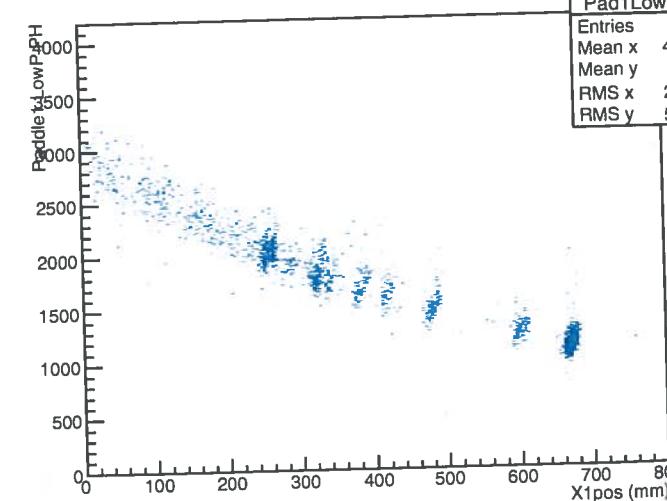
off:  $x_1 = 97$   
 $w_1 = 99$   
 $x_2 = 95$



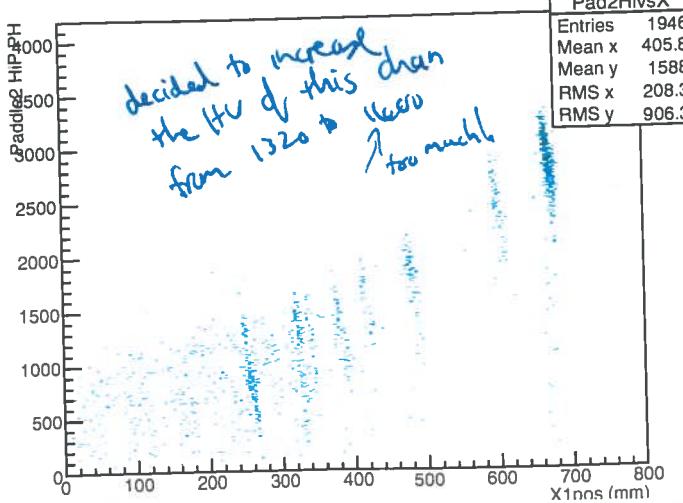
↓ obtained with card draw me - Pad vs X(C)



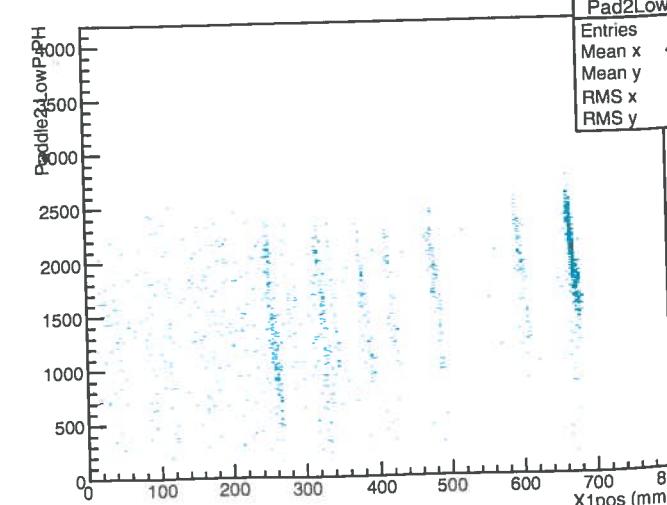
Paddle 1 Low VS X1 (pid gated)



Paddle 2 High VS X1 (pid gated)



Paddle 2 Low VS X1 (pid gated)



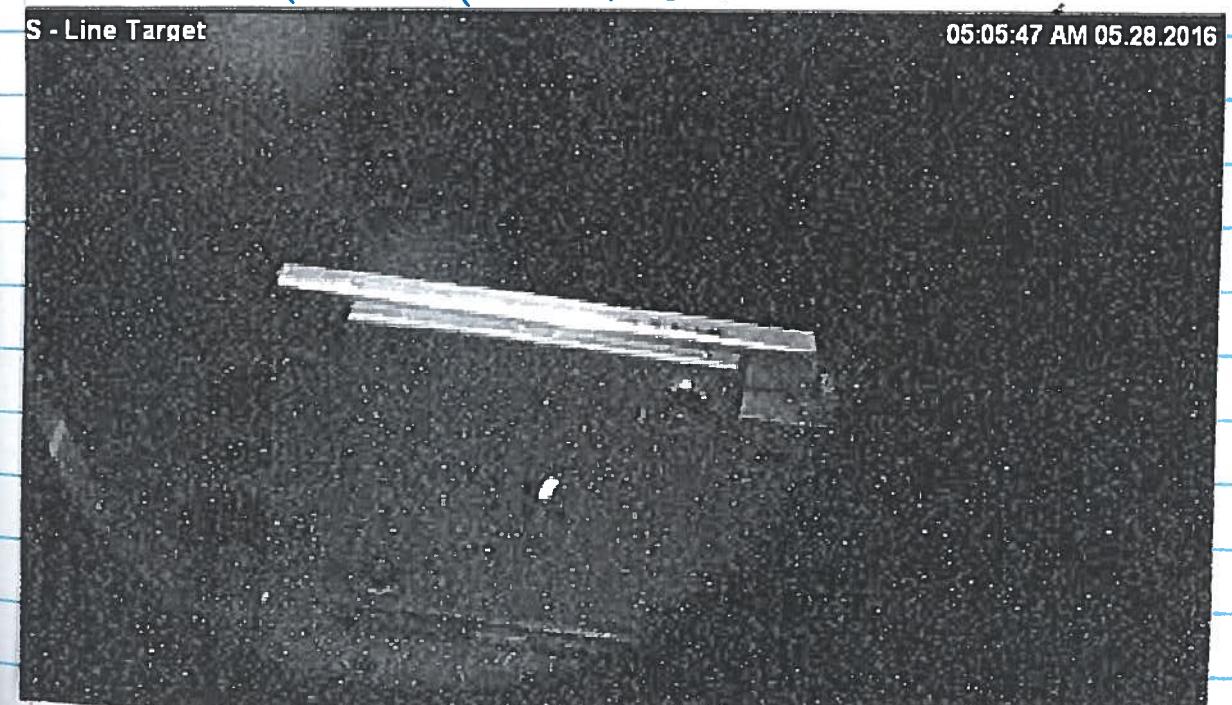
~~Q<sub>FS</sub> = 23.5~~ Run 1018  $Q_{FS} = 23.8$   
Also increased Pad 2 hi to -1400 ✓

No beam Beam lost, Ben not sure why. Is it similar to the problem earlier or Fri night when beam loss was due to mysterious change in SSC?

Yes. In X line Ben says beam on harp was moved 20 mm

Re-align along beamline  
Switch of detectors. Put in viewer.

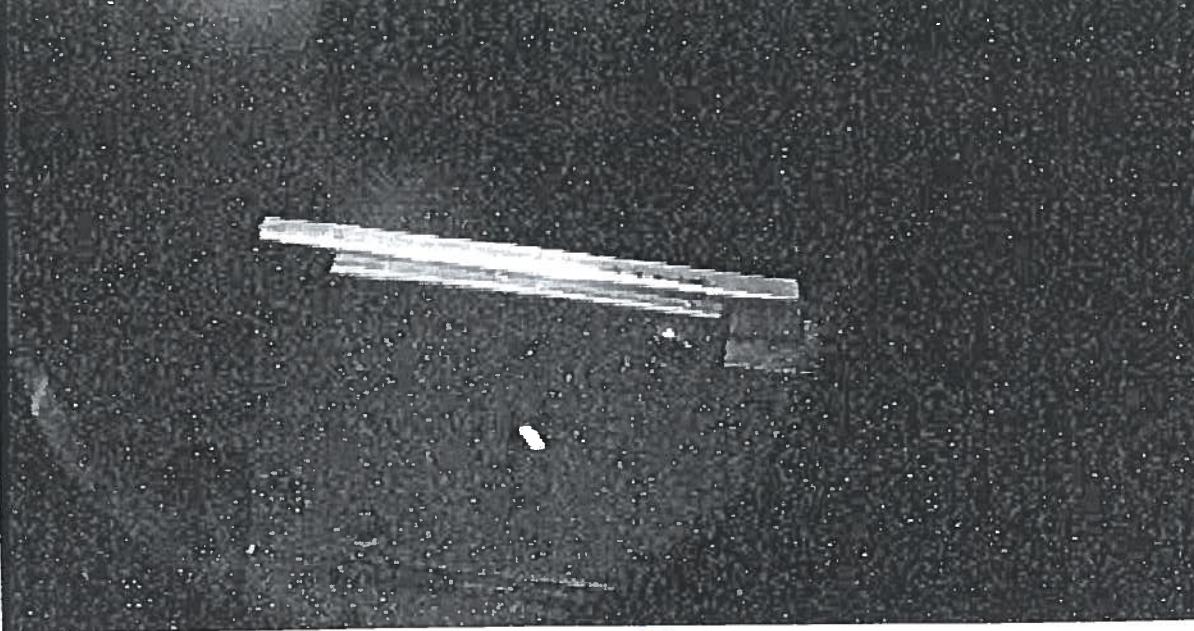
$Q_{FS} = 38.1$   $Q_{GS} = 22.7$



$QSS = 38.1$   $QGS = 23.1$

S - Line Target

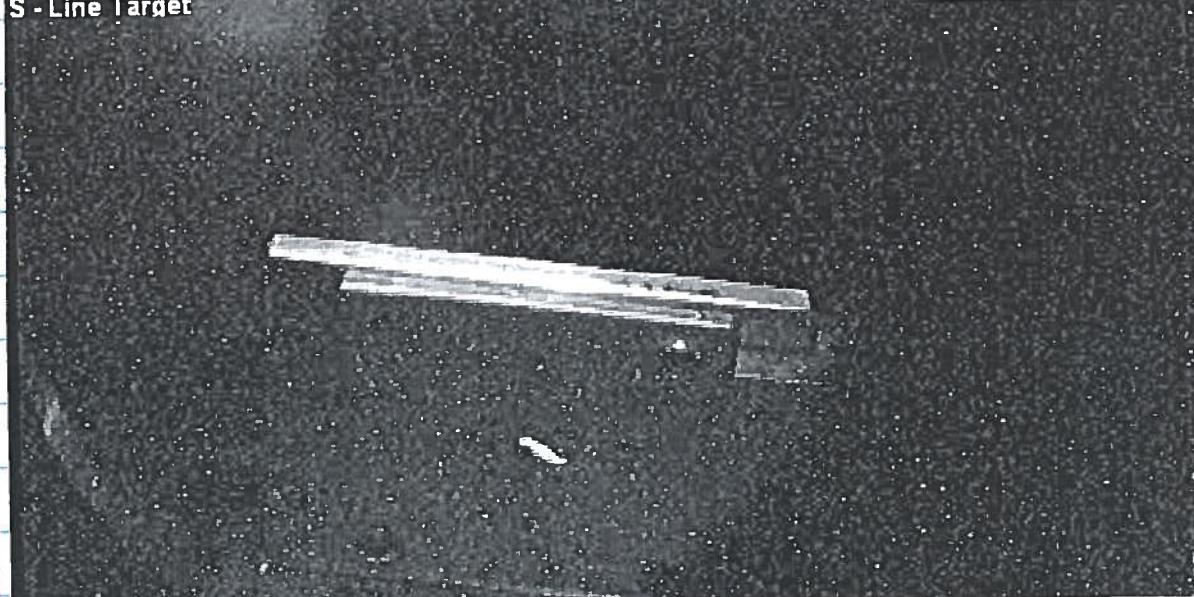
05:06:15 AM 05.28.2016



$QSS = -38.1$   $QGS = 23.5$

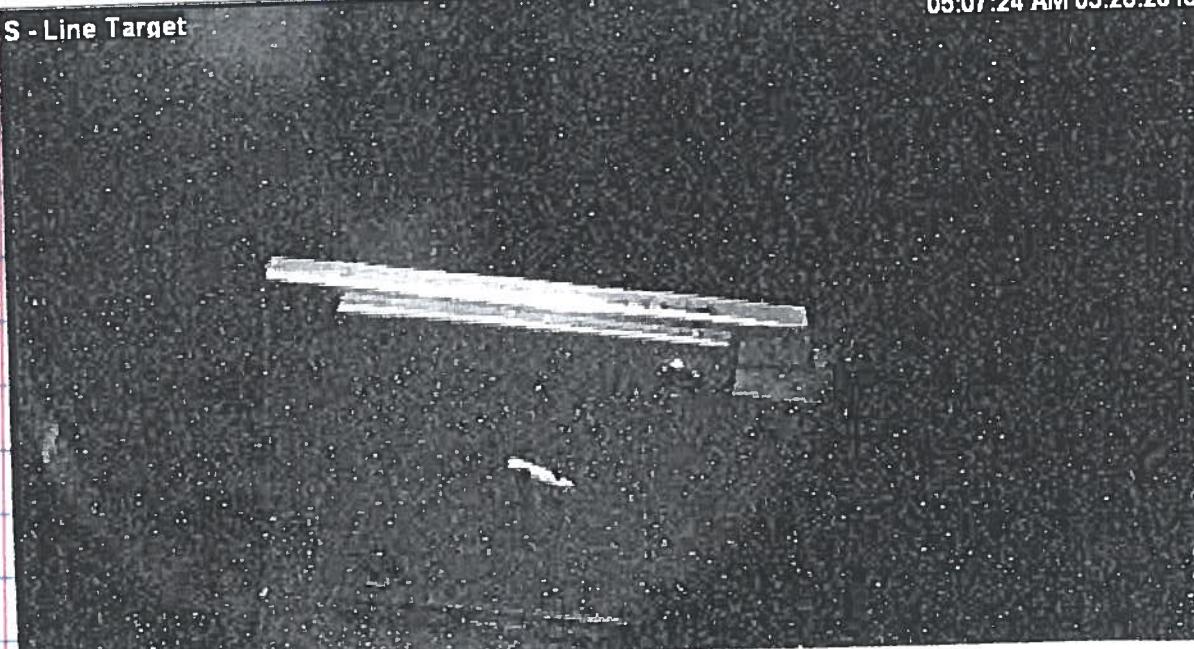
S - Line Target

05:07:00 AM 05.28.2016



$QSS = 38.1$   $QGS = 23.8$

05:07:24 AM 05.28.2016



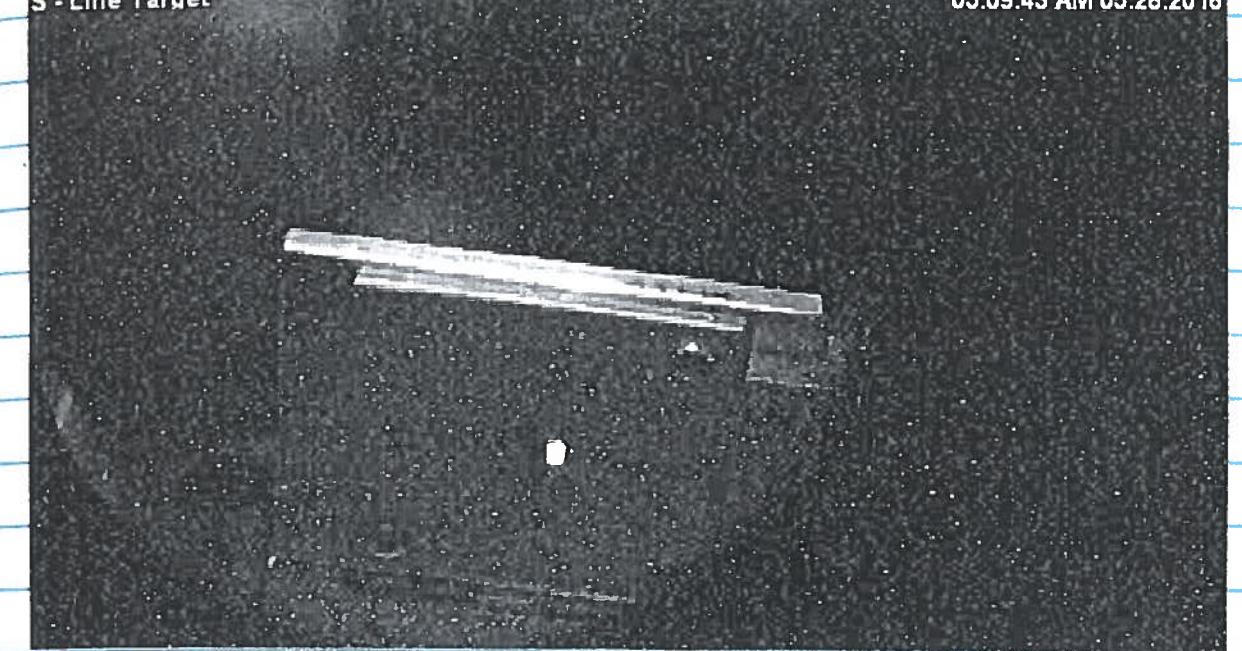
$QSS \rightarrow 39.4$

$QGS = 23.8$

65

S - Line Target

05:09:43 AM 05.28.2016



→ Leave  $QSS @ -38.1$   $QGS @ 23.8$ .

05:45 Run 1018 EMPTY tgt  $70\text{Hz} @ 4\text{nA}$   
shut trn →  $60\text{Hz} @ 5\text{nA}$

05:47 Run 1019  $^{24}\text{Mg} (0.2)$   $70\text{Hz} @ 4\text{nA}$

Switching on detectors in run

Is  $E_{beam}$  different? no?

But why don't I see the g.s. of  $^{24}\text{Mg}$  any more?

↳ due to change in PadZhi voltage?

Yep. seen clearly in PadZhi vs X.

More PadZhi HV down to  $\sim 130$

with D1 superknd = 403.93

\*\* EnMet Ver5.7 Oct 2013 \*\*  
Energie\_NMR.txt

\*\* BEREKENDE ENERGIE \*\*\*\* CALCULATED ENERGY \*\*

2016/05/28

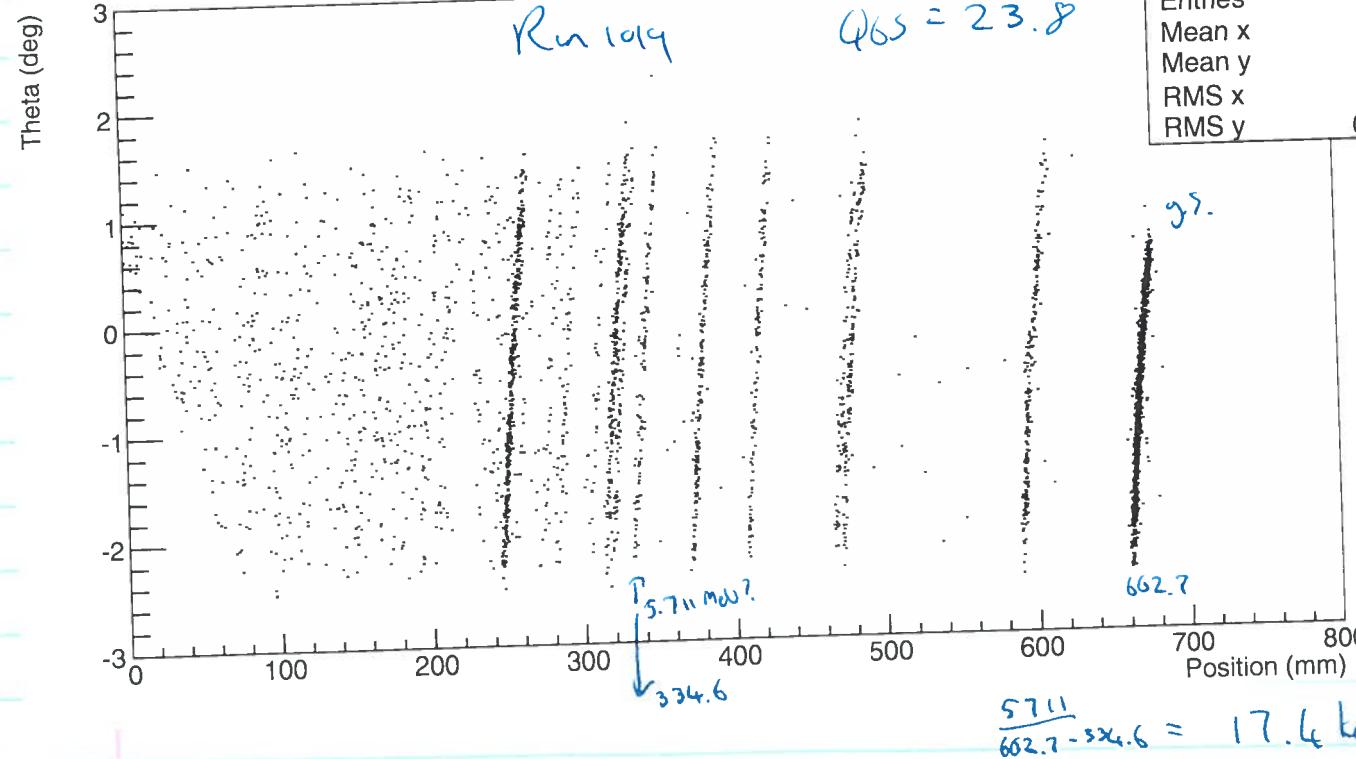
Versnelde deeltjie      Accelerated particle :  
 Element                    = H  
 Atoomgetal                = Atomic Number     = 1  
 Massagetal                = Mass Number       = 1  
 Rel. Atoommassa          = Rel. Atomic Mass = 1.00782  
 Natuurlike voorkoms     = Natural Abundance = 99.98 %  
 Ladingsgetal Q           = Charge State Q    = 1

1 Tesla = 42.5759 MHz [Linear Relation]

BEAM ENERGY FROM NMR-READING/S (frequency) :

BEAM ENERGY FROM NMR-READING/S (field):

B3P Beam Energy = 99.94 Mev from NMR = 0.741263 Tesla



ThSCATvsX1	
Entries	3416
Mean x	403.5
Mean y	-0.541
RMS x	203.3
RMS y	0.9732

Now quickly look at other fieldsets.

$D1 = 395.91$

All beam still in Ac D1

Run comment: \_\_\_\_\_

Run #: 1020

Start: 06:36 Current: 3 nA Trigger rate: 370 Hz

Stop: CI Range: 6 Trigger evts: \_\_\_\_\_

Target:  $^{24}\text{Mg}$  0.1 Scaler evts: \_\_\_\_\_

draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg

Q: -444.493 A

D1: 395.910 A

H: -29.654 A

D2: 394.451 A

K: 6.415 A

Mental Health Level:

VDC efficiency

X1 94

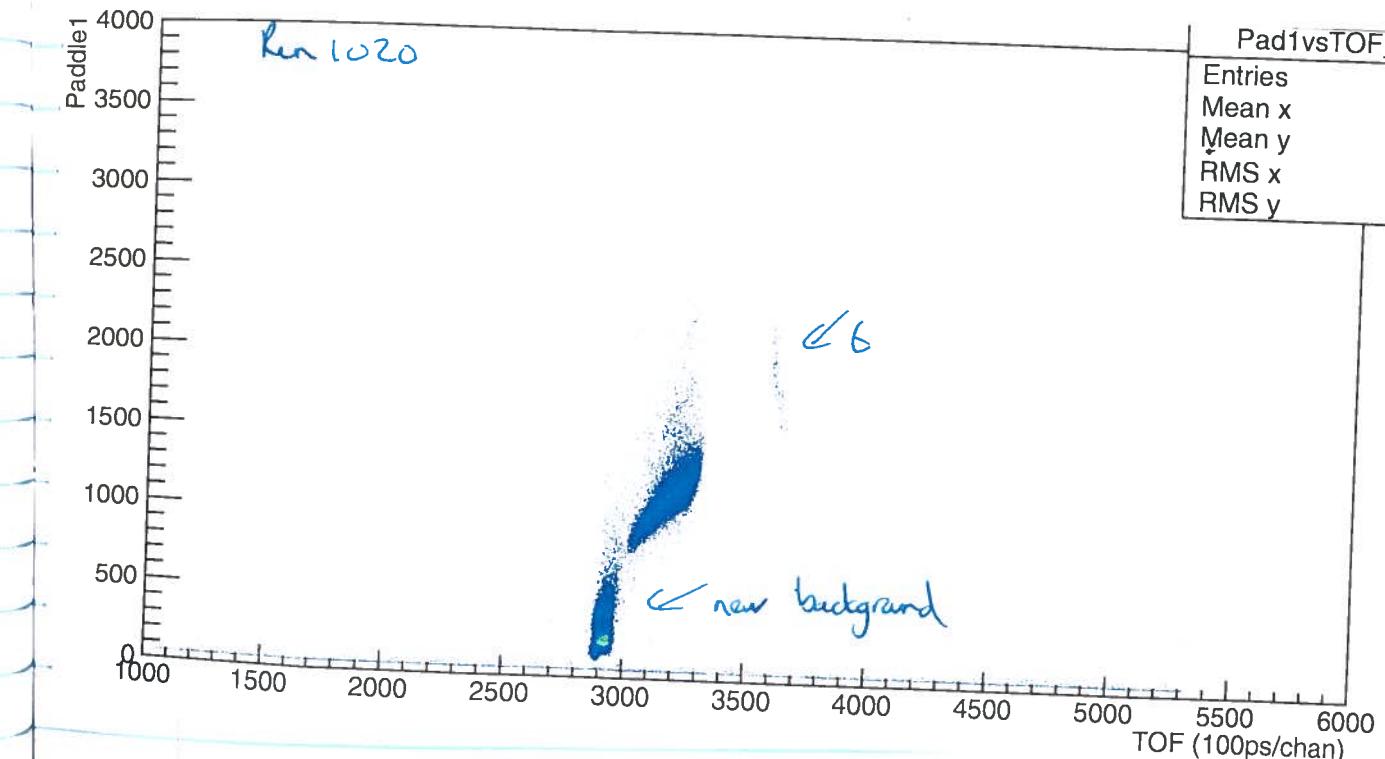
U1 97

X2 95

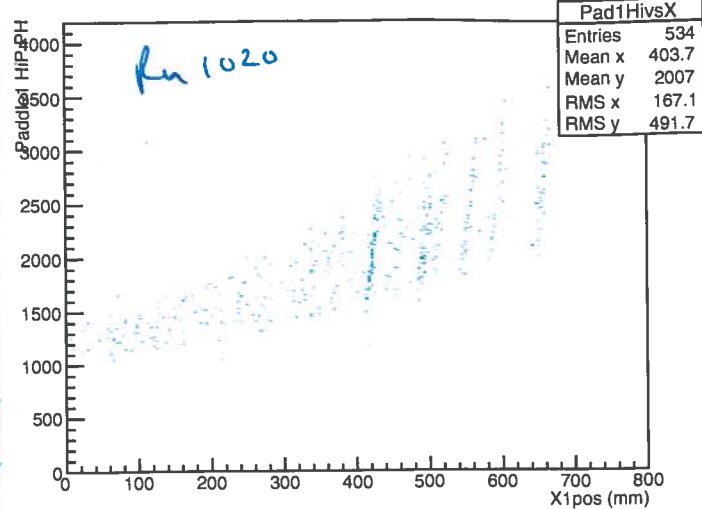
D2 NMR

Pad1vsTOF\_000

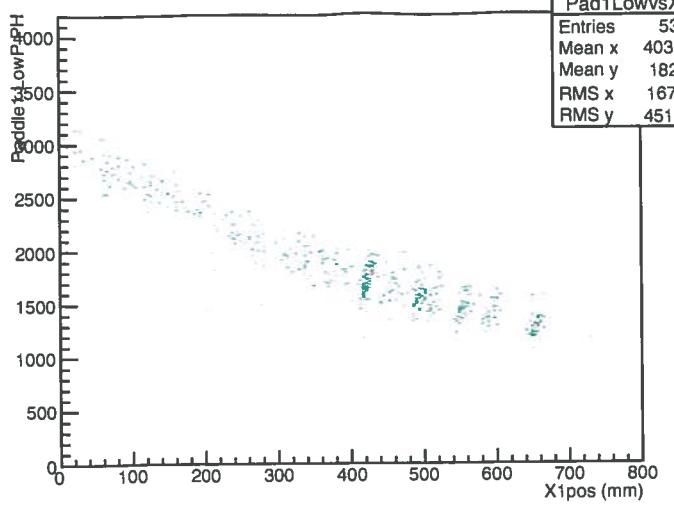
Entries	37806
Mean x	3074
Mean y	743.6
RMS x	331.6
RMS y	474



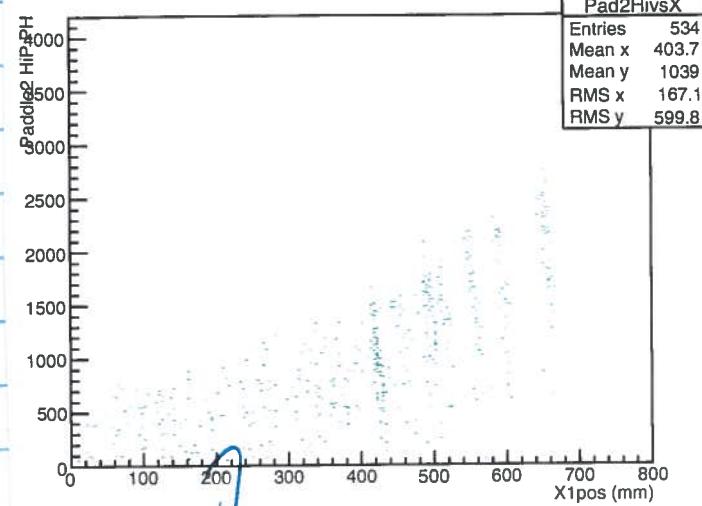
Paddle 1 High VS X1 (pid gated)



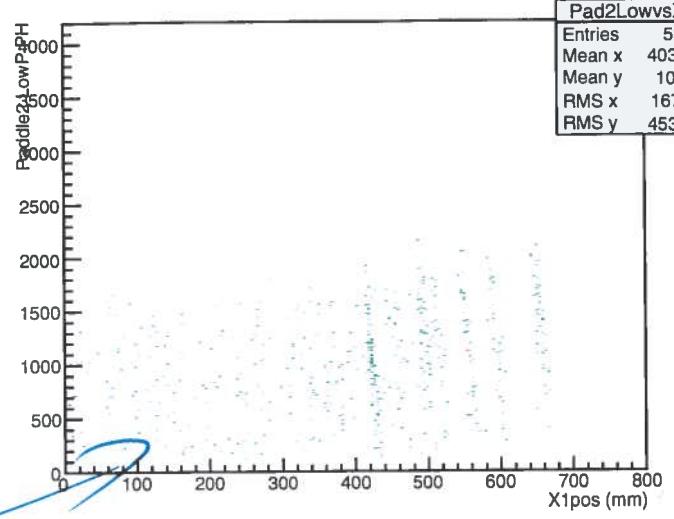
Paddle 1 Low VS X1 (pid gated)



Paddle 2 High VS X1 (pid gated)

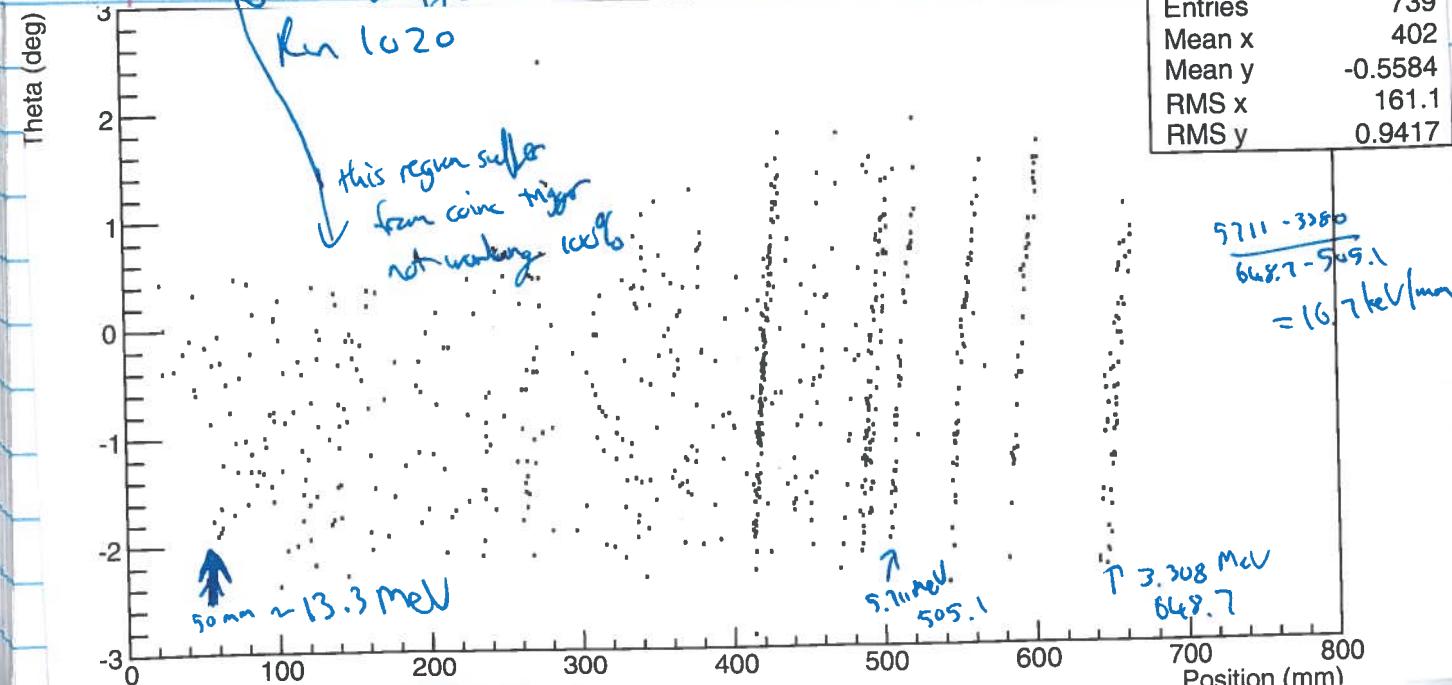


Paddle 2 Low VS X1 (pid gated)



Could it be that these tritons are too low in energy? So that one has to try single paddle trigger?

Run 1020



Run 1021 Locking at effect of field lowering on trig rate etc.  
Not good!

- 1). Trig rate goes up
- 2). t cross goes bad
- 3). We loose beam: not on F!

$$\Omega_1 = 392.12 \rightarrow \text{trig rate } 2 \text{ kHz}$$

(@ 2mA)

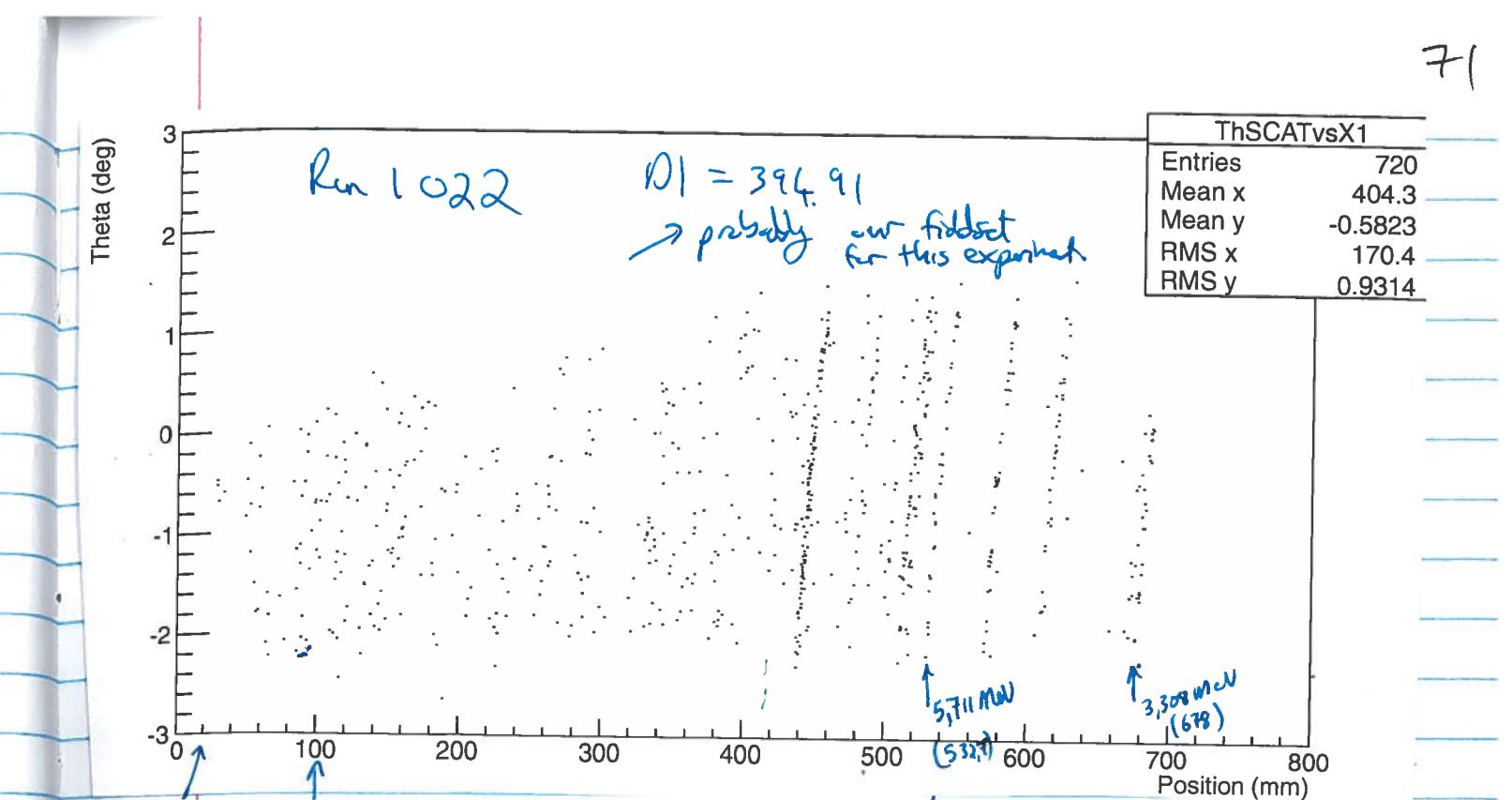
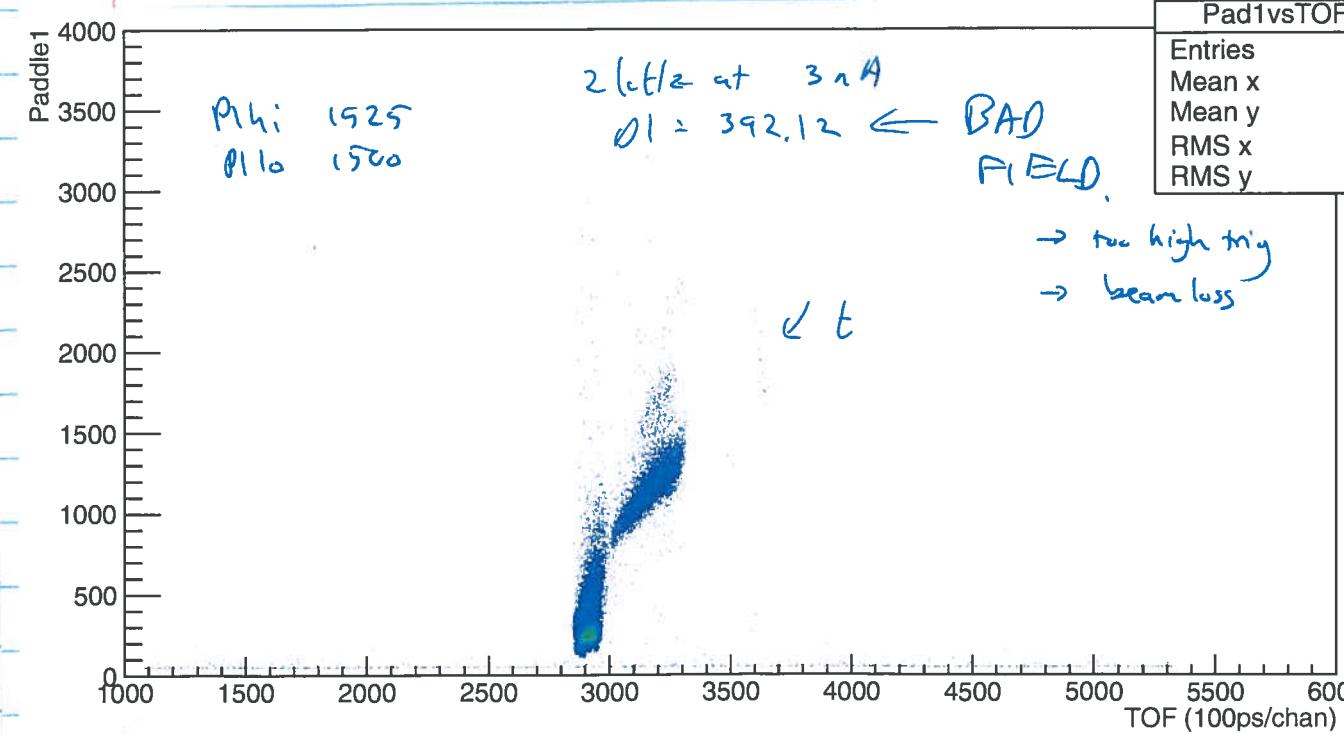
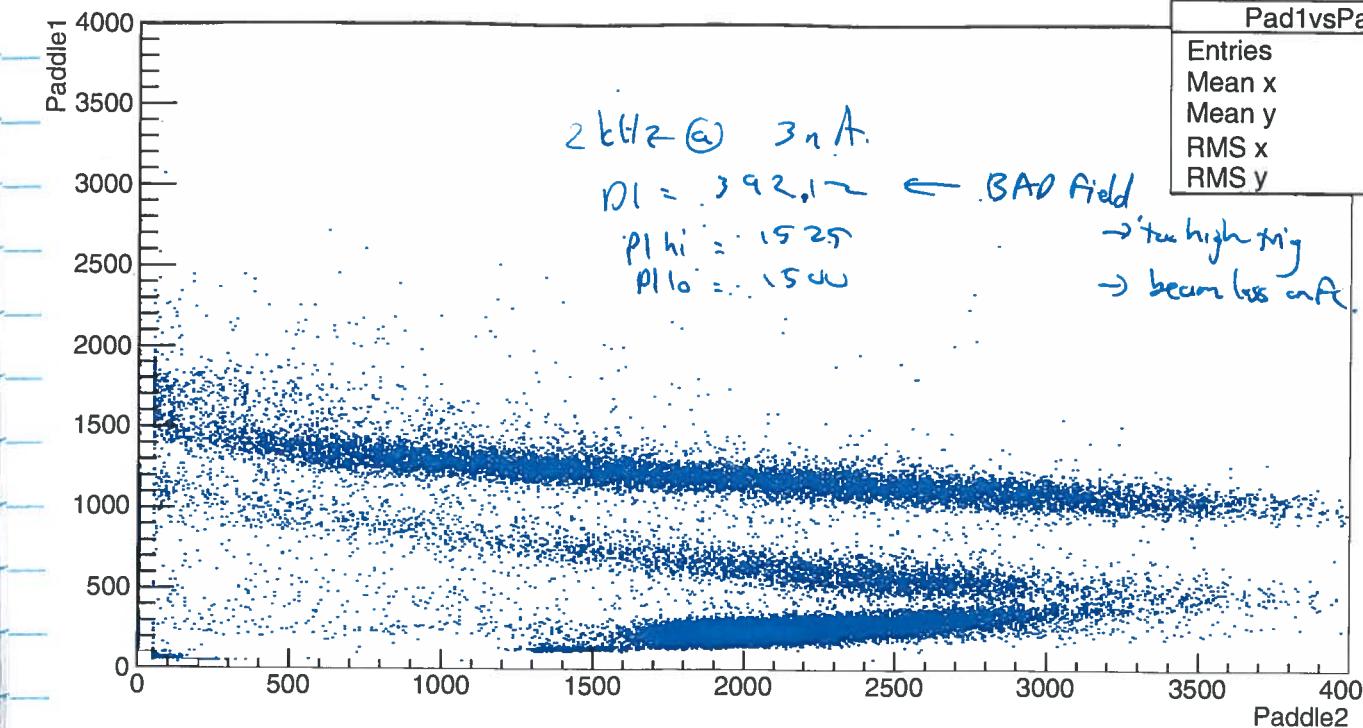
The good news is we probably don't have to go to the fieldset on p4c1. That of p4c1 should be good enough. Now testing one slightly weaker at  $\Omega_1 = > 94.91$

Run comment: test fieldset

Run #: 1022  
Start: 7:23 Current: 34 nA Trigger rate: 280 Hz  
Stop: 7:37 CI Range: 6 Trigger evts: 336125  
Target: 24 MeV  
draw\_me\_frontback() OK?  
draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
Q: -443.37 A  
D1: 394.91 A  
H: -29.579 A  
D2: 393.654 A  
K: 6.399 A  
D2 NMR  
Mental Health Level:  
VDC efficiency  
X1 \_\_\_\_\_  
U1 \_\_\_\_\_  
X2 \_\_\_\_\_

↑  
current detector settings p1hi -1460 p2hi -1330  
p1lo -1490 p2lo -1520  
WDC1 -3.56 kV in vault  
WDC2 -3.66 kV "  
thresholds X1 U1 X2 → all max



Sat 08:00 Take tgt out. Vent.

Phil putting in Si detectors

Cycle magnets with  $D_1 = 394.91$

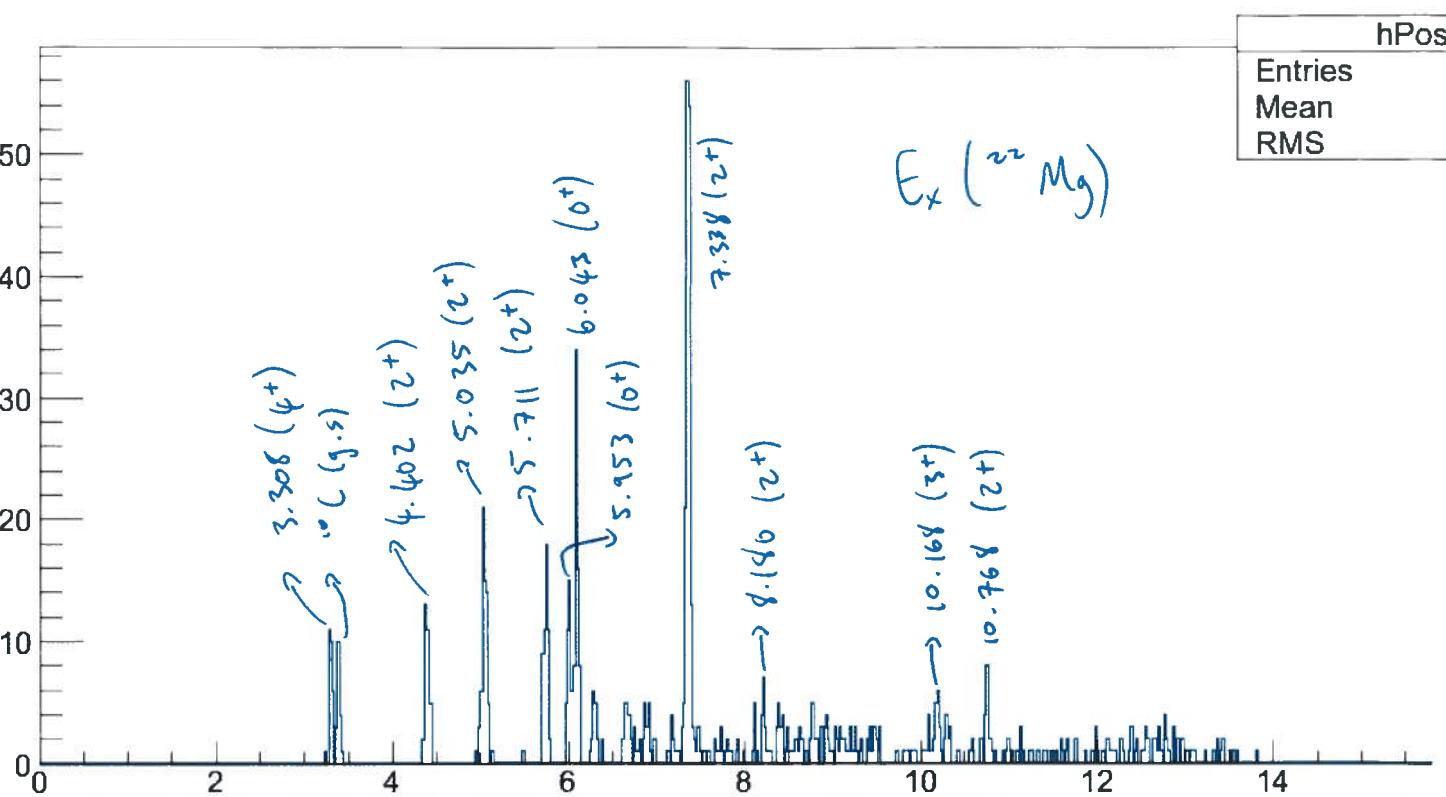
- Si detectors in and biased;  $D_1 - W_5 @ 80V$
- Leakage currents:  $D_1 \quad 1.371 \text{ mA}$

2 0.827  
3 0.848  
4 0.855  
5 1.073

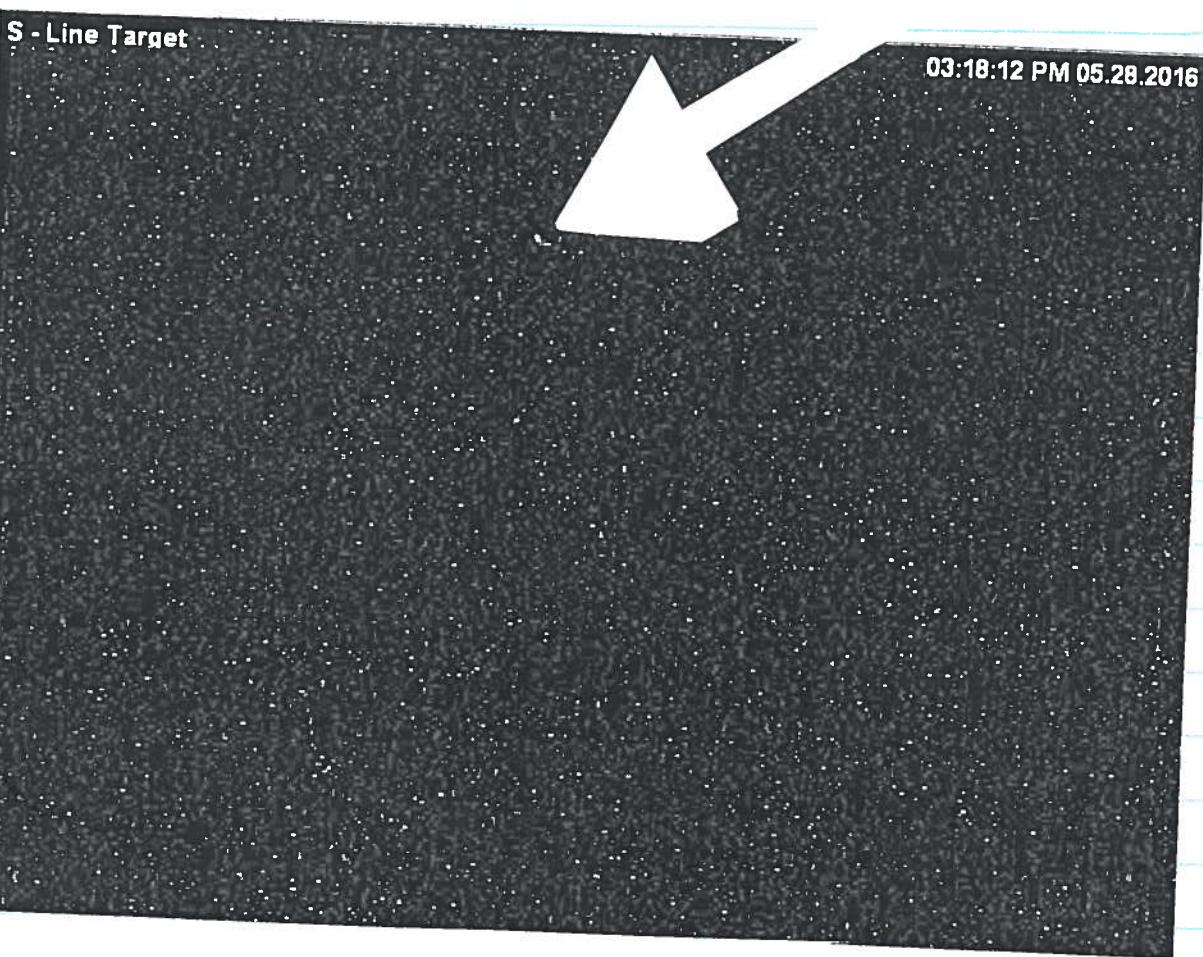
10:35 Run 1023  $\pi^+$  my problems with GDC inputs.

Field needs slight adjustment  
 $D_1 394.91 \rightarrow 394.41$



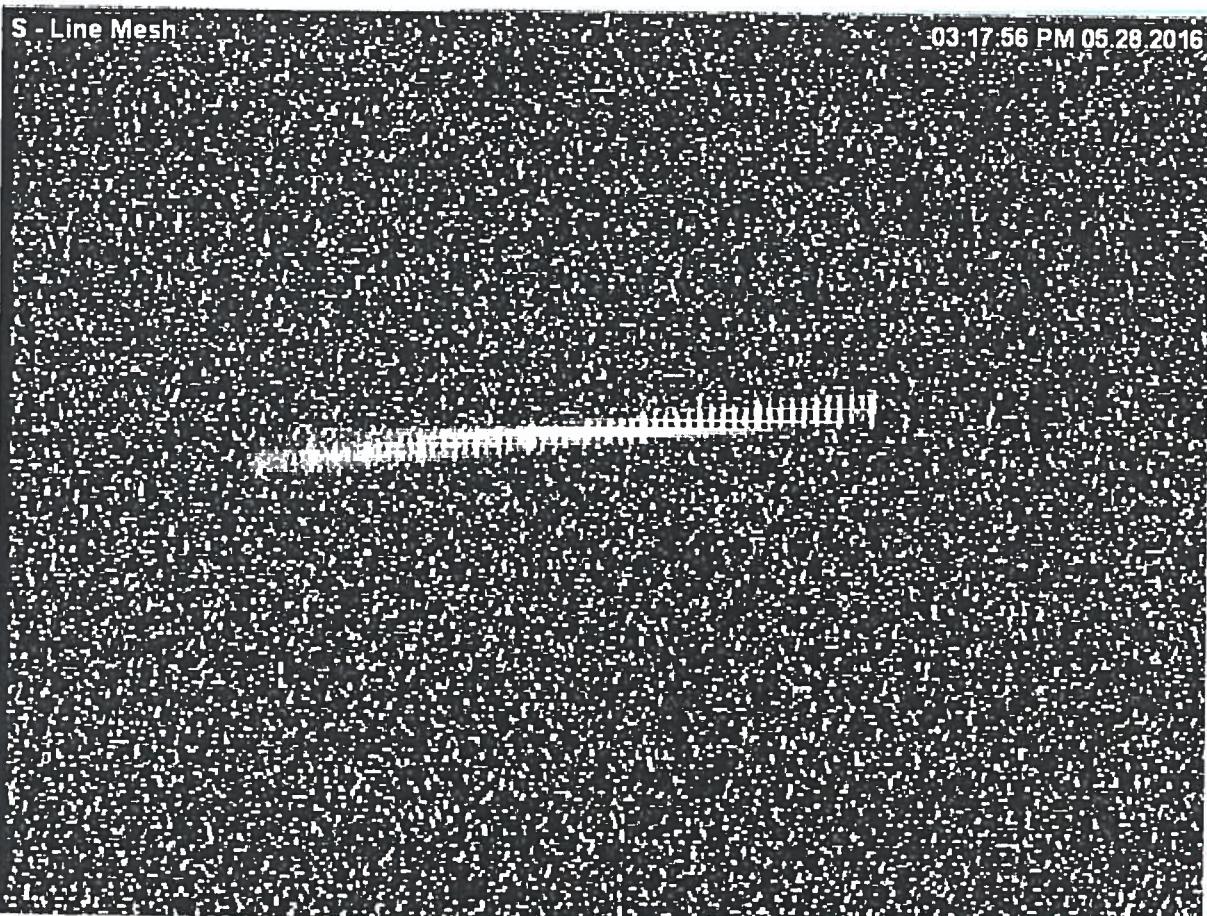


RF on but...  
is how Charles needs to realign.

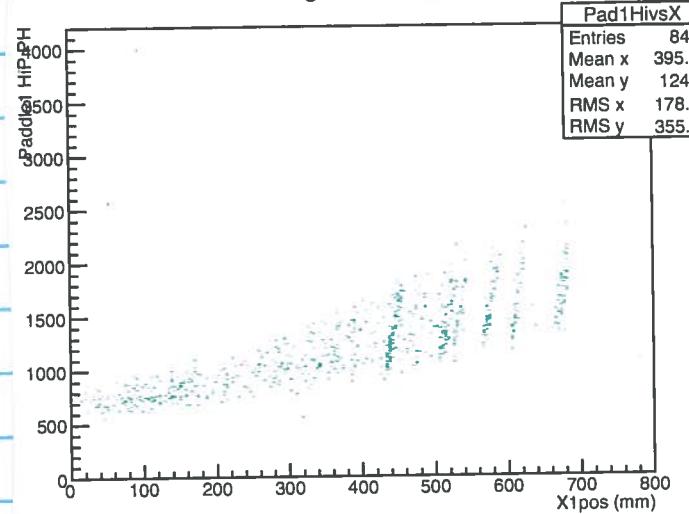


Beam centred  
Background with empty 5cuts / 1.1 nA

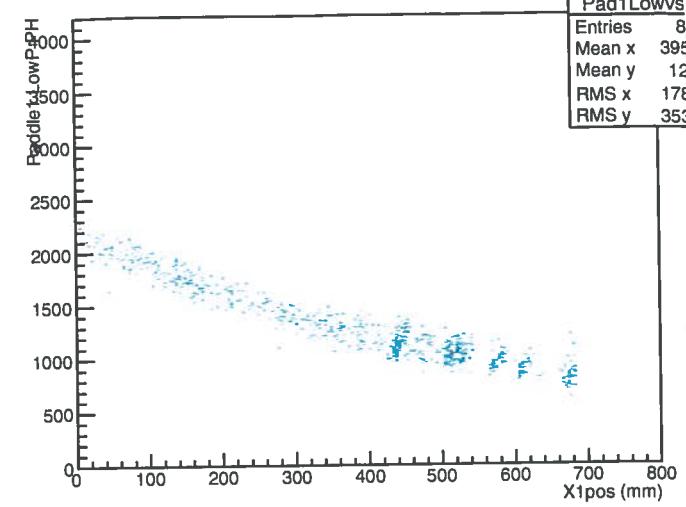
Run 1020 #3 Mg



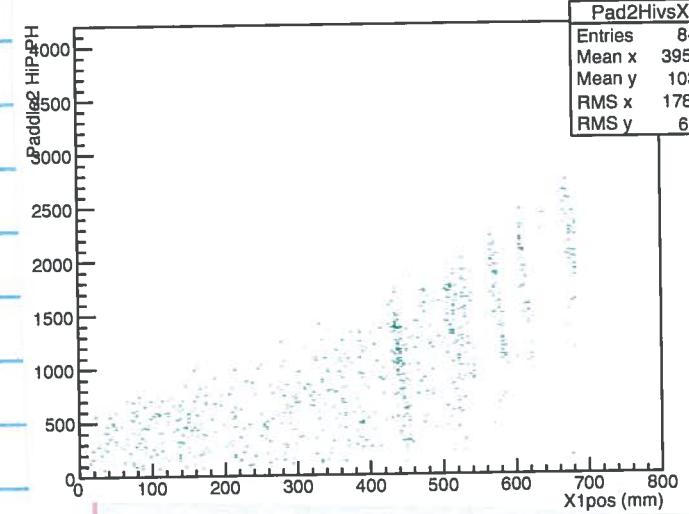
Paddle 1 High VS X1 (pid gated)



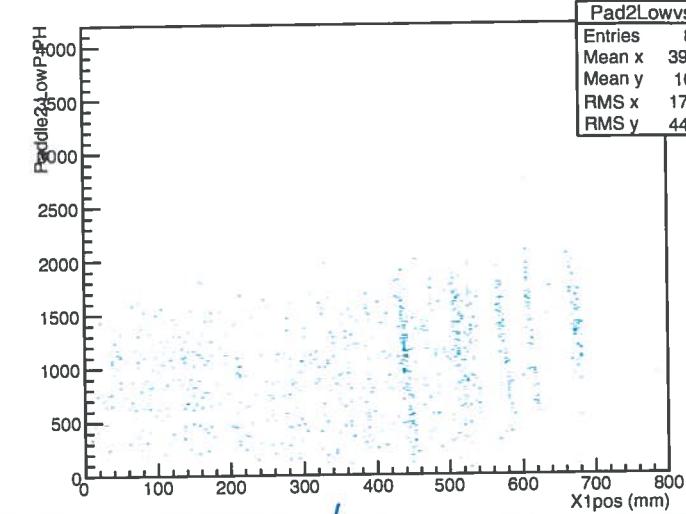
Paddle 1 Low VS X1 (pid gated)



Paddle 2 High VS X1 (pid gated)



Paddle 2 Low VS X1 (pid gated)



$\rightarrow P_2 \text{hi} - 1400$   
 $P_2 \text{lo} - 1600$

$P_1 \text{hi} - 1460$   
 $P_1 \text{lo} - 1450$

too low: change  
pad2 (hit lo)

Run # 1031

(Trigger  $\rightarrow$  paddle 1)

paddle 2 not in trigger  
anymore

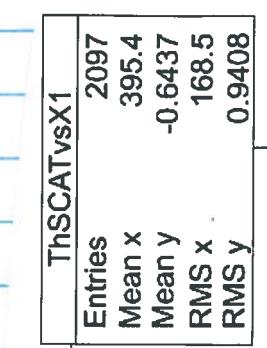
low pad 1000  
hi pad 2000  
tot 3460 - 3600

Efficiencies:  $X_1$  95

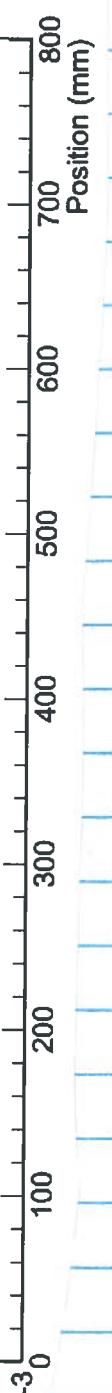
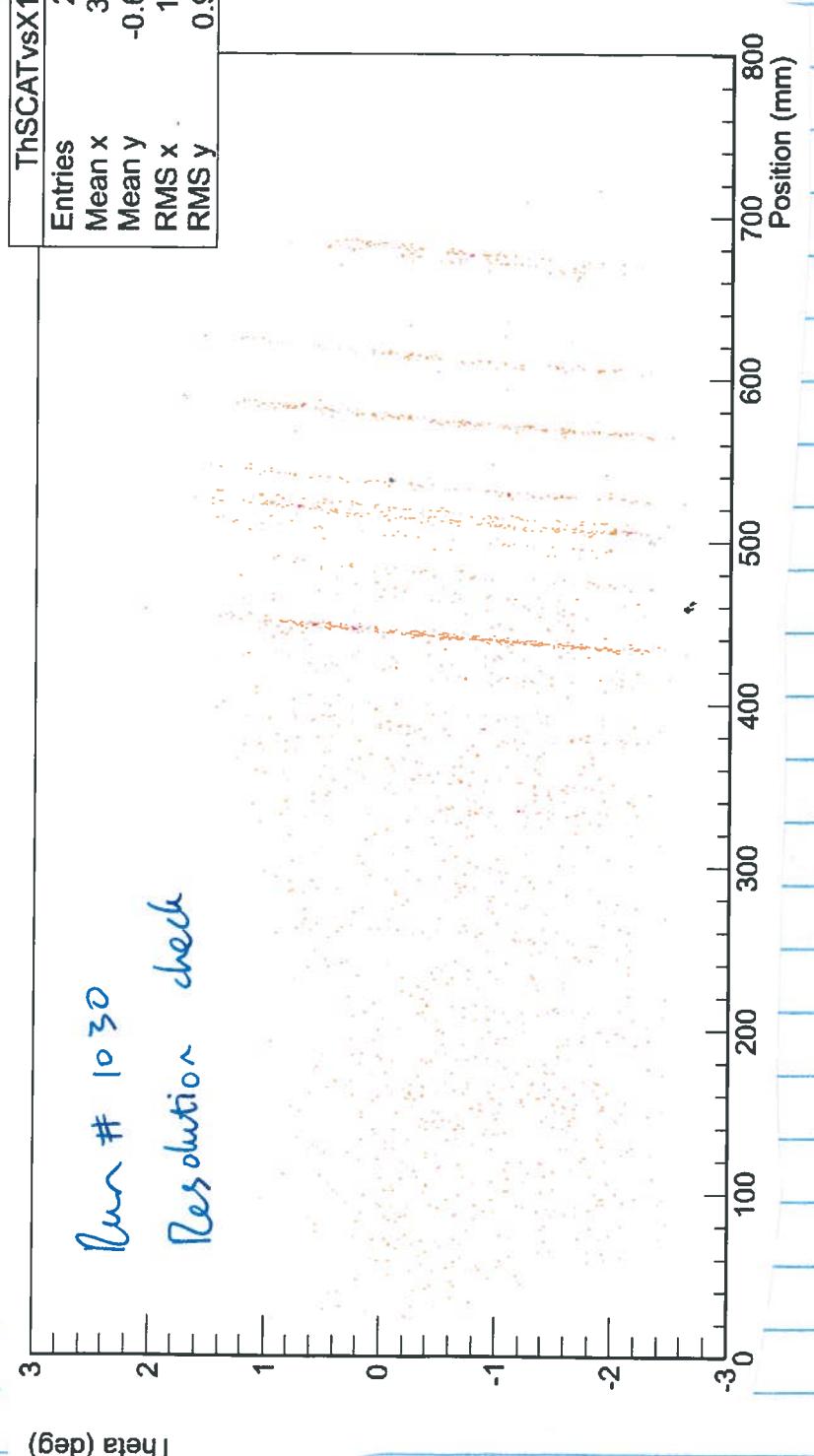
$X_1$  98

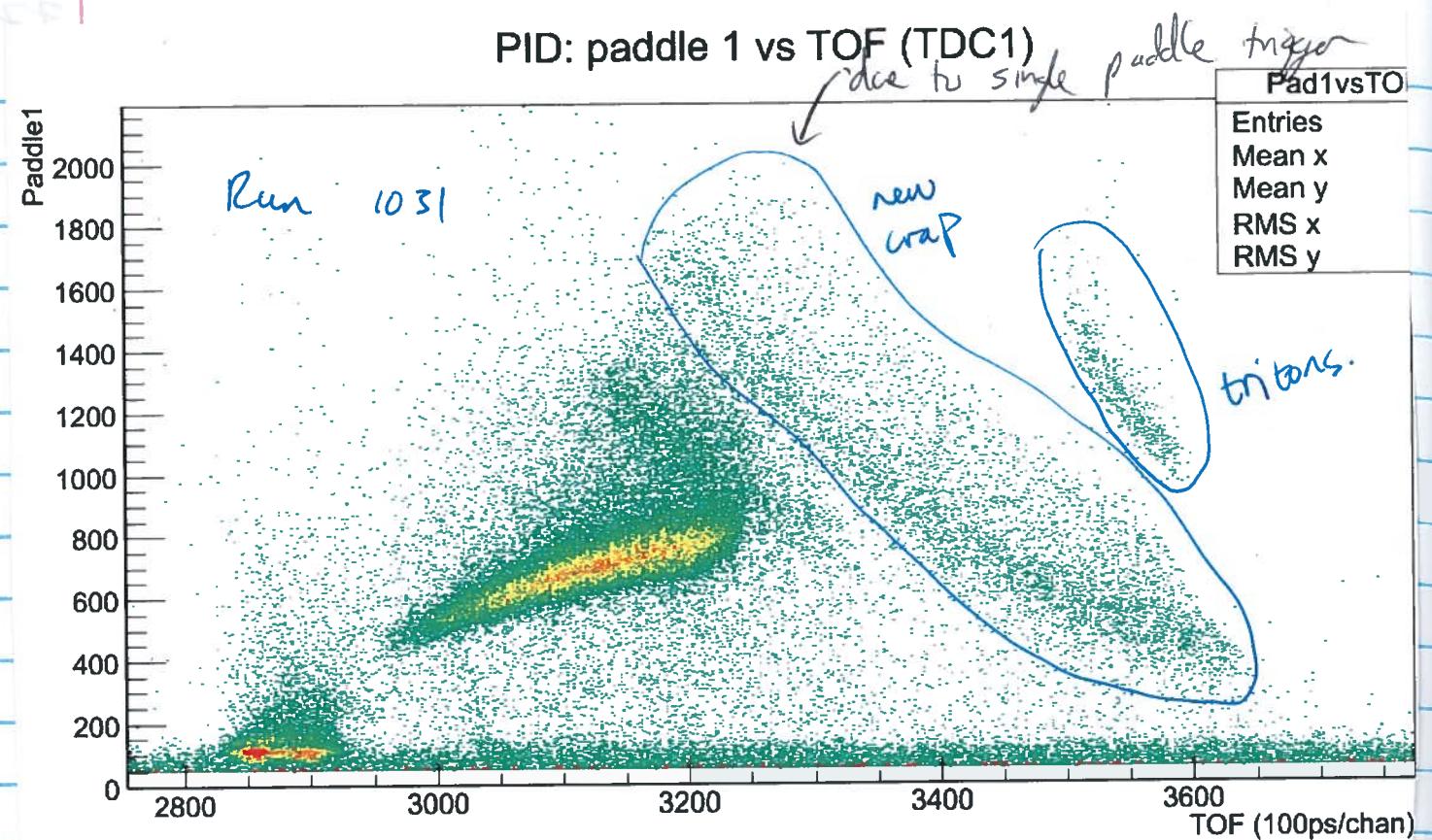
$X_2$  95

Target ( $^{24}\text{Mg}$ )  $0 \rightarrow \text{mg/cm}^2$



ThSCAT vs X1





(Still run 1031): Si leakage currents

$$\Rightarrow 1.485 \mu\text{A} \pm (\Delta)$$

0.948	2
0.956	3
0.978	4
1.143	5

Run 1032: Target #3 ( $^{24}\text{Mg}$  0.7 mg/cm $^2$ )

D1P	0.045 V
D2P	0.045 V
D3P	0.077 V
D4P	0.045 V
D5P	0.069 V
D12N	0.041 V
D34N	0.050 V
DSN	0.026 V

D1P energy monitor: PP #6.  
(patch panel)

From channel 9

Run 1032: Saw ADCs reading at 4096 the entire time. Not good... turned up thresholds + now looking for coincidences again.

Using DLC  $\rightarrow$   $^{12}\text{C}$  states are well-known.

Using run 1033

Still not seeing good coincidences.

Restarting front end. Not for a good reason, just because I feel like it.

~~From picture below, si rates seem  
far too low to be realistic.~~

Where's the scattered beam?

What happened to 1000s of Hz?

Looking on the scope, the rate is so high that it doesn't let the logic signal get back up. That's why the rate is so low... because it's too high. Obviously.

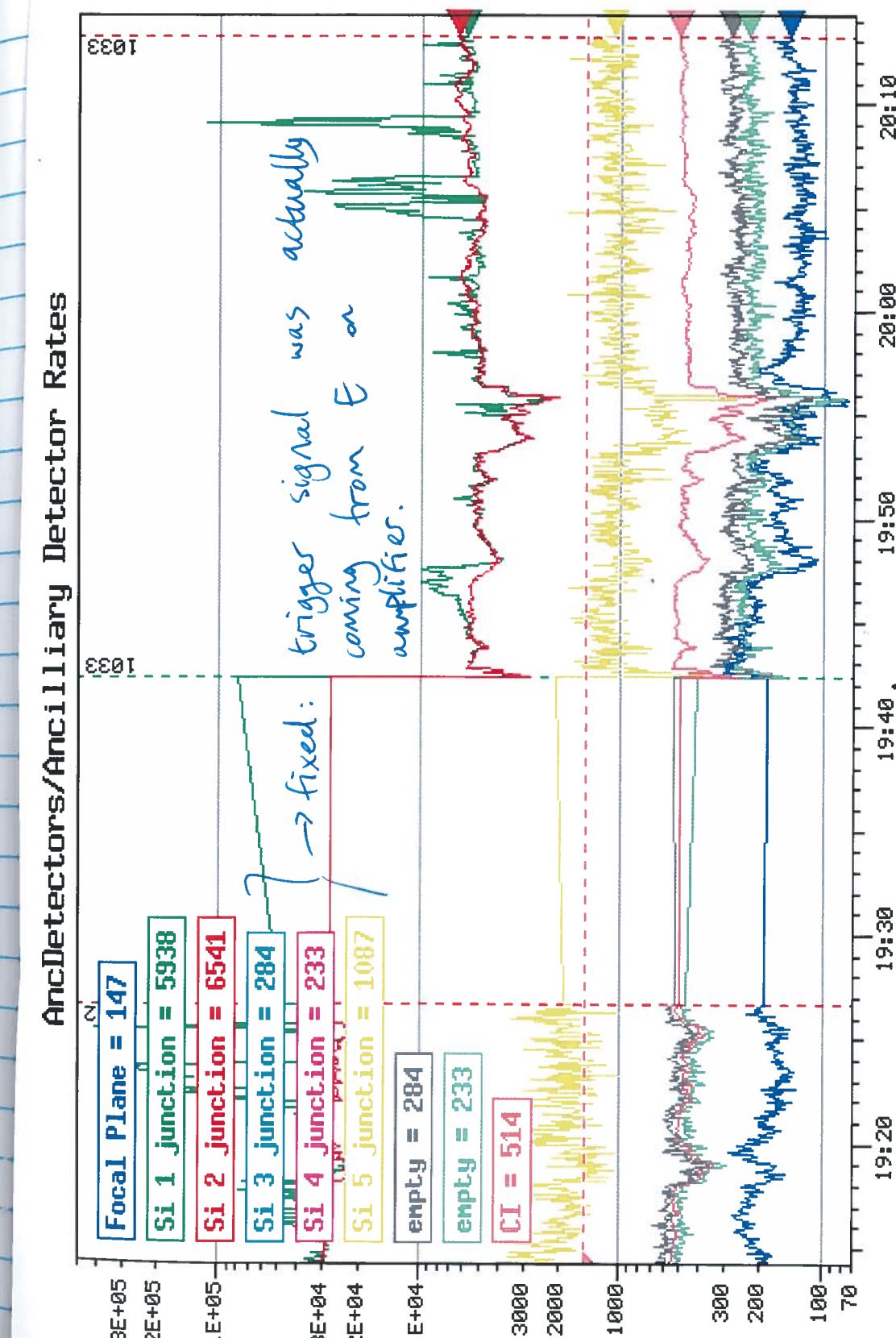
Also, energy monitor output was being taken for rate trigger  $\rightarrow$  Logic FIFO  $\rightarrow$  DAC.

Not going to help with determining the rate...

Turned up thresholds more to try to ID the problem.

Leakage currents aren't changing.

Why?



Increased amplifier thresholds:

D<sub>1</sub>P 0.113 V

2 0.082

3 0.178

4 0.155

5 0.152

D<sub>1/2</sub>N 0.184

3/4 0.133

5 0.084

Run 1034

Still nothing that I understand.

Losing my marble a lot.

Try VMESysreset in case ADCs have gone into some funny mode.

The si leakages are lower than for run 1031.

This is very odd. Should we not see an increase with exposure to beam?

Shaped output from silicon also looks decent → If the detectors are broken, why don't they look worse?

Run 1035

3.1 pnt on DLC.

Rate: 180 Hz.

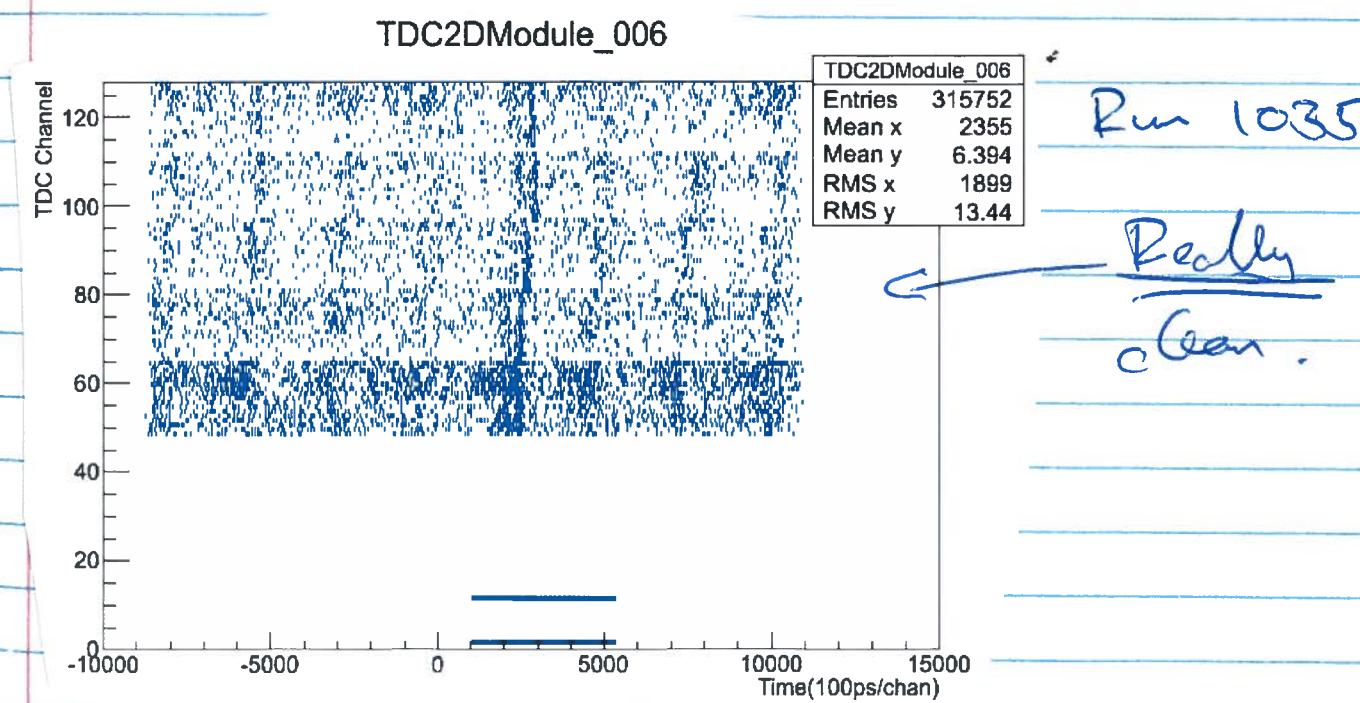
Start: 20:57

Stop: 22:01

Events: 660579

Still see saturated ADCs quite a large amount of the time.

Leakages:	1	1.475	μA	6
	2	0.965	μA	
	3	0.951	μA	
	4	0.976	μA	
	5	1.134	μA	



Then why do things not make sense?

end of run 1035 → still mostly ADC saturation.

Going to get ADC gate for testing.

Ran 1039 DLC

The problem is fixed (also I'm a moron).

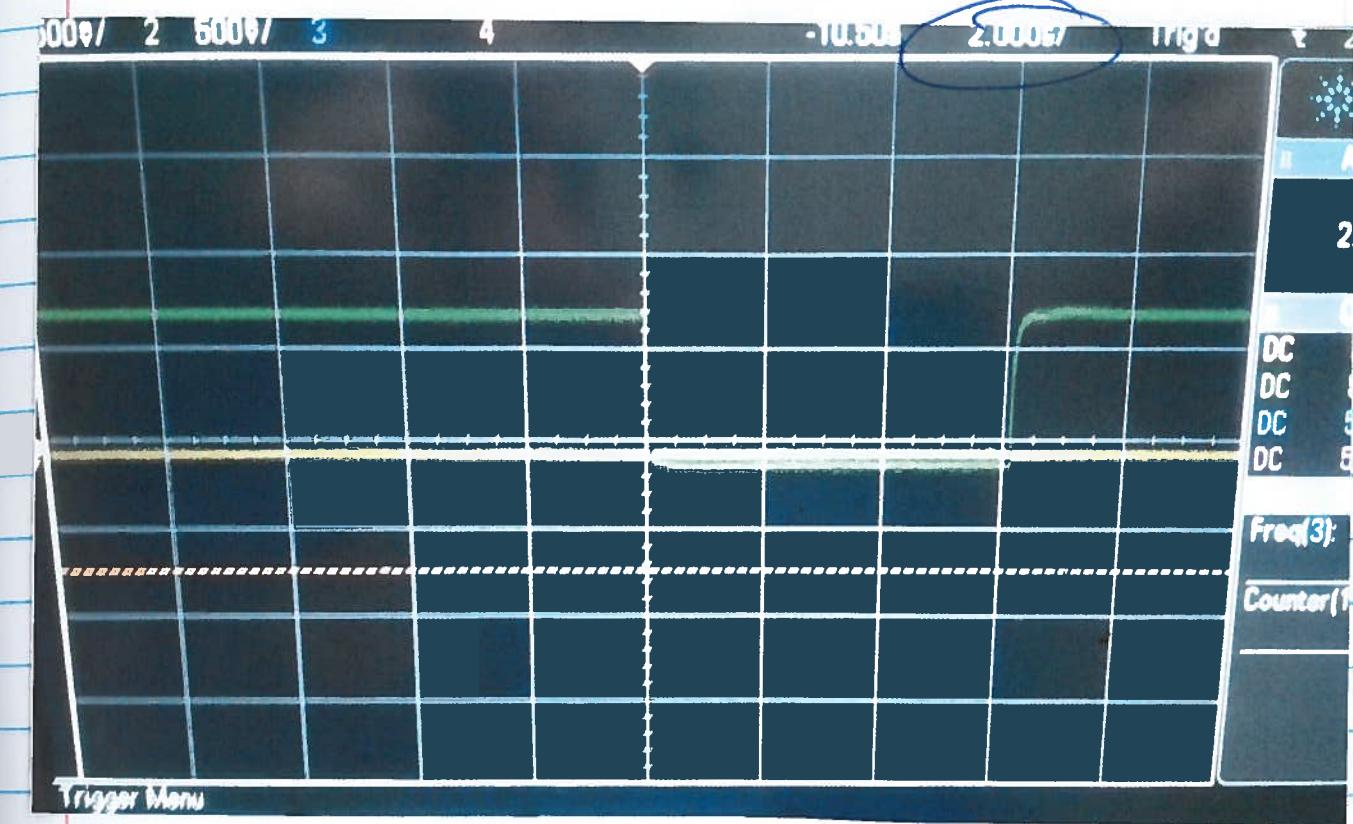
The GDG was being a prissy little \*\*\*. The before picture.



ADC gate is 75-ns wide

I laid hands upon the GDG  
and b! and belab!

2nd line.



6- $\mu$ s ADC gate!

So, the module had a dodgy connection. Now we're seeing something.

Run comment:  $^{24}\text{Mg}$  (0.7 mg/cm<sup>2</sup>)

Run #: 1040  
Start: 22:47 Current: 3.4 nA Trigger rate: 195 Hz  
Stop: 23:56 CI Range: 6 mA Trigger evts: 718886  
Target:  $^{24}\text{Mg}$  Scaler evts: 6054 draw\_me\_frontback() OK? Yes  
draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.481 2: 0.949 3: 0.955 4: 0.980 5: 1.139  
Si rates (kHz) 1: 921 2: 987 3: 9364 4: 9304 5: 2246  
D2NMR: 0.9936161 T

### Before Readback Values

K600 angle: 0 deg  
Mental Health Level:  
Q: -439.660 A  
D1: 324.154 A  
H: -29.241 A  
D2: 341.220 A  
K: 6.268 A  
VDC efficiency  
X1 95  
U1 98  
X2 95  
D2 NMR 0.9936161

87

Run comment:  $^{24}\text{Mg}$  (0.7 mg/cm<sup>2</sup>)

Run #: 1041  
Start: 00:04 Current: 3.2 nA Trigger rate: 174 Hz  
Stop:  $^{24}\text{Mg}$  CI Range: 6 mA Trigger evts: 91451  
Target:  $^{24}\text{Mg}$  Scaler evts: 887 draw\_me\_frontback() OK?  
draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.475 2: 0.942 3: 0.949 4: 0.975 5: 1.134  
Si rates (kHz) 1: 8796 2: 9158 3: 1142 4: 10574 5: 10239

K600 angle: 0 deg  
Mental Health Level:  
Q: 5 A  
D1: A A  
H: M A  
D2: E A  
K: E A  
VDC efficiency  
X1 93  
U1 99  
X2 94  
D2 NMR

Mental Health Level:  
Q: A A  
VDC efficiency  
X1 93  
U1 97  
X2 91  
D2 NMR

Run comment:  $^{24}\text{Mg}$  #5

Run #: 1042  
Start: 00:27 Current: 2 nA Trigger rate: 110 Hz  
Stop: 00:46 CI Range: 6 mA Trigger evts:  
Target:  $^{24}\text{Mg}$  Scaler evts:  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.487 2: 0.955 3: 0.961 4: 0.987 5: 1.147  
Si rates (kHz) 1: 1142 2: 1142 3: 1142 4: 1142 5:

K600 angle: 0 deg  
Mental Health Level:  
Q: 5 A  
D1: A A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 \_\_\_\_\_  
U1 \_\_\_\_\_  
X2 \_\_\_\_\_  
D2 NMR

Mental Health Level:  
Q: A A  
VDC efficiency  
X1 96  
U1 90  
X2 91  
D2 NMR

Run comment:  $^{24}\text{Mg}$  (0.7 mg/cm<sup>2</sup>)

Run #: 1043  
Start: 02:50 Current: 4.0 nA Trigger rate: 318 Hz  
Stop: 01:26 CI Range: 6 mA Trigger evts: 692990  
Target:  $^{24}\text{Mg}$  Scaler evts: 2122 draw\_me\_TDC2D() OK?  
draw\_me\_frontback() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.481 2: 0.943 3: 0.950 4: 0.976 5: 1.138  
Si rates (kHz) 1: 1142 2: 1142 3: 1142 4: 1142 5:

K600 angle: 0 deg  
Mental Health Level:  
Q: 5 A  
D1: A A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 93  
U1 97  
X2 94  
D2 NMR

Mental Health Level:  
Q: A A  
VDC efficiency  
X1 93  
U1 96  
X2 90  
D2 NMR

Lost beam @ 01:26,

Back @ 01:32

Run comment:  $^{24}\text{Mg}$  (0.7 mg/cm<sup>2</sup>)

Run #: 1044  
Start: 01:32 Current: 5.0 nA Trigger rate: 292 Hz  
Stop: 02:31 CI Range: 6 mA Trigger evts: 1149 M  
Target:  $^{24}\text{Mg}$  #2 Scaler evts: 3458  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No Almost  
Si leakages (uA) 1: 1.504 2: 0.952 3: -0.959 4: 0.985 5: 1.158  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
Mental Health Level:  
Q: A A  
D1: S A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 93  
U1 98  
X2 94  
D2 NMR

Run comment: MYLAR #5

Run #: 1045  
Start: 02:35 Current: 5 nA Trigger rate: 440 Hz  
Stop: 02:49 CI Range: 6 mA Trigger evts: 374027  
Target: MYLAR Scaler evts: 8220  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.502 2: 0.953 3: 0.960 4: 0.986 5: 1.157  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
Mental Health Level:  
Q: A A  
D1: S A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 93  
U1 97  
X2 91  
D2 NMR

Run comment:

Run #: 1046  
Start: 02:52 Current: 4 nA Trigger rate: 620 Hz  
Stop: 03:53 CI Range: 6 mA Trigger evts: 1756 M  
Target: #3.  $^{24}\text{Mg}$  Scaler evts: 3532  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.498 2: 0.937 3: 0.944 4: 0.970 5: 1.150  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
Mental Health Level:  
Q: A A  
D1: S A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 96  
U1 90  
X2 91  
D2 NMR

Run comment: MYLAR.

Run #: 1047  
Start: 03:52 Current: 5. nA Trigger rate: 570 Hz  
Stop: 04:10 CI Range: 6 mA Trigger evts: 418296  
Target: #5 Scaler evts: 802  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.495 2: 0.938 3: 0.945 4: 0.971 5: 1.148  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
Mental Health Level:  
Q: A A  
D1: S A  
H: M A  
D2: E A  
K: A A  
VDC efficiency  
X1 93  
U1 96  
X2 90  
D2 NMR

Run comment: ~~DLC~~

Run #: 1048

Start: 04:11 Current: 5 nA Trigger rate: 360 Hz  
Stop: 04:27 CI Range: 6mA Trigger evts: 323529  
Target: #4 DLC  
draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.502 2: 0.945 3: 0.952 4: 0.978  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	A
H:	<del>S</del> A
D2:	<del>S</del> A
X1:	94
U1:	90
X2:	91
D2 NMR:	1.155

MYLAR.

Run #: 1052

Start: 06:54 Current: 5-5 nA Trigger rate: 420 Hz  
Stop: 07:12 CI Range: 20 Trigger evts: 420598  
Target: #5  
draw\_me\_frontback() OK? 3.5 ~~too much~~ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No YES

Si leakages (uA) 1: 1.523 2: 0.942 3: 0.949 4: 0.975  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	A
H:	<del>S</del> A
D2:	<del>S</del> A
X1:	90
U1:	95
X2:	93
D2 NMR:	1.169

Run comment: Thin  $^{24}\text{Mg}$  (#2)

Run #: 1049

Start: 04:29 Current: 4.5 nA Trigger rate: 329 Hz  
Stop: 05:34 CI Range: 6mA Trigger evts: \_\_\_\_\_  
Target: #2  
draw\_me\_frontback() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No YES

Si leakages (uA) 1: 1.510 2: 0.942 3: 0.948 4: 0.971  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>S</del> A
H:	<del>S</del> A
D2:	<del>S</del> A
X1:	93
U1:	98
X2:	96
D2 NMR:	1.155

$^{24}\text{Mg}$  (#3)

Run #: 1053

Start: 07:14 Current: 5-5 nA Trigger rate: 430 Hz  
Stop: 08:09 CI Range: 20 Trigger evts: 423653  
Target: #3  $^{24}\text{Mg}(0.7)$   
draw\_me\_frontback() OK? 03, 05 noisy draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No YES

Si leakages (uA) 1: 1.531 2: 0.955 3: 0.961 4: 0.987  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>S</del> A
H:	<del>S</del> A
D2:	5 A
X1:	96
U1:	93
X2:	91
D2 NMR:	1.179

→ CI Range changed to 20 mA

Run comment: Mylar (#5)

Run #: 1050

Start: 05:37 Current: 6 nA Trigger rate: 329 Hz  
Stop: 05:51 CI Range: 20 mA Trigger evts: \_\_\_\_\_  
Target: Mylar  
draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>S</del> A
H:	<del>S</del> A
D2:	E A
X1:	95
U1:	78
X2:	74
D2 NMR:	1.155

Run comment: DLC

Run #: 1054

Start: 08:11 Current: 4.5 nA Trigger rate: 441 Hz  
Stop: 08:28 CI Range: 20 Trigger evts: 42633  
Target: #4 DLC  
draw\_me\_frontback() OK? 3.5 noisy draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.534 2: 0.946 3: 0.953 4: 0.978  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>S</del> A
H:	<del>S</del> A
D2:	E A
X1:	93.7
U1:	96.3
X2:	93.8
D2 NMR:	1.179

Run comment:  $^{24}\text{Mg}$  (#3) 0.7/mg/cm<sup>2</sup>

Run #: 1051

Start: 05:53 Current: 4.5 nA Trigger rate: 340 Hz  
Stop: 06:51 CI Range: 20 Trigger evts: 1442 M  
Target:  $^{24}\text{Mg}$   
draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No Almost  
Si leakages (uA) 1: 1.520 2: 0.955 3: 0.960 4: 0.986  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>S</del> A
H:	<del>S</del> A
D2:	E A
X1:	90
U1:	77
X2:	73
D2 NMR:	1.176

Run comment: Mylar

Run #: 1055

Start: 08:30 Current: 4.5 nA Trigger rate: 319 Hz  
Stop: \_\_\_\_\_ CI Range: 20 Trigger evts: \_\_\_\_\_  
Target: #5 Mylar  
draw\_me\_frontback() OK? 3.5 noisy draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q:	A
D1:	<del>A</del> A
H:	<del>A</del> A
D2:	E A
X1:	91.16
U1:	98.18
X2:	91.4
D2 NMR:	1.179

Run comment: 24 Ny

Run #: 1056  
Start: 08:47 Current: 4.0 nA Trigger rate: 350 Hz  
Stop: 09:48 CI Range: 20 Trigger evts: 1.2e6  
Target: #3 Scaler evts: 3565

draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.535 2: 0.953 3: 0.959 4: 0.985 5: 1.183

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg		Mental Health Level:
Q:	S A	😊 😊 😥
D1:	A A	
H:	I A	
D2:	E A	
K:	A	
VDC efficiency		
X1:	94 %	
U1:	97 %	
X2:	98 %	
D2 NMR		—

Beam intensity drops often --

Run comment: Ny lar

Run #: 1057 Start: 09:50 Current: 6 nA Trigger rate: 378 Hz Stop: 09:53 CI Range: 20

Target: #5 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.540 2: 0.944 3: 0.951 4: 0.977 5: 1.183

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg		Mental Health Level:
Q:	S A	😊 😊 😥
D1:	A A	
H:	I A	
D2:	E A	
K:	A	
VDC efficiency		
X1:	_____	
U1:	_____	
X2:	_____	
D2 NMR		—

Something looks funny in the frontback plots

Run comment: My lar

Run #: 1058 Start: 09:53 Current: 5.5 nA Trigger rate: 359 Hz Stop: 10:08 CI Range: 20

Target: #5 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.538 2: 0.943 3: 0.950 4: 0.976 5: 1.182

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

Stop / start / fixed :-)

K600 angle: 0 deg		😊 😊 😥
Q:	S A	
D1:	A A	
H:	I A	
D2:	E A	
K:	A	
VDC efficiency		
X1:	90.50	
U1:	95.16	
X2:	91.36	
D2 NMR		—

Run comment: 24 Ny #3

Run #: 1059 Start: 10:10 Current: 5.0 nA Trigger rate: 350 Hz Stop: 11:07 CI Range: 20

Target: draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

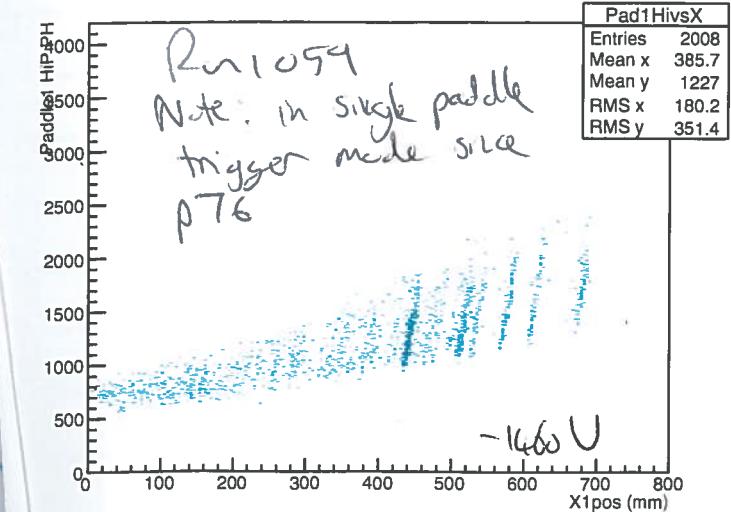
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

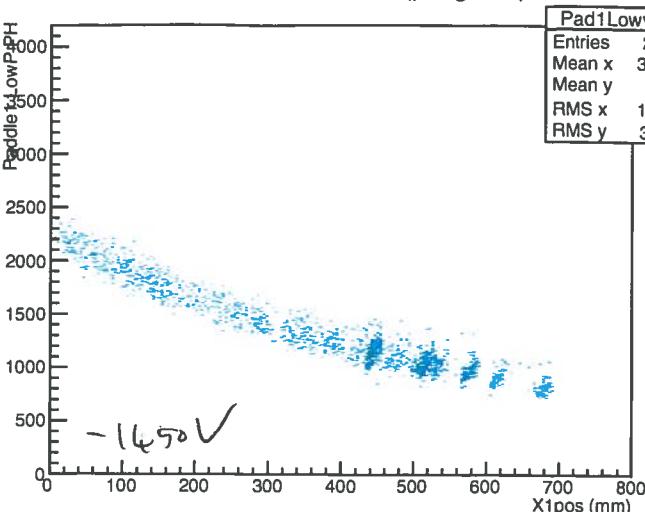
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg		😊 😊 😥
Q:	S A	
D1:	A A	
H:	I A	
D2:	E A	
K:	A	
VDC efficiency		
X1:	98 %	
U1:	96 %	
X2:	95 %	
D2 NMR		—

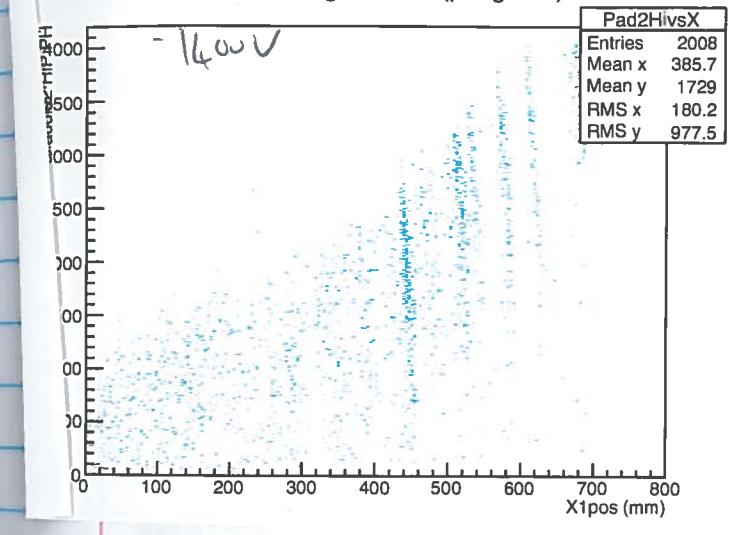
Paddle 1 High VS X1 (pid gated)



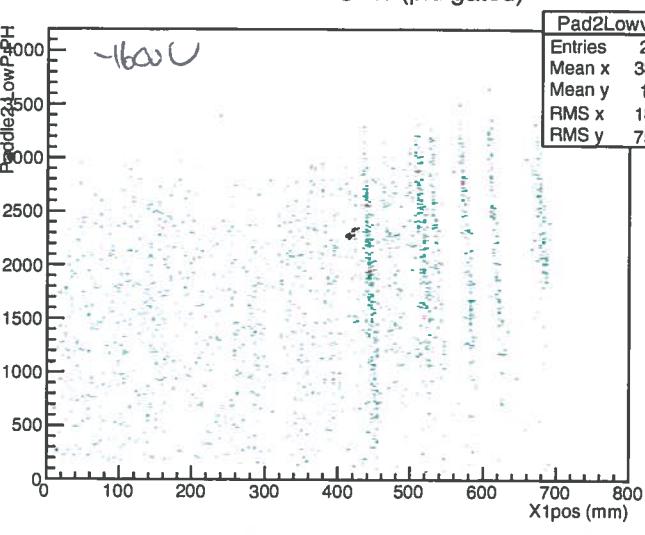
Paddle 1 Low VS X1 (pid gated)



Paddle 2 High VS X1 (pid gated)



Paddle 2 Low VS X1 (pid gated)



Sunday 23 11:00 (current conditions)

VDC1 -3.56 kV (in vault)

VDC2 -3.66 kV

Pad1hi ~1460 Pad2hi ~1400

Pad1lo ~1450 Pad2lo ~1600

NMR : D1 0.96651 T (setting A)

02 0.99359 T (setting F)

Q = -442.28

D1 = 393.910

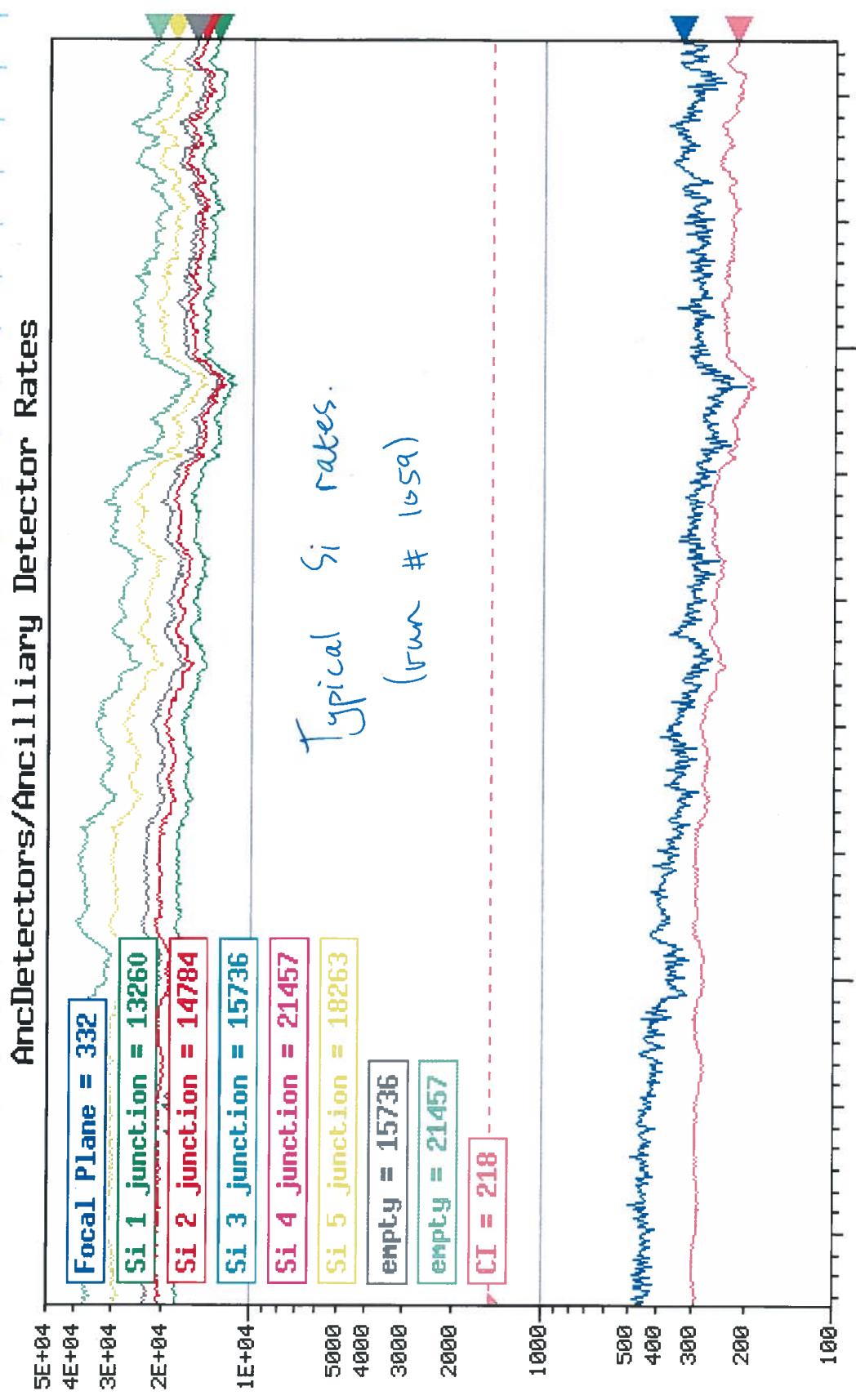
H = -29.504

D2 = 392.458

K = 6.383

Y1 = 9.4 V in detector

X2 = 9 V

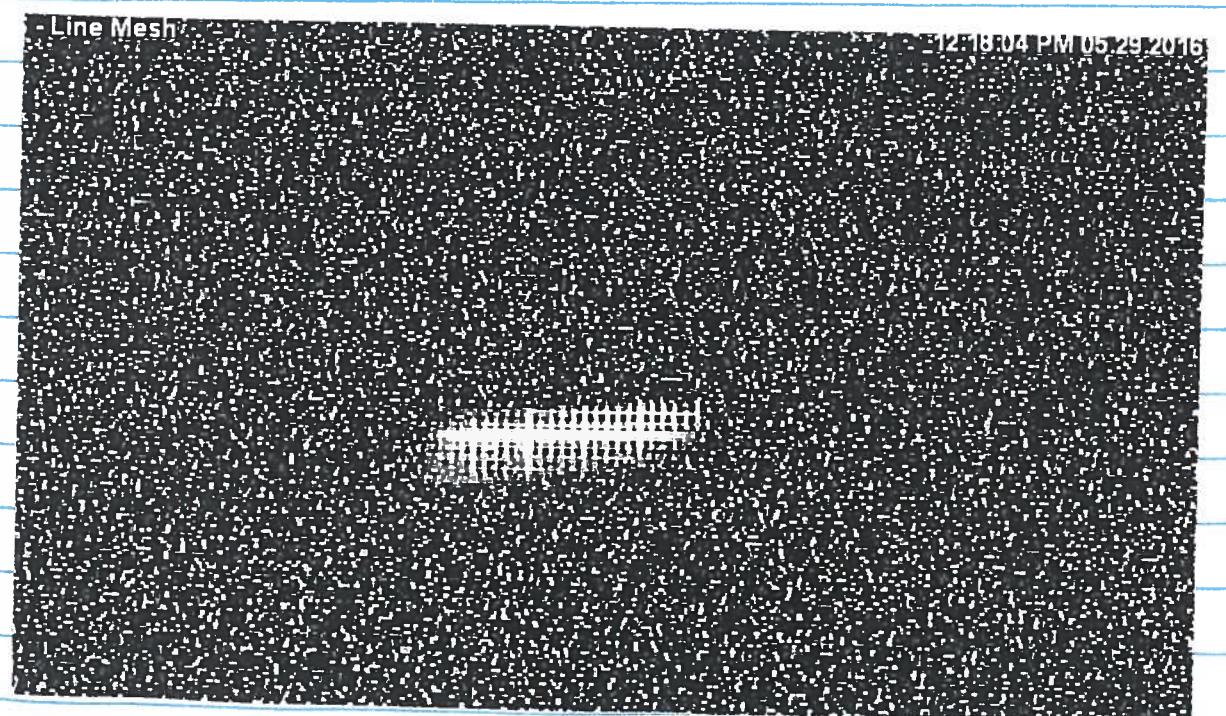


Run # 1060: halo tuning.

- Si rates have climbed too high & SiFB spectrum looks dirty.

- Start at 50 cts / 1nA.

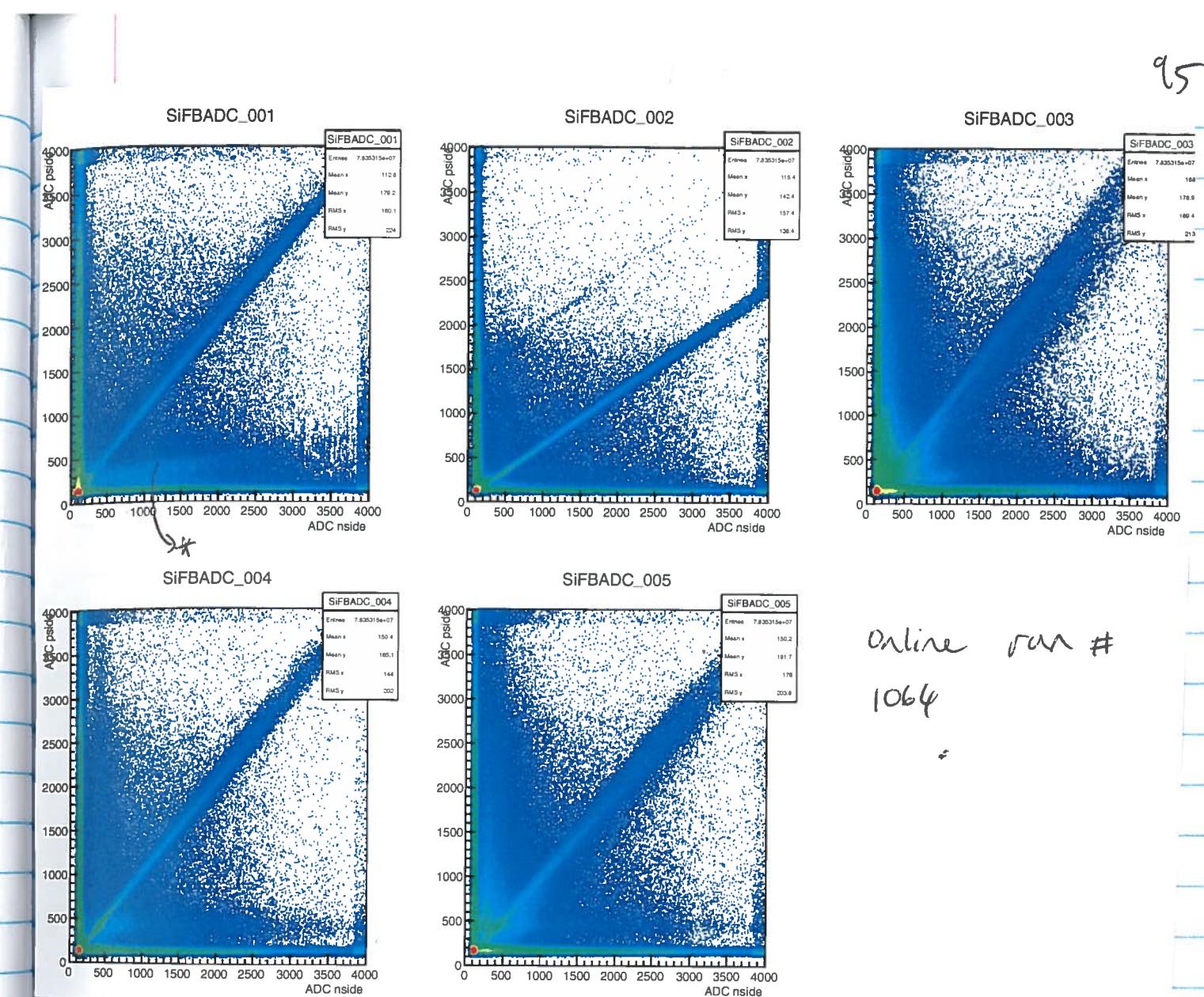
Run # 1061: still 50 cts / 1nA.



Tuned beam for better halo. Still 50 cts for 1 nA.

Run comment: Thick Mg  
 Run #: 1062  
 Start: 13:15 Current: 335.1 nA Trigger rate: 706 Hz  
 Stop: 14:11 CI Range: 6 nA Trigger evts: 670831  
 Target:  $^{24}\text{Mg}$  Scaler evts:  
 draw\_me\_frontback() OK? bit halo? draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.545 2: 0.994 3: 1.007 4: 1.026 5: 1.204  
 Si rates (kHz) 1: 15.194 2: 22.23061 3: 25.983 4: 46.755 5: 27.640

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A A  
 VDC efficiency  
 X1 95  
 U1 98  
 X2 95  
 D2 NMR



- Run 1063: restart a run to see if halo on FBADC spectra would disappear. Didn't.
- Beam intensity drops often. Due to temp fluctuations at ion source. Additionally, running higher currents.

Run comment: Mg thick  
 Run #: 1064  
 Start: 14:14 Current: 4.7 nA Trigger rate: 135 Hz  
 Stop: 15:17 CI Range: 6 nA Trigger evts: 754733  
 Target:  $^{24}\text{Mg}$  Scaler evts:  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.557 2: 0.972 3: 0.983 4: 1.006 5: 1.205  
 Si rates (kHz) 1: 16.2 2: 21.0 3: 22.8 4: 36.5 5: 25.0

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: M A  
 H: M A  
 D2: E A  
 K: A A  
 VDC efficiency  
 X1 94  
 U1 98  
 X2 95  
 D2 NMR

D<sub>2</sub>NMR: 0.99 36 13 T (stable within 1  $\mu\text{T}$ )

Run comment: Background (0)  
 Run #: 1065  
 Start: 15:20 Current: 4.8 nA Trigger rate: 226 Hz  
 Stop: 15:37 CI Range: 6 nA Trigger evts: 706845  
 Target: Mylar Scaler evts:  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 5 2: A 3: M 4: E 5: I  
 Si rates (kHz) 1: 6 2: 13 3: 16 4: 42 5: 10

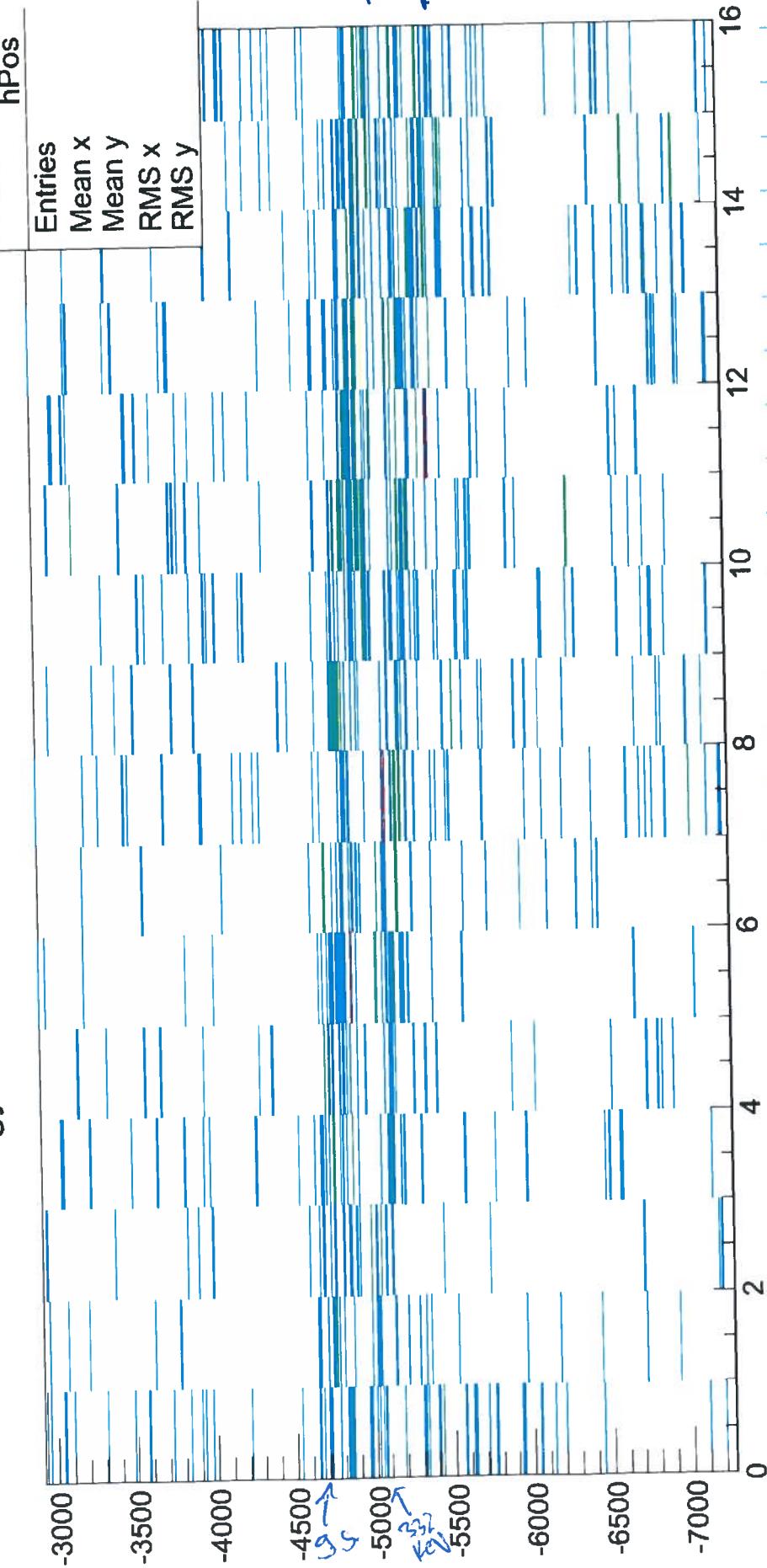
K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A A  
 VDC efficiency  
 X1 95  
 U1 98  
 X2 95  
 D2 NMR

\* Some halo (low E) starting to show in spectra.

Run comment:  
 Run #: 1066  
 Start: 15:39 Current: 4.9 nA Trigger rate: 230 Hz  
 Stop: 16:11 CI Range: 6 nA Trigger evts: 837937  
 Target: Mg thick Scaler evts: 4134  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.57 2: 0.98 3: 0.99 4: 1.00 5: 1.2  
 Si rates (kHz) 1: 22.463 2: 23.524 3: 20.055 4: 38.17 5: 25.0

Run comment:  
 Run #: 1067  
 Start: 16:55 Current: 4.9 nA Trigger rate: 230 Hz  
 Stop: 18:11 CI Range: 6 nA Trigger evts: 932171  
 Target: Mg thick Scaler evts: 4424  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.582 2: 0.974 3: 0.984 4: 1.009 5: 1.225  
 Si rates (kHz) 1: 18.254 2: 22.3 3: 24.0 4: 43.0 5: 30.0

## 22./21.\*EnergyFront-newEx\*1000:StripFront {CUTpad1vstoRun1056}



The plot on the previous page shows that there are two loci at various angles which are broadened out due to noise effects.

$^{21}\text{Na}$  The ground + first-excited states in following  $^{22}\text{Mg} \rightarrow ^{21}\text{Na} + p$  decays.

## Run comment: Thick Mg

Run #: 1068

Start: 18:15 Current: 5.1 nA Trigger rate: 179 Hz

Stop: 19:25 CI Range: 6 nA Trigger evts: 835823

Target:  $^{24}\text{Mg}$  Scaler evts: 4128

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.589 2: 0.976 3: 0.988

Si rates (kHz) 1: 13.8 2: 14.9 3: 16.2

K600 angle: 0 deg

Q: A

D1: SA

H: M

D2: E

K: A

D2 NMR

Mental Health Level:

VDC efficiency

X1 94.7

U1 97.8

X2 94.4

D2 NMR

5: 1.231

5: 15.5

## Run comment: Background (( ))

Run #: 1069

Start: 19:29 Current: 4.1 nA Trigger rate: 212 Hz

Stop: 19:45 CI Range: 6 nA Trigger evts: 141458

Target: DCC Scaler evts: 956

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 9.7 2: 10.9 3: 11.1

Si rates (kHz) 1: 19.8 2: 21.7 3: 15.5

K600 angle: 0 deg

Q: A

D1: SA

H: M

D2: E

K: A

Mental Health Level:

VDC efficiency

X1 94.2

U1 97.7

X2 94.5

D2 NMR

5: 13.5

D2 NMR: 0.993608 T

## Run comment: Mylar BL check

Run #: 1070

Start: 19:50 Current: 5.4 nA Trigger rate: 213 Hz

Stop: 20:10 CI Range: 6 nA Trigger evts: 249986

Target: Mylar #5 Scaler evts: 1202

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 5.0 2: 5.7 3: 6.0

Si rates (kHz) 1: 10.4 2: 10.3 3: 6.3

K600 angle: 0 deg

Q: A

D1: SA

H: M

D2: E

K: A

Mental Health Level:

VDC efficiency

X1 91.9

U1 97.2

X2 93.6

Not / -myr -

Same

Run comment: Halo Check  
 Run #: 1071  
 Start: 20:13 Current: 5.4 nA Trigger rate: 200 Hz  
 Stop: 20:28 CI Range: 6 nA Trigger evts: 178139  
 Target: MT Scaler evts: 865  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: E A  
 K: E A  
 D2 NMR

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: E A  
 K: E A  
 D2 NMR

→ Seems like halo improved of its own accord. 40 cts per 1 pA (on average).

Run comment: Mg Thick  
 Run #: 1072  
 Start: 20:30 Current: 5.1 nA Trigger rate: 205 Hz  
 Stop: 21:31 CI Range: 6 nA Trigger evts: 721999  
 Target: <sup>24</sup>Mg Scaler evts: 3532  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.588 2: 0.976 3: 0.985 4: 1.005 5: 1.226  
 Si rates (kHz) 1: 17.3 2: 18.6 3: 18.6 4: 22.9 5: 17.4

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: E A  
 K: E A  
 D2 NMR

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: E A  
 K: E A  
 D2 NMR

Beam BACK @ 01:55

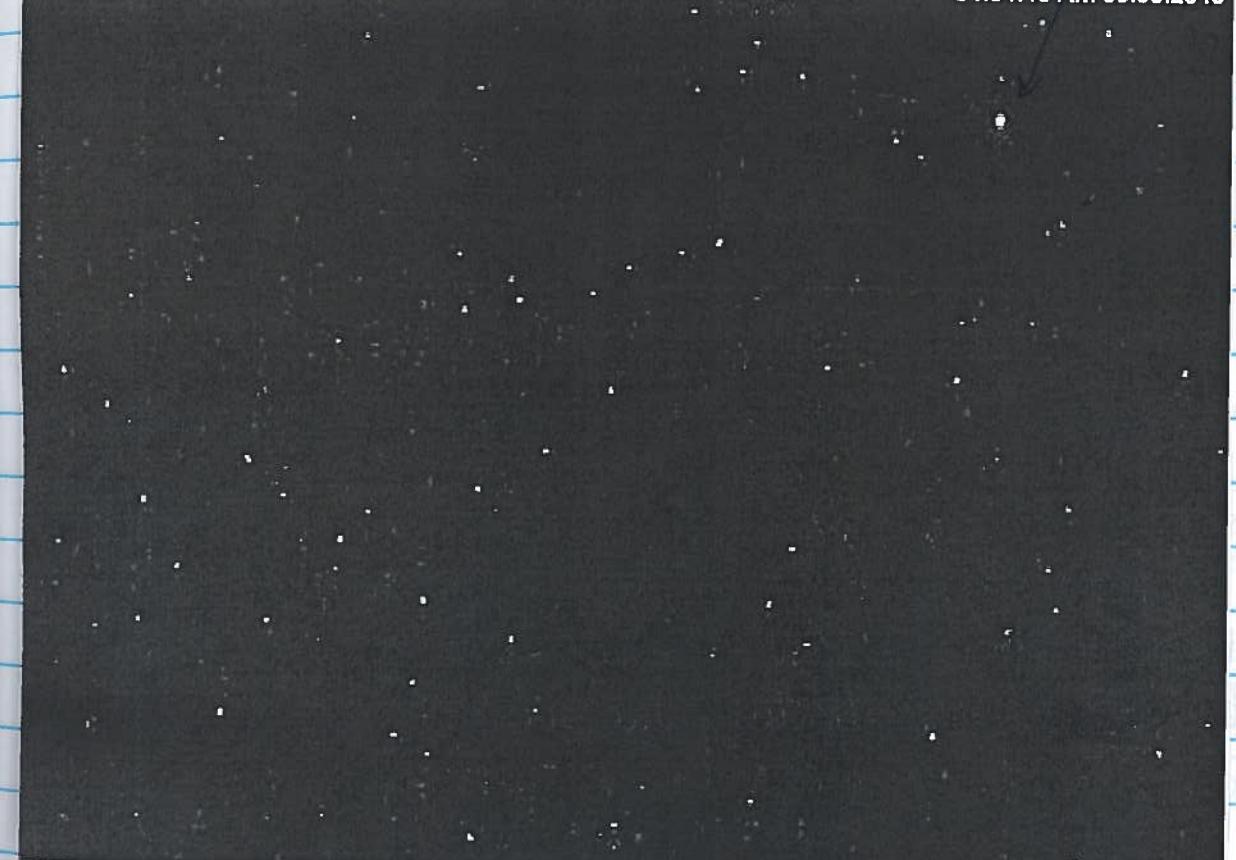
checking the beam spot with viewer and haloscopes  
 now put the empty in to see the halo.

→ 1 nA ⇒ 500 Hz !!

now trying to reduce it

### S - Line Target

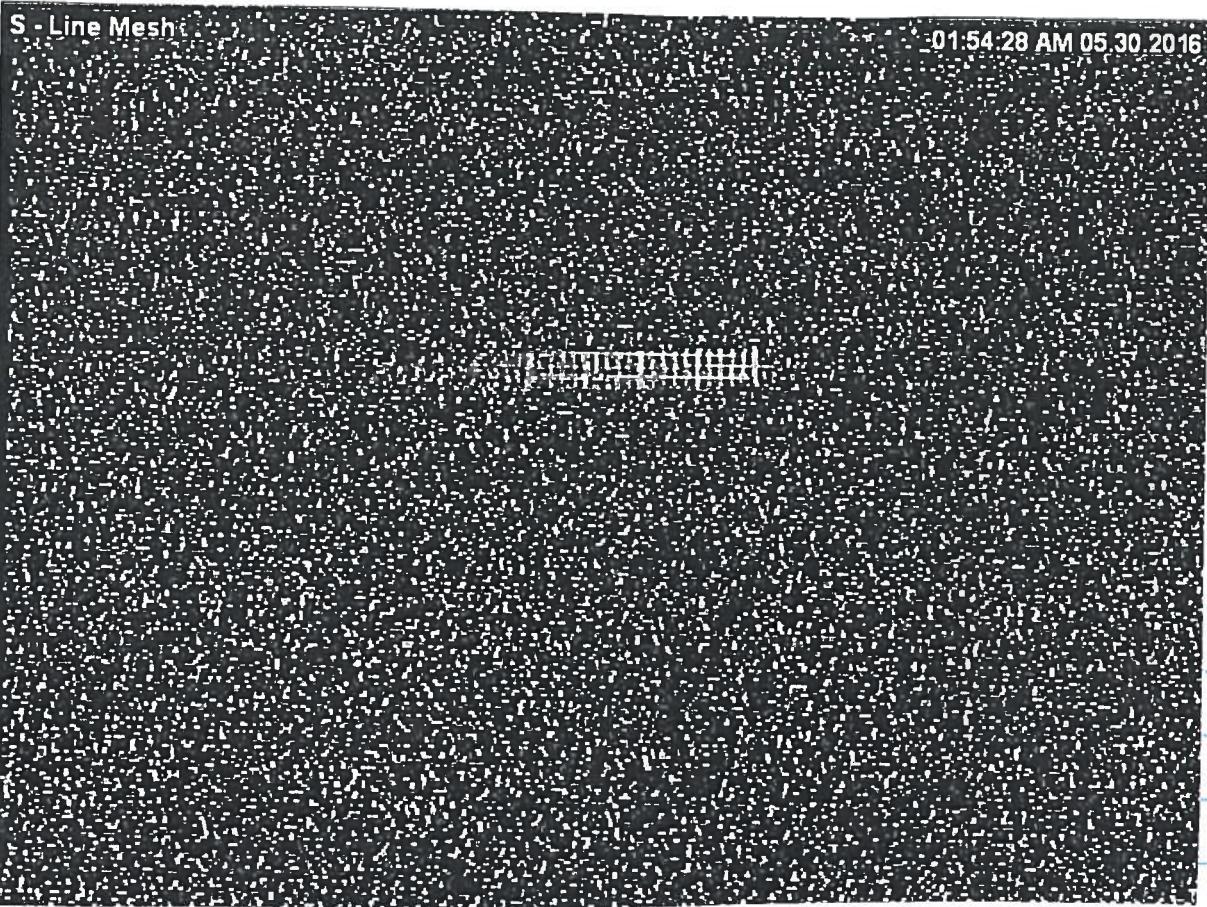
01:54:15 AM 05.30.2016



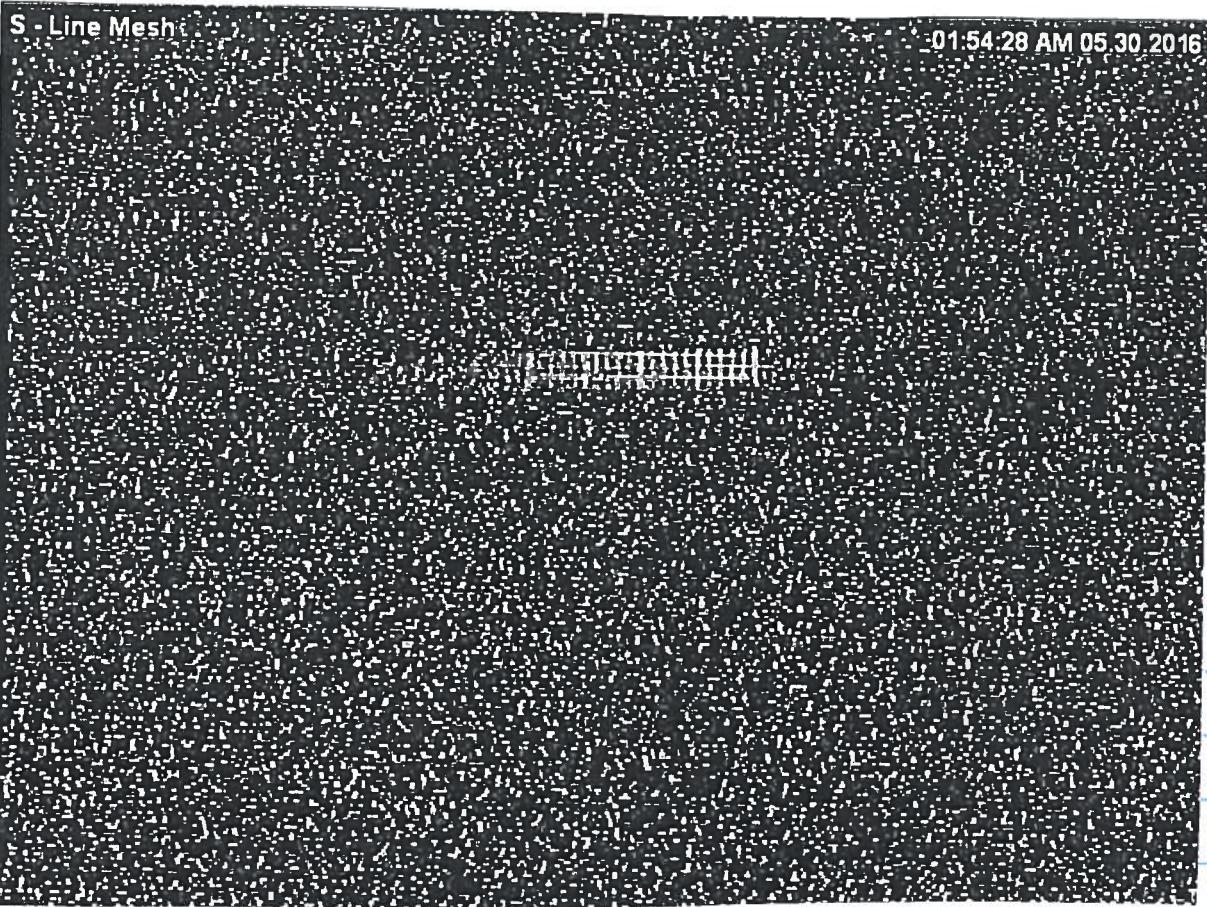
Run comment: Mg Thick  
 Run #: 1073  
 Start: 21:33 Current: 5.1 nA Trigger rate: 209 Hz  
 Stop: 22:20 CI Range: 6 nA Trigger evts: 516328  
 Target: <sup>24</sup>Mg Scaler evts: 2736  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.576 2: 0.967 3: 0.978 4: 1.000 5: 1.221  
 Si rates (kHz) 1: 19.7 2: 21.1 3: 21.1 4: 29.2 5: 22.2

beam gone @ 22:09.



01:54:28 AM 05.30.2016



We decided to close the slit because the rate in the silicon was too high.

Now it is decreased ~ 60-70 Hz but it is still high.

Run comment: 24Mg DATA

Run #: 1077  
 Start: 04:29 Current: 2.7 nA Trigger rate: 127 Hz  
 Stop: 05:33 CI Range: 6 n Trigger evts: 275180  
 Target: 24Mg #3 Scaler evts: 3644  
 draw\_me\_frontback() OK? OK draw\_me\_TDC2D0 OK? OK  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.083 2: 1.146 3: 1.212 4: 1.122  
 Si rates (kHz) 1: 19.84 2: 34.11 3: 14.13 4: 9.94  
 5: 1.308  
 5: 7.84

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A A  
 D2 NMR  
 VDC efficiency  
 X1 95.61  
 U1 98.42  
 X2 94.78

halo @ 1 nA 50 Hz  $Q = -442.248$

Happy with this.

Silicon back ON

Beam on target

- Run #1076 halo

EMPTY Run for checking the halo

Run # 1075 : Target 2.5 nA  $\Rightarrow$  128 Hz u

$D1 = 393.910$

$H = -29.504$

$D2 = 392.458$

$k = 6.383$

Run comment: 24Mg Resolution check

Run #: 1076 Current: 2.5 nA Trigger rate: 96 Hz

Start: 03:07 Stop: 04:27 CI Range: 6 n Trigger evts: 572071

Target: 24Mg #3 draw\_me\_TDC2D0 OK?

draw\_me\_frontback() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.722 2: 1.203 3: 1.277 4: 1.227  
 Si rates (kHz) 1: 63.93 2: 94.7 3: 66.8 4: 48.78

5: 7.341 5: 7.341  
 5: 7.341 5: 7.341

5: 7.341 5: 7.341

5: 7.341 5: 7.341

5: 7.341 5: 7.341

Run comment: MYLAR  
 Run #: 1050  
 Start: 07:01 Current: 0.8 nA Trigger rate: 55 Hz  
 Stop: 07:33 Cl Range: 6 Trigger evts: 185281  
 Target: MYLAR #5 Scaler evts: 1841  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.673 2: 1.142 3: 1.205 4: 1.179  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg	Mental Health Level:
Q: <u>A</u>	☺ ☺ ☺
D1: <u>SA</u>	A
H: <u>SA</u>	A
D2: <u>MB</u>	A
K: <u>BS</u>	A
D2 NMR	
VDC efficiency	
X1	<u>96.49</u>
U1	<u>93.89</u>
X2	<u>94.52</u>
5:	<u>1.300</u>

Bedm come and go come and go 11  
 and now in ~~go~~! R.I.P. + 1

$$Q = -442.248$$

$$D1 = 393.910$$

$$H = -29.504$$

$$D2 = 392.458$$

$$K = 6.383$$

VDC VOLTAGE 4.03 3.76

HiP	Pad1	Ch0	1460
LoP	"	Ch1	1450
HiP	u2	Ch2	1400
LoP	u2	Ch3	1600

X1	ch0	500
U1	ch1	500
X2	ch2	500
U2	ch3	0

9:30  
 Switched off  $V_{bias}$   
 detectors  
 Stopped gas flow.

Silicon and crater OFF  
 SV2/SV14 closed  
 Magets midrange

02 June 2016 (12:30)

- Run 1082: 228Th calibration run  
 Target ladder in position 2.

Detector #	Si leakage (uA)	Amp Threshold (mV)
1	<del>1.481</del>	-115 (1P)
2	0.980	-83 (2P)
3	1.054	-178 (3P)
4	1.008	-155 (4P)
5	1.179	-153 (5P)

- 2 h-long run. Then another with lowered amp. thresholds. (4h-long run)

BTW: Triggering DAQ on p-side of MM's.

- Run 1083 (14:36)  
 Set. New Threshold (mV)

1P	-64
2P	-36
3P	-64
4P	-54
5P	-83

Weekend 2 start

Go to run #2000

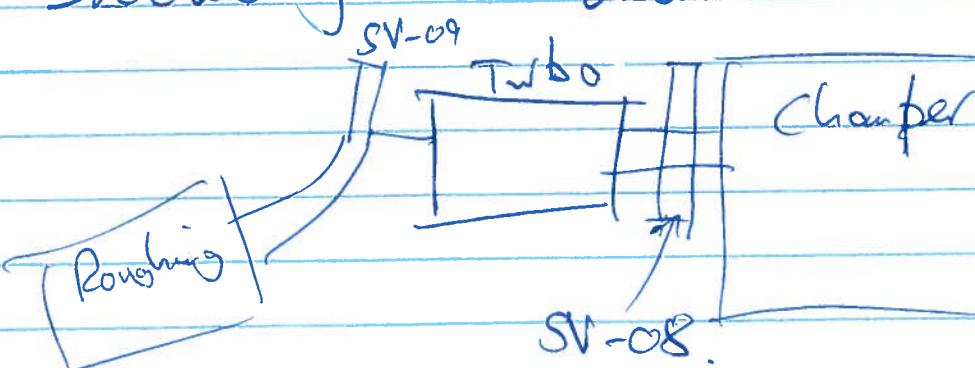
The gauge upstream of SV-02 was not working so that valve may have been over-ridden at some point.

12.20 Getting viewer set up at the moment

12.45 We have big problems.

The vacuum control system crashed and vented more-or-less everything.

Including the chamber.



When things went off, SV-08 stayed open.

Turbo turned off.

Roughing stayed on.

SV-09 ~~st~~ opened.

This effectively vented the chamber through the turbo.

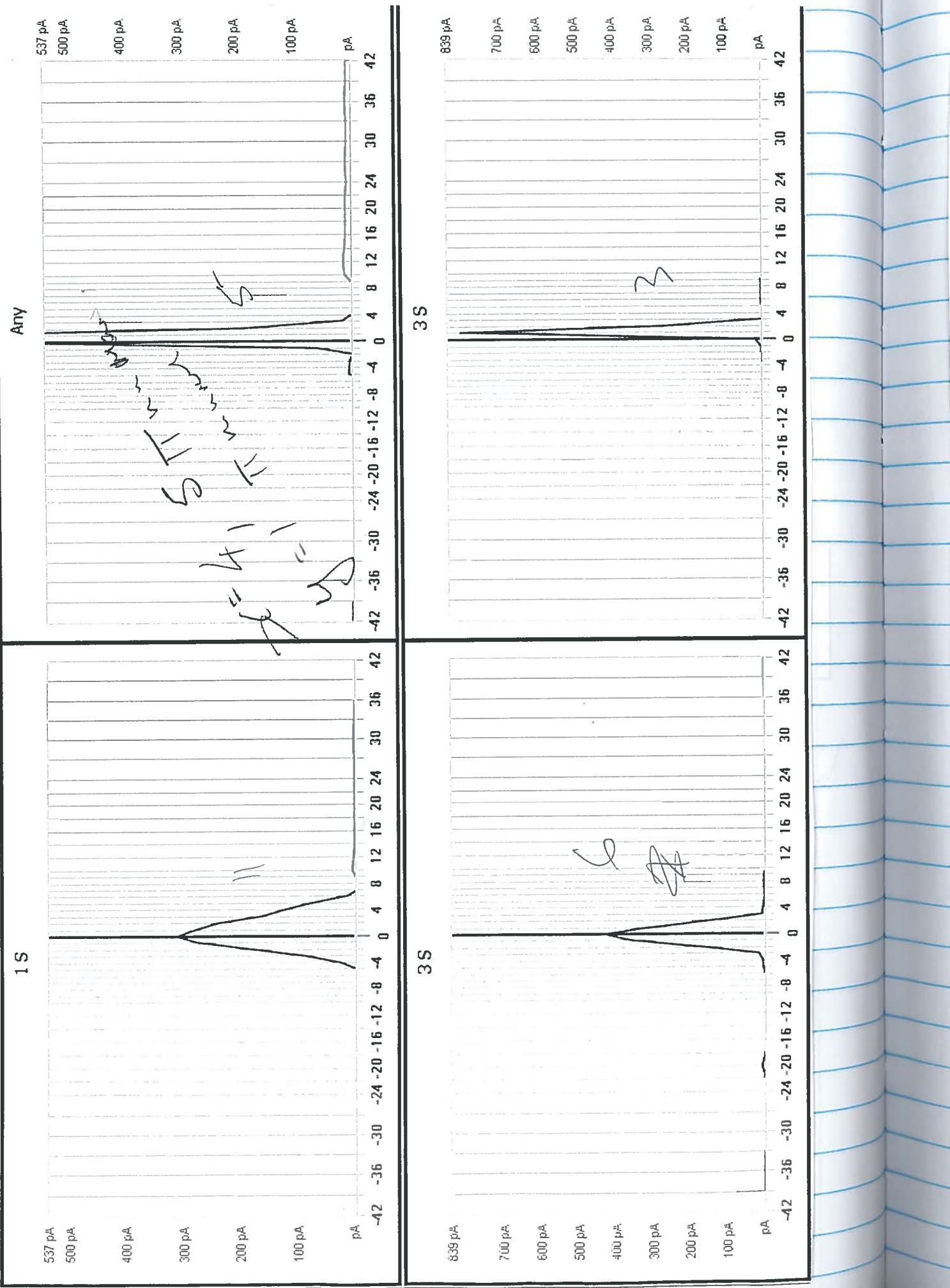
If this had been an experiment with the Ca targets, they would have been lost.

We now need to wait for the beamline to be pumped down again.

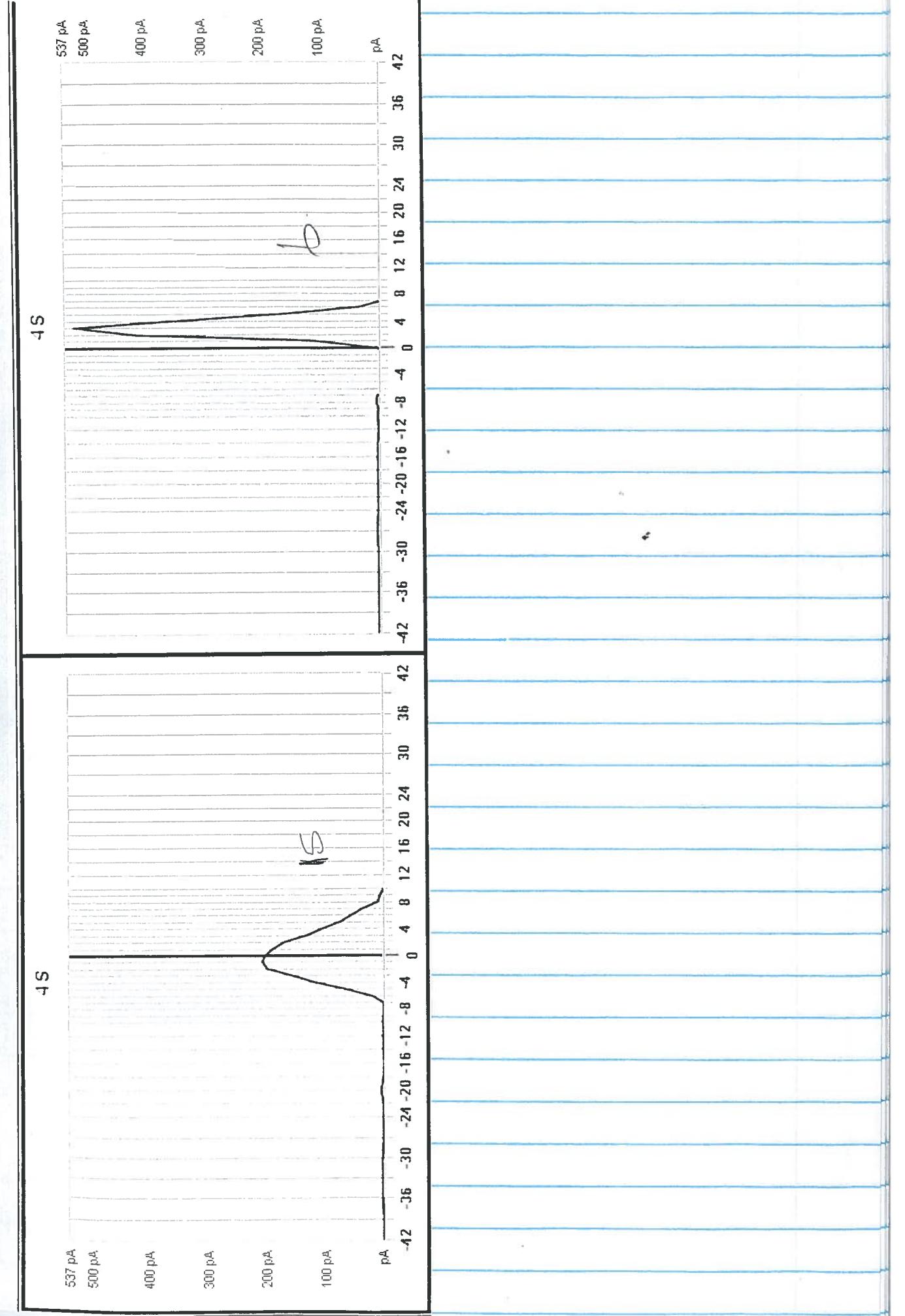
Possibly also the spectrometer.

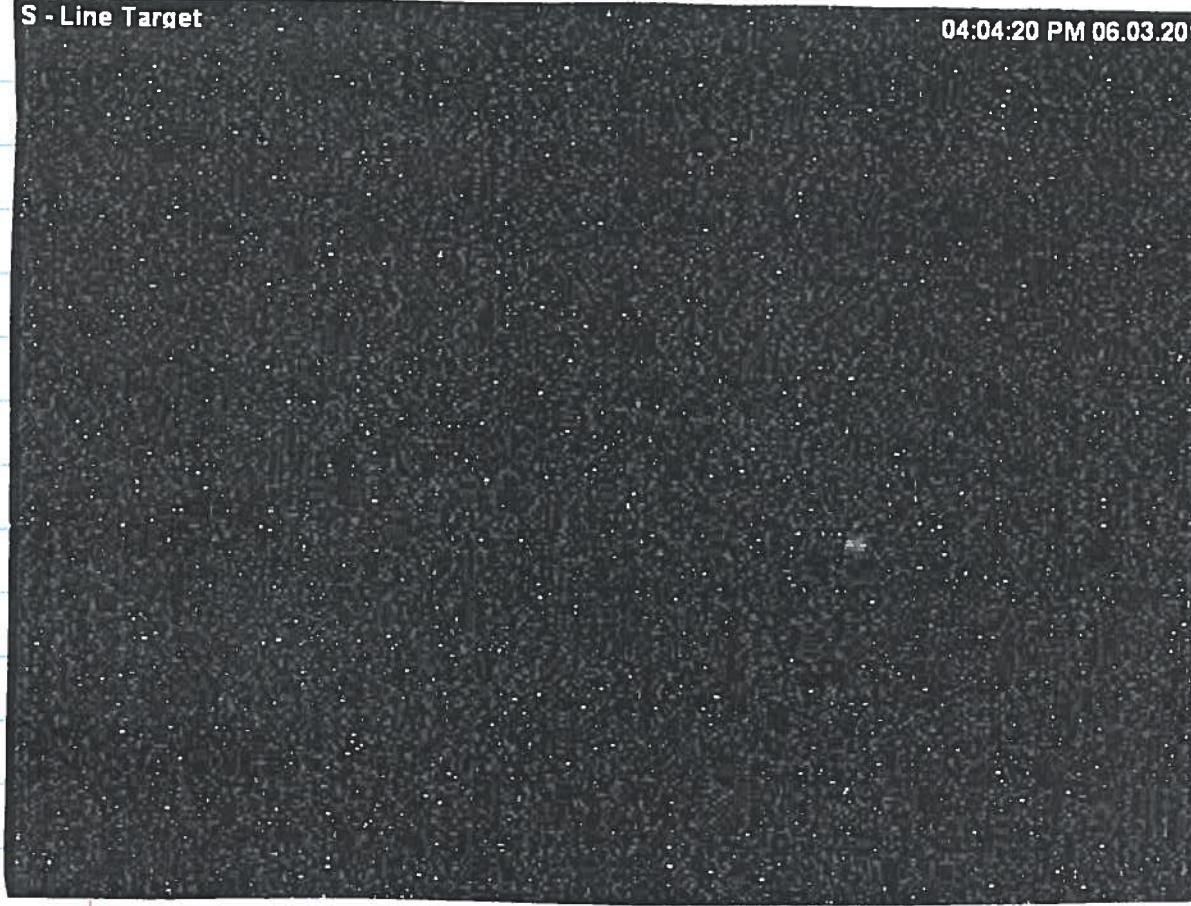
Target chamber?

Profile Print : 03 June 2016 : 15:04:42

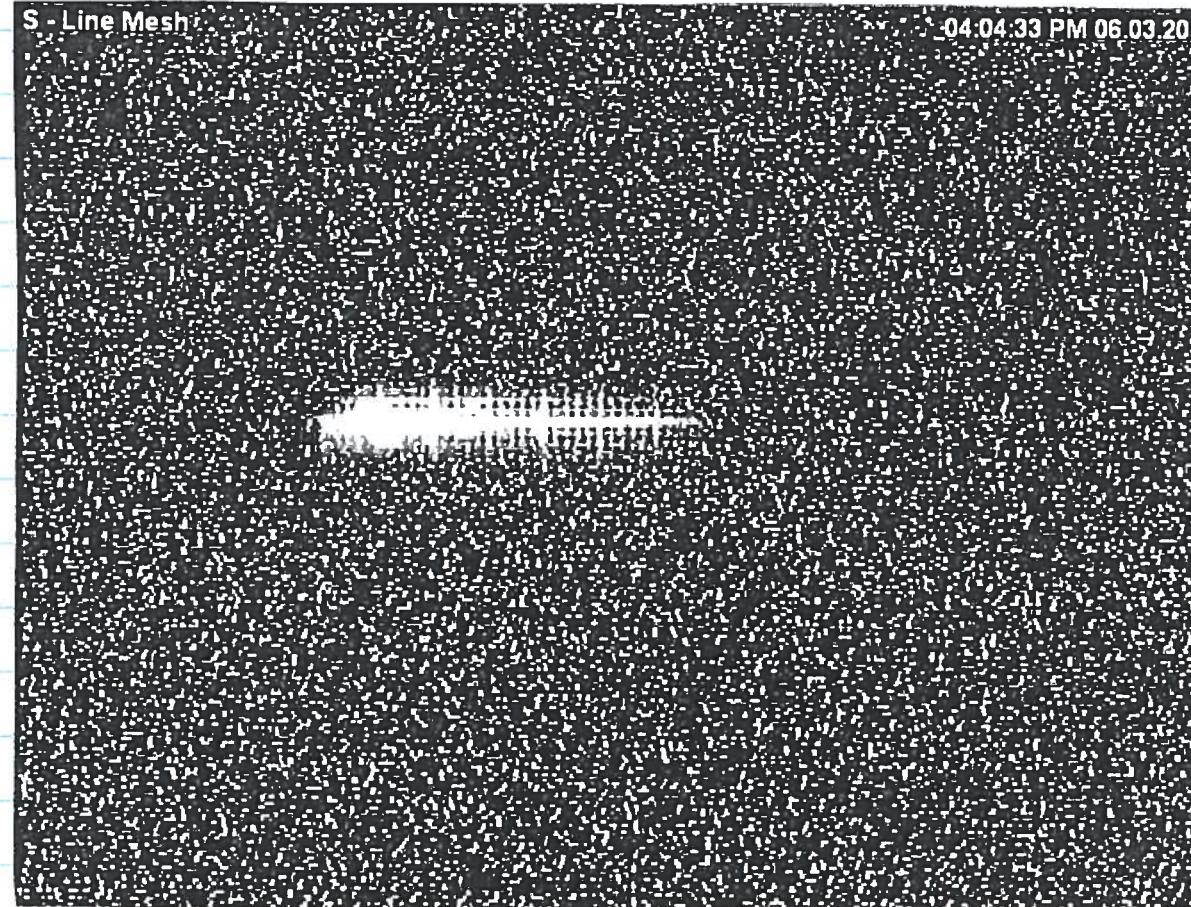


Profile Print : 03 June 2016 : 15:05:11





04:04:20 PM 06.03.2016



04:04:33 PM 06.03.2010

\*\*\* EnMet Ver5.7 Oct 2013 \*\*\* Energie\_NMR.txt

\*\* BEREKENDE ENERGIE \*\*\*\* CALCULATED ENERGY \*\*

2016/06/03

109

Versnelde deeltjie	Accelerated particle :
Element	= H
Atoomgetal	= Atomic Number = 1
Massagetal	= Mass Number = 1
Rel. Atoommassa	= Rel. Atomic Mass = 1.00782
Natuurlike voorkoms	= Natural Abundance = 99.98 %
Ladingsgetal Q	= Charge State Q = 1

1 Tesla = 42.5759 MHz [Linear Relation]

BEAM ENERGY FROM NMR-READING/S (frequency) :

BEAM ENERGY FROM NMR-READING/S (field):

B3P Beam Energy = 98.59 MeV from NMR = 0.736 Tesla

increased DI. 1.5A for all current  
on the beam dump

Pulse Selection still  $V = 5$ .

~~Sett~~ Voltages on paddles as on page 102.

stated @ 50 Hz for 1 nt.

Doesn't really get settled, take it for now.

Faint beam from page 56

D1 from 403.93 A

To 270.0 A

Current current on D1: 393.41

Q: -442.248

D1: 395.41

H: 29.504

D2: 392.458

R: 6.383

Ratios: D2 H: 1.0037  
Q -0.8907  
R 61.7130  
H -13.3510

$E_p = 98.59 \text{ MeV}$

Specit

D1: 268.01 A

D2: ~~266~~ 266.98 A

Q: -331.77 A

FAINT BEAM to check the resolution

Got ~150 Hz on the FP. w/  
FB.

Run # 2000 Faint beam run tent

Don't see many counts →  
check FP cover removed.

Also, may need to change paddle  
HN.

→ Page 56

Pad 1 H: → 1625

Pad 2 L: → 1600.

blow on the VDC or now

Run # 2001 Faint beam tuning

We increase the voltage of paddle to see the pre-torch

Pad1Hi: +Lo = 1600 V.

Pad1Hi: AT channel #1000

1Lo: AT #500  
+70 V

1670 V:

Pad1Lo: #850.

Gate:  $3960 < T_{0F} < 4000$   
 $600 < \text{pad1} < 1200$

VDCs 1: -3.56 kV  $\rightarrow$  -3.50 kV  
2: -3.66 kV  $\rightarrow$  -3.60 kV.

Wrong  $T_{0F}$  gate!

1360  $\rightarrow$  1400.

Gives  $\sigma = 0.48 \text{ mm}$ .

Putting in  $750 \mu\text{g/cm}^2$   $^{24}\text{Mg}$  to see peak shift.

Run 2002  
Now at  $668.620 \text{ mm}$ .  
 $4 \text{ keV}$   
 $0.2 \text{ mm}$   
 $20^\circ$

Using PR242 Volume 1, page 64.  
19-26 keV/mm  
 $\sigma = 0.552 \text{ mm} \rightarrow 25 \text{ keV FullW.}$

Q6S now 22.7 A.

Run 2003

$\sigma = 0.633 \text{ mm}$   
 $\hookrightarrow 30 \text{ keV.}$

Q6S to 22.5 A

Run 2004

$\sigma = 0.494 \text{ mm}$   
 $\hookrightarrow 23 \text{ keV.}$

Q6S to 22.4 A

Run 2005  $\sigma = 0.572 \text{ mm}$   
 $\hookrightarrow 27 \text{ keV}$

Settling for Q6S = 22.5 A.

Resetting fields.

Pool 1 H: -1460 V

L: -1650 V

2 H: -1400 V

L: -1600 V

VDC1: -3.56 kV

2: -3.66 kV.

Fields now:

Q: -443.932 A

D1: 895.410 A

H: -29.617 A

D2: 393.952 A

K: 6.407 A

with 1 nA  $\rightarrow$   $\sim 50$  Hz on the FP as halo.

Need to adjust the delay to get the ToF in the middle of the FP

Run comment:  $^{24}\text{Mg}$  #3 750  $\mu\text{s}/\text{cm}^2$

Run #: 2006 Start: 18:28 Current: 4.5 nA Trigger rate: 270 Hz

Stop: 18:47 CI Range: 6n Trigger evts: 237084

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 1091

draw\_me\_frontback() OK? draw\_me\_TDC2D0() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:

Q: -443.932 A ☺ ☺ ☺

D1: 895.410 A VDC efficiency

H: -29.617 A X1 \_\_\_\_\_

D2: 393.952 A U1 \_\_\_\_\_

K: 6.407 A X2 \_\_\_\_\_

D2 NMR

New gate:

ToF: 3420  $\rightarrow$  3580

Pool 1: 950  $\rightarrow$  1800.

Need to get same Ex on the FP

$\downarrow$   
change D2 a bit

D2  $\rightarrow$  391.952 A.

New D2 ratio = 1.0088

Run comment:  $^{24}\text{Mg}$  #3

Run #: 2007

Start: 18:50 Current: 3 nA Trigger rate: 170 Hz

Stop: 18:56 CI Range: 6n Trigger evts: 45479

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 313

draw\_me\_frontback() OK? draw\_me\_TDC2D0() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg

Mental Health Level:

☺ ☺ ☺

VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

X2 \_\_\_\_\_

391.952 A  $\rightarrow$  388.952 A.

New D2 ratio: 1.0166.

Run comment:  $^{24}\text{Mg}$  #3

Run #: 2008

Start: 18:57 Current: 2.5 nA Trigger rate: 130 Hz

Stop: 18:57 CI Range: Trigger evts: \_\_\_\_\_

Target:  $^{24}\text{Mg}$  #3 Scaler evts: \_\_\_\_\_

draw\_me\_frontback() OK? draw\_me\_TDC2D0() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg

Mental Health Level:

☺ ☺ ☺

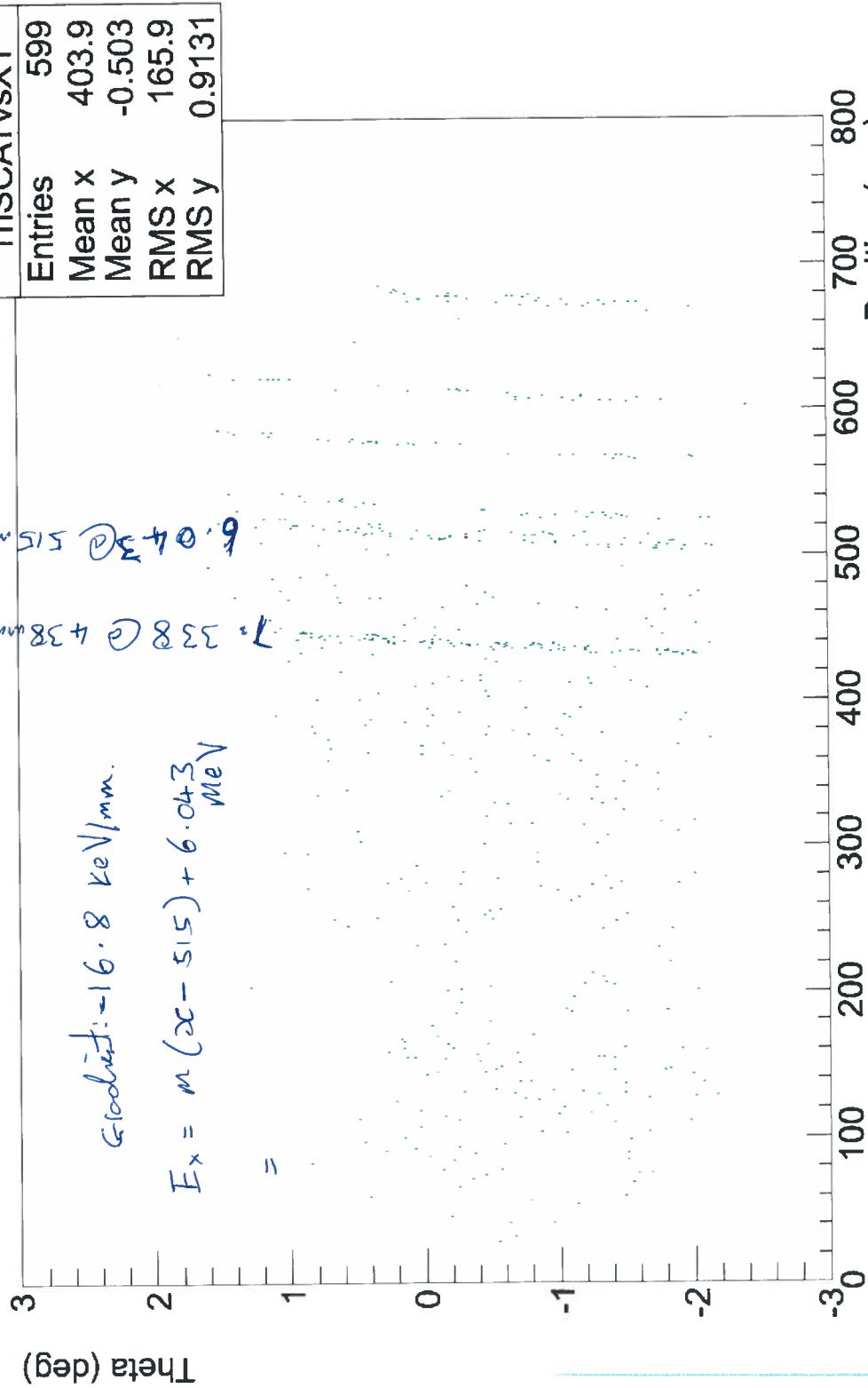
VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

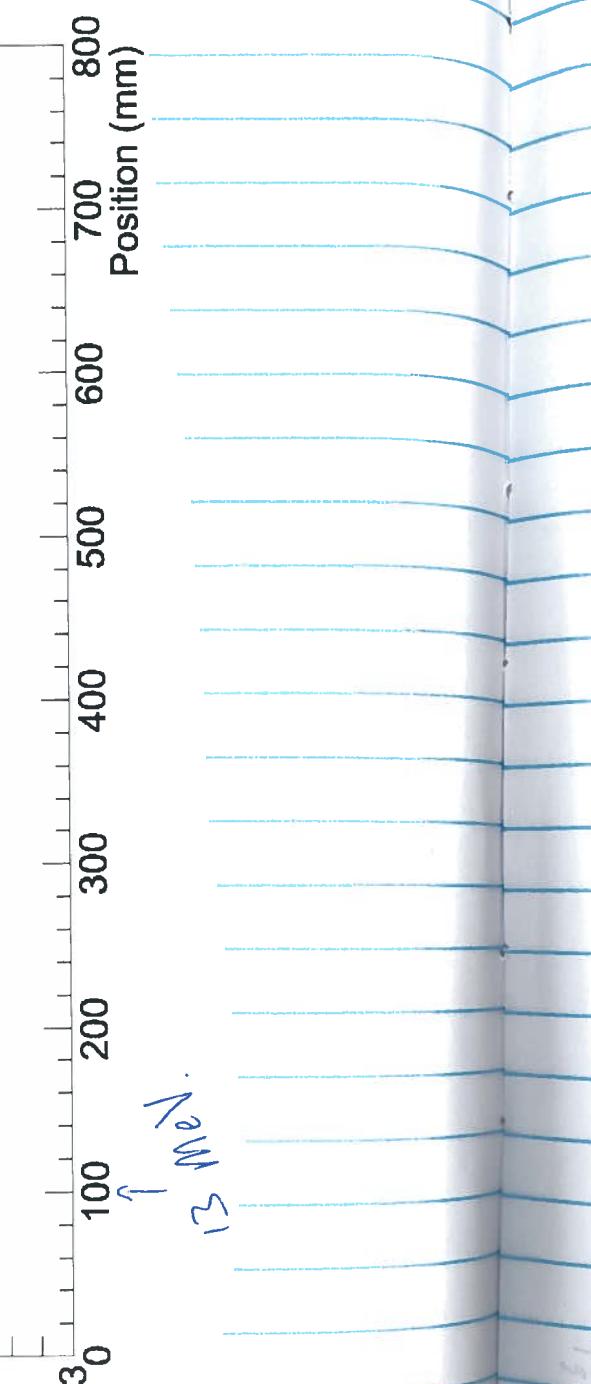
X2 \_\_\_\_\_

## ThSCAT vs X1



I'm happy with this  $E_x$  region.

We are going to take a little more stats and then put CAKE in.



The  $E_x$  region is fine. The resolution might be slightly worse but not especially so.

$\text{Q6S}$  now: 22.5 A

Going to weaken to 22.0 A.

Run comment:  $^{24}\text{Mg} \#3$

Run #: 2009

Start: 19:34

Stop: 20:18

Target:  $^{24}\text{Mg} \#3$

draw\_me\_frontback() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

Si rates (kHz)

Current: 3.1 nA

Cl Range: 6

Trigger evts: 374416

Scaler evts: 2523

draw\_me\_TDC2D() OK?

1: \_\_\_\_\_

2: \_\_\_\_\_

3: \_\_\_\_\_

4: \_\_\_\_\_

1: \_\_\_\_\_

2: \_\_\_\_\_

3: \_\_\_\_\_

4: \_\_\_\_\_

Trigger rate: 130 Hz

130

5: \_\_\_\_\_

6: \_\_\_\_\_

7: \_\_\_\_\_

8: \_\_\_\_\_

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: A A

D2 NMR

Mental Health Level:  
😊 😐 😕

VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

X2 \_\_\_\_\_

5: \_\_\_\_\_

5: \_\_\_\_\_

Resolution seems worse.  
 $\text{Q6S}$  back to 22.5 A.

D2 ratio back to 1.0037.

Try changing the super knob.

D1 From 395.40 A

To 393.41 A

No obvious current change when this ~~happened~~ happened.

Run comment:  $^{24}\text{Mg}$  #3  
 Run #: 2010      Current: 3.5 nA      Trigger rate: 190 Hz  
 Start: 20:25      Stop: 20:42      Cl Range: 6n      Trigger evts: 153667  
 Target:  $^{24}\text{Mg}$  #3

draw\_me\_frontback() OK?        draw\_me\_TDC2D() OK?       

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg		Mental Health Level:
Q:	A	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
D1:	A	
H:	A	
D2:	A	
K:	A	
VDC efficiency		
X1		
U1		
X2		
D2 NMR		

Going to shift 2 more amps.

D1 → 391.41

& Strong state @ 410 mm

Run comment:  $^{24}\text{Mg}$  #3  
 Run #: 2011      Current: 3.5 nA      Trigger rate: 180 Hz  
 Start: 20:44      Stop: 20:48      Cl Range: 6n      Trigger evts: 55633  
 Target:  $^{24}\text{Mg}$  #3

draw\_me\_frontback() OK?        draw\_me\_TDC2D() OK?       

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg		Mental Health Level:
Q:	A	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
D1:	A	391.41
H:	A	
D2:	A	
K:	A	
VDC efficiency		
X1		93
U1		95
X2		92
D2 NMR		

Venting + putting in CAKE.

Having opened the chamber, the situation is more serious than first thought.

See the picture →

Due to this, I (Pl) have removed the actuator + read back for SV-O9.



View.e

Was  $^{24}\text{Mg}$   $230 \mu\text{g}/\text{cm}^2$

$^{24}\text{Mg}$   $700 \mu\text{g}/\text{cm}^2$   
Exp target. Bent.

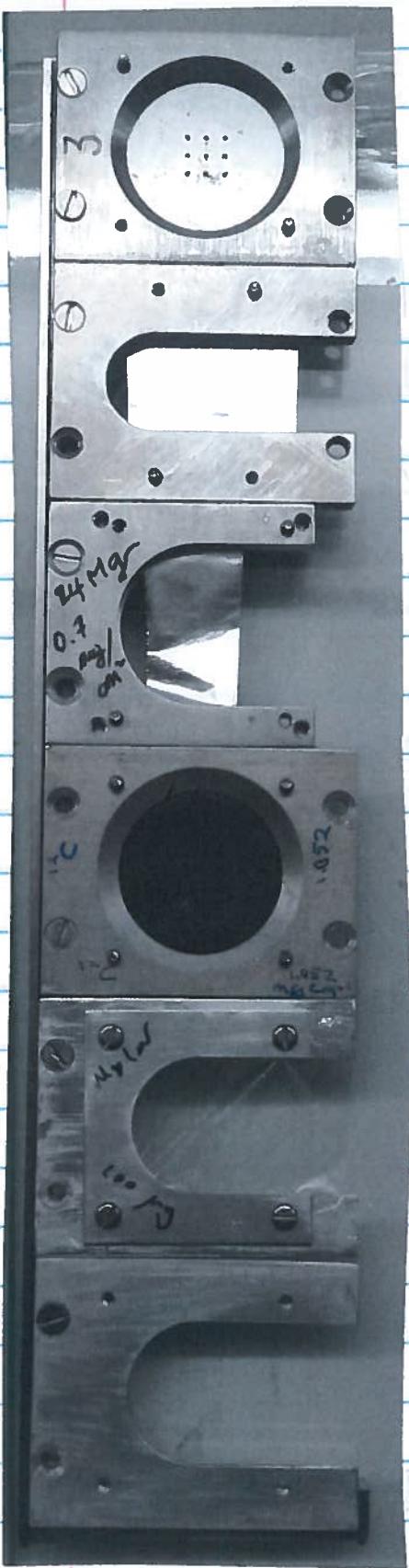
Was DLC  $500 \mu\text{g}/\text{cm}^2$

Myfa.

MT

I'm REALLY CHEESED OFF about this.

New! Target ladder.



### Leakages

D1: 1.540  $\mu\text{A}$   
D2: 1.004  $\mu\text{A}$   
D3: 1.072  $\mu\text{A}$   
D4: ~~1.00~~ 1.033  $\mu\text{A}$   
D5: 1.213  $\mu\text{A}$ .

MT in @ 10:10 pm.

Going to try with  $^{24}\text{Mg}$ .

Run comment:  $^{24}\text{Mg} \#3$   
Run #: 2012  
Start: 22:17 Current: 2.5 nA Trigger rate: 130 Hz  
Stop: 22:50 CI Range: 6n Trigger evts: 982151  
Target:  $^{24}\text{Mg} \#3$  Scaler evts:  
draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages ( $\mu\text{A}$ ) 1: 1.558 2: 1.017 3: 1.082 4: 1.046  
Si rates (kHz) 1: 15K 2: 15K 3: 15K 4: 18K

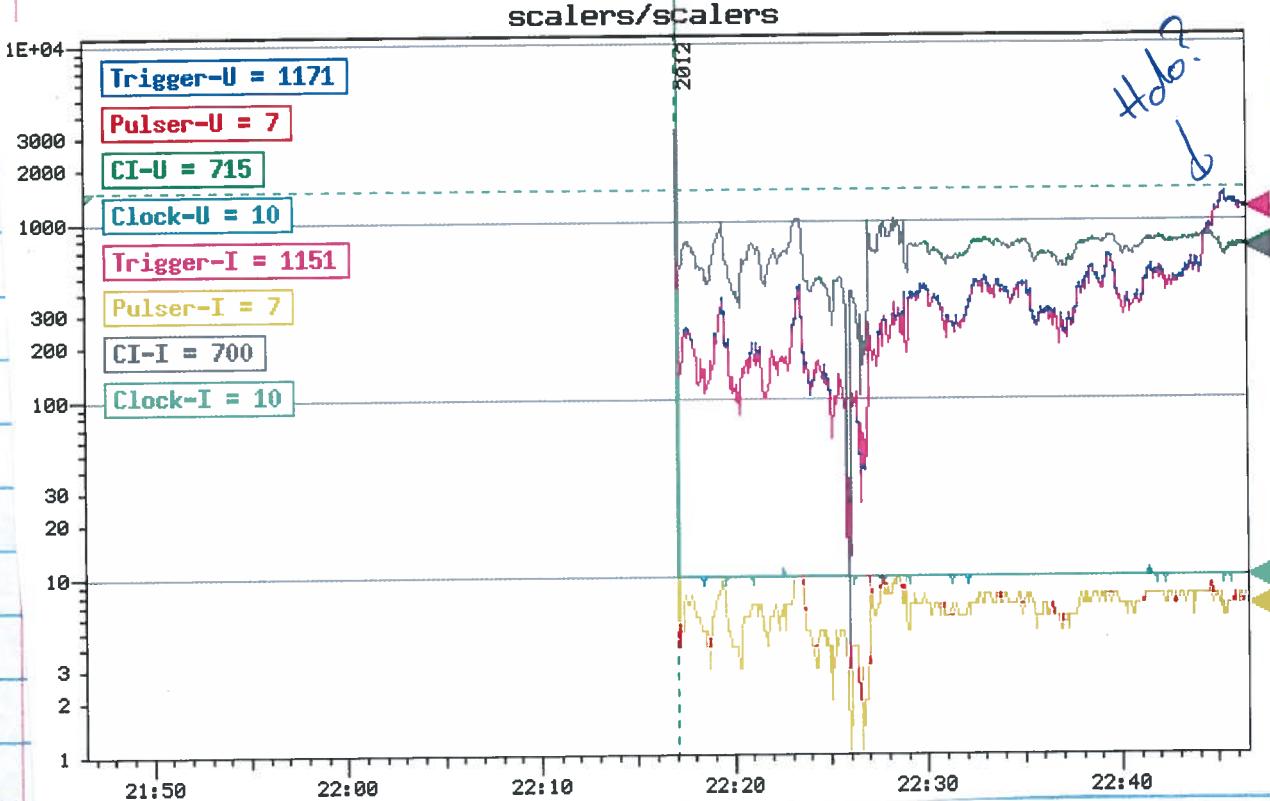
K600 angle: 0 deg  
Q: -439-441 A  
D1: 391-410 A  
H: -29-317 A  
D2: 389-967 A  
K: 6.342 A  
D2 NMR  
5: 1.224.  
5: 12K.

Mental Health Level:  
MDC efficiency  
X1 95  
U1 95  
X2 93

During this run, the count rate shot up  $\rightarrow$  Halo? Putting in the MT to check.

4 nA  $\rightarrow$  1000 Hz on the MT.

Oops.  
Run 2013: Halo tuning.



- Halo better: 200 Hz @ ~4 pNa.

Run comment:  $^{24}\text{Mg}$  #3

Run #:	2014	Current:	4.3 nA	Trigger rate:	269 Hz
Start:	22:57	CI Range:	6 nA	Trigger evts:	521109
Stop:	00:00	Scaler evts:	3701	draw_me_TDC2D0 OK? Yes	
Target:	$^{24}\text{Mg}$	Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No			
Si leakages (uA)	1: 1.600	2: 1.047	3: 1.107	4: 1.079	5: 1.252
Si rates (kHz)	1: 17.6	2: 18.4	3: 24.0	4: 22.3	5: 17.6

K600 angle: 0 deg      Mental Health Level:  
 Q: A      D1: A      H: M      D2: E      K: A  
 VDC efficiency  
 X1 93.8  
 U1 97.1  
 X2 94.4

D2 NMR

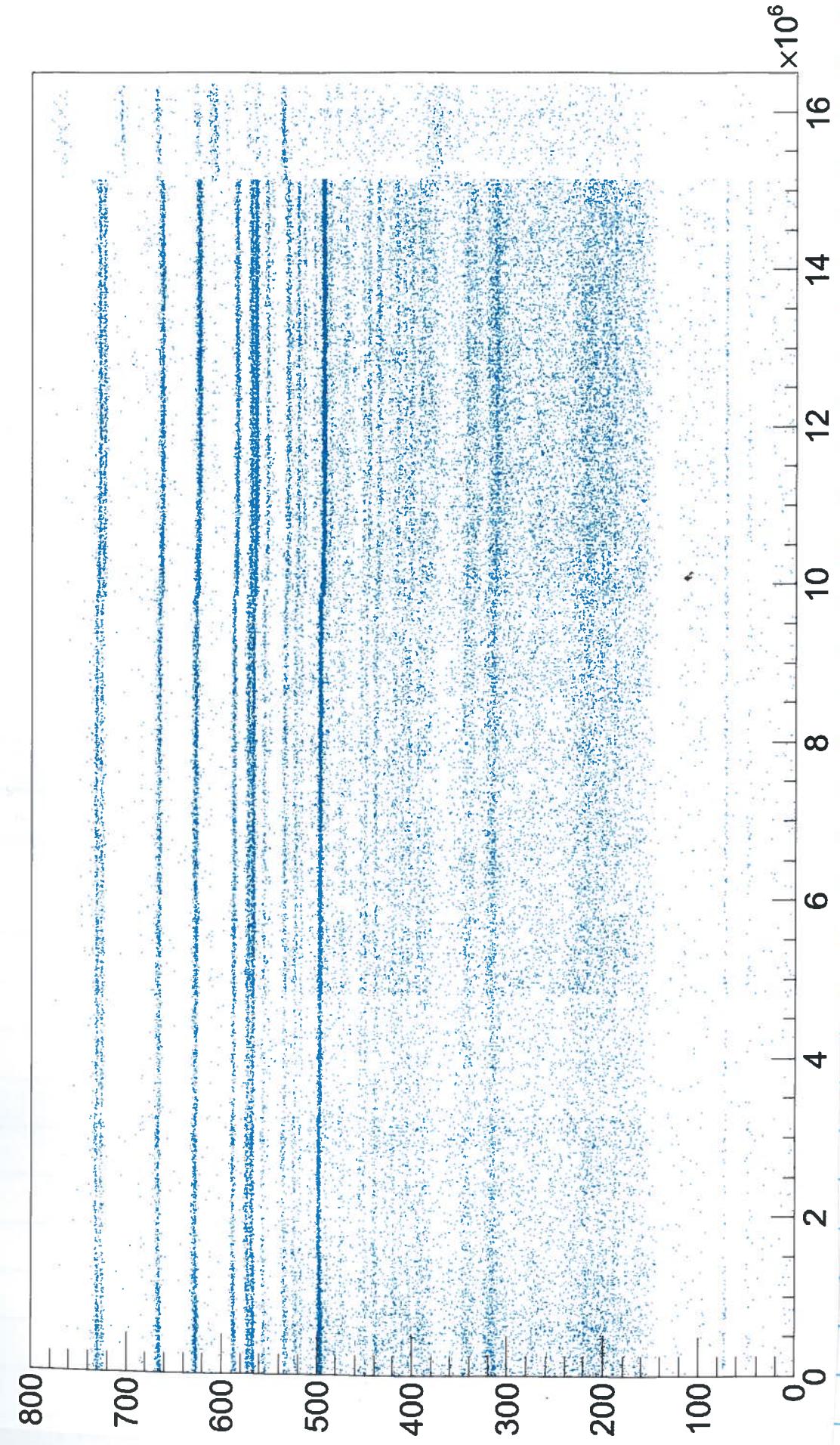
Run comment:  $^{24}\text{Mg}$  #3

Run #:	2015	Current:	4.3 nA	Trigger rate:	209 Hz
Start:	00:01	CI Range:	6 nA	Trigger evts:	335107
Stop:	01:03	Scaler evts:		draw_me_TDC2D0 OK? Yes	
Target:	$^{24}\text{Mg}$	Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No			
Si leakages (uA)	1: 1.614	2: 1.064	3: 1.120	4: 1.095	5: 1.264
Si rates (kHz)	1: 16.7	2: 17.5	3: 22.1	4: 21.2	5: 16.1

K600 angle: 0 deg      Mental Health Level:  
 Q: S A      D1: A      H: M      D2: E      K: A  
 VDC efficiency  
 X1 96.5  
 U1 95.8  
 X2 90.2

D2 NMR

X1pos - 3.40739\*thetaSCAT - 0.079275\*thetaSCAT\*thetaSCAT:Entry\\$ {CUTpad1vsf0Run1040 && !X1flag}



Run comment: MYLAR  
Run #: 2016

Start: 01:05 Current: 4.7 nA Trigger rate: 601 Hz  
Stop: 1:32 CI Range: 6 Trigger evts: 167346269092

Target: MYLAR #5 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.622 2: 1.026 3: 1.121 4: 1.097 5: 1.265  
Si rates (kHz) 1: 4.8 2: 5.4 3: 11.5 4: 5.5 5: 4.5

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 92
U1 90
X2 93

D2 NMR

Run comment: MYLAR #5  
Run #: 2020

Start: 3:43 Current: 4.0 nA Trigger rate: 152 Hz  
Stop: 04:10 CI Range: 6 Trigger evts: 293191

Target: #5 mylar draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.641 2: 1.086 3: 1.137 4: 1.116 5: 1.773  
Si rates (kHz) 1: 4.1 2: 4.5 3: 10 4: 4.6 5: 3.8

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 97.8
U1 87.8
X2 94.6

D2 NMR

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup> #3  
Run #: 2017

Start: 01:34 Current: 3.4 nA Trigger rate: 160 Hz  
Stop: 02:24 CI Range: 6 Trigger evts: 956052

Target: #3  $^{24}\text{Mg}$  draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.632 2: 1.081 3: 1.136 4: 1.113 5: 1.274  
Si rates (kHz) 1: 15 2: 16 3: 21 4: 20 5: 16

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 95
U1 91
X2 93

D2 NMR

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup> #3  
Run #: 2021

Start: 04:22 Current: 4.5 nA Trigger rate: 172 Hz  
Stop: 05:10 CI Range: 6 Trigger evts: 758150

Target: #3  $^{24}\text{Mg}$  draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.616 2: 1.076 3: 1.151 4: 1.125 5: 1.285  
Si rates (kHz) 1: 16 2: 17 3: 23 4: 21 5: 17

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 93.0
U1 98.1
X2 93.7

D2 NMR

02.24 I have noticed that the elent date has gone up to ~500. Stop the run, start a new one while the operators play their game.

With 4.4 mA

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup> #3 half turning  
Run #: 2018

Start: 2:25 Current: 4.3 nA Trigger rate: 500 → 200 Hz  
Stop: 7:40 CI Range: 6 Trigger evts: 168008

Target: #3  $^{24}\text{Mg}$  draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 _____
U1 _____
X2 _____

D2 NMR

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup>  
Run #: 2022

Start: 05:35 Current: 3.7 nA Trigger rate: 163 Hz  
Stop: 06:35 CI Range: 6 Trigger evts: 633076

Target: #3  $^{24}\text{Mg}$  draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.652 2: 1.102 3: 1.155 4: 1.133 5: 1.793  
Si rates (kHz) 1: 13 2: 14 3: 18 4: 17 5: 13

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 97.2
U1 78.1
X2 93.0

D2 NMR

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup> #3  
Run #: 2019

Start: 2:40 Current: 4.8 nA Trigger rate: 210 Hz  
Stop: 3:41 CI Range: 6 Trigger evts: 16026658883

Target: #3  $^{24}\text{Mg}$  draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.649 2: 1.093 3: 1.148 4: 1.126 5: 1.288  
Si rates (kHz) 1: 17 2: 19 3: 24 4: 23 5: 18

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 93.5
U1 98.7
X2 96.1

D2 NMR

Run comment: 2023 Mylar #5  
Run #: 2024

Start: 6:36 Current: 4.5 nA Trigger rate: 192 Hz  
Stop: 7:01 CI Range: 6 mA Trigger evts: 159136

Target: #5 Mylar draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.652 2: 1.092 3: 1.146 4: 1.174 5: 1.287  
Si rates (kHz) 1: 4.4 2: 4.8 3: 11.0 4: 5.2 5: 4.2

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: S A H: S M E A D2: S E A K: A

VDC efficiency
X1 98.0
U1 95.4
X2 97.4

D2 NMR

Run comment:  $^{24}\text{Mg}$  0.7 mg/cm<sup>2</sup>

Run #: 2025

Start: 08:03 Current: 4.4 nA Trigger rate: 172 Hz  
Stop: 08:05 CI Range: 6 nA Trigger evts: 673956  
Target:  $^{24}\text{Mg}$  thick

draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.657 2: 1.103 3: 1.156 4: 1.134 5: 1.293  
Si rates (kHz) 1: 16 2: 18 3: 24 4: 22 5: 17

K600 angle: 0 deg		Mental Health Level:
Q: S	A	😊 😊 😊
D1: A	A	
H: M	A	
D2: E	A	
K: A	A	
VDC efficiency		
X1	97.1	
U1	97.4	
X2	85.941	
D2 NMR		
1: 1.690	2: 1.117	3: 1.169
4: 1.168	5: 1.319	
Si leakages (uA)	1: 1.690	2: 1.117
Si rates (kHz)	1: 15.5	2: 17.6
4: 18.9	5: 14.4	
5: 17	3: 20.7	

$^{24}\text{Mg} \#3$

Run comment:  $^{24}\text{Mg} \#3$

Run #: 2025

Start: 08:08 Current: 4.3 nA Trigger rate: 190 Hz  
Stop: 09:21 CI Range: 6 nA Trigger evts: 904147  
Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.666 2: 1.097 3: 1.168 4: 1.128 5: 1.297  
Si rates (kHz) 1: 17.2 2: 18.0 3: 23.8 4: 21.6 5: 16.8

K600 angle: 0 deg		Mental Health Level:
Q: S	A	😊 😊 😊
D1: A	A	
H: M	A	
D2: E	A	
K: A	A	
VDC efficiency		
X1	93.8	
U1	96.6	
X2	94.6	
D2 NMR		
1: 4.7	2: 5.3	3: 11.1
4: 5.5	5: 4.8	
Si leakages (uA)	1: 4.7	2: 5.3
Si rates (kHz)	1: 18.0	2: 23.8
4: 21.6	5: 16.8	
5: 17.2	3: 1.168	

Mylar 6hg

Run comment: Mylar 6hg

Run #: 2026

Start: 09:31 Current: 4.6 nA Trigger rate: 170 Hz  
Stop: 09:55 CI Range: 6 nA Trigger evts: 287257909  
Target: Mylar #5

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 4.6 2: 5.1 3: 10.5 4: 5.3 5: 4.5  
Si rates (kHz) 1: 4.6 2: 5.1 3: 10.5 4: 5.3 5: 4.5

K600 angle: 0 deg		Mental Health Level:
Q: S	A	😊 😊 😊
D1: A	A	
H: M	A	
D2: E	A	
K: A	A	
VDC efficiency		
X1	94.9	
U1	96.9	
X2	93.9	
D2 NMR		
1: 4.0	2: 4.6	3: 1.167
4: 1.146	5: 1.322	
Si leakages (uA)	1: 4.0	2: 4.6
Si rates (kHz)	1: 14.7	2: 15.3
3: 20.1	4: 18.5	
4: 1.146	5: 14.5	
5: 16.0	3: 1.167	

Data  $^{24}\text{Mg}$

Run comment: Data  $^{24}\text{Mg}$

Run #: 2027

Start: 10:06 Current: 4.7 nA Trigger rate: 147 Hz  
Stop: 11:09 CI Range: 6 nA Trigger evts: 719289  
Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.671 2: 1.102 3: 1.152 4: 1.133 5: 1.302  
Si rates (kHz) 1: 15.0 2: 16.7 3: 19.2 4: 17.5 5: 13.9

K600 angle: 0 deg		Mental Health Level:
Q: S	A	😊 😊 😊
D1: A	A	
H: M	A	
D2: E	A	
K: A	A	
VDC efficiency		
X1	94.7	
U1	97.2	
X2	94.5	
D2 NMR		
1: 1.302	2: 1.302	3: 1.302
4: 1.302	5: 1.302	
Si leakages (uA)	1: 1.671	2: 1.102
Si rates (kHz)	1: 15.0	2: 16.7
3: 19.2	4: 17.5	
5: 13.9	3: 1.152	

→ filled LEPS 11:15

$^{24}\text{Mg}$  data

Run comment:  $^{24}\text{Mg}$  data

Run #: 2028

Start: 11:25 Current: 4.2 nA Trigger rate: 195 Hz

Stop: 12:38 CI Range: 6 nA Trigger evts: 869336

Target:  $^{24}\text{Mg}$  Scaler evts: 4233

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.690 2: 1.117 3: 1.169 4: 1.168 5: 1.319

Si rates (kHz) 1: 15.5 2: 17.6 3: 20.7 4: 18.9 5: 14.4

K600 angle: 0 deg

Mental Health Level:

😊 😊 😊

VDC efficiency

X1 93.5

U1 97.0

X2 75.0

$^{24}\text{Mg}$  data Mylar 6hg

Run comment:  $^{24}\text{Mg}$  data Mylar 6hg

Run #: 2029

Start: 12:44 Current: 5.2 nA Trigger rate: 199 Hz

Stop: 13:06 CI Range: 20 nA Trigger evts:

Target: Mylar #5 Scaler evts:

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 4.7 2: 5.3 3: 11.1 4: 5.5 5: 4.8

Si rates (kHz) 1: 18.0 2: 23.8 3: 21.6 4: 16.8 5: 17.2

K600 angle: 0 deg

Mental Health Level:

😊 😊 😊

VDC efficiency

X1 93.5

U1 92.3

X2 95.4

$^{24}\text{Mg}$  data

Run comment:  $^{24}\text{Mg}$  data

Run #: 2030

Start: 13:08 Current: 4.0 nA Trigger rate: 156 Hz

Stop: 14:27 CI Range: 20 nA Trigger evts: 856477

Target:  $^{24}\text{Mg}$  Scaler evts: 4544

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.694 2: 1.116 3: 1.167 4: 1.146 5: 1.322

Si rates (kHz) 1: 14.7 2: 15.3 3: 20.1 4: 18.5 5: 14.5

K600 angle: 0 deg

Mental Health Level:

😊 😊 😊

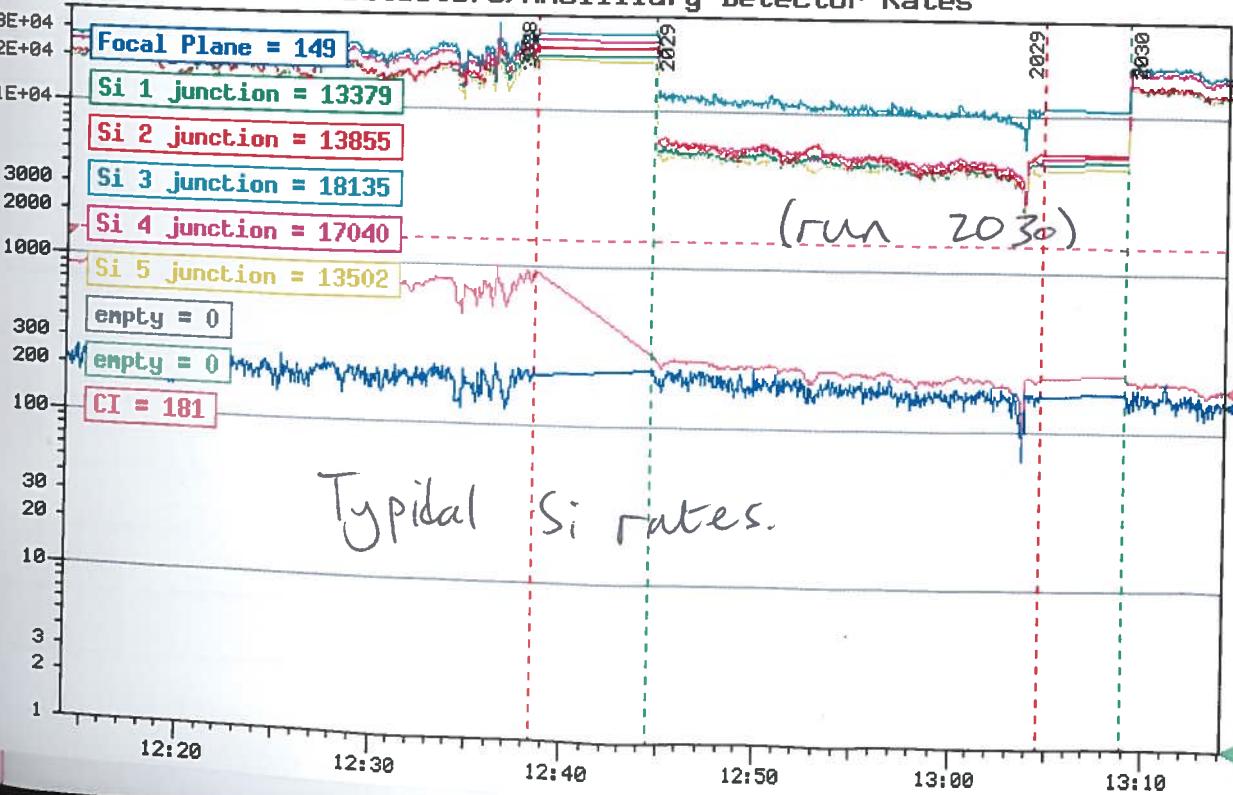
VDC efficiency

X1 94.7

U1 97.2

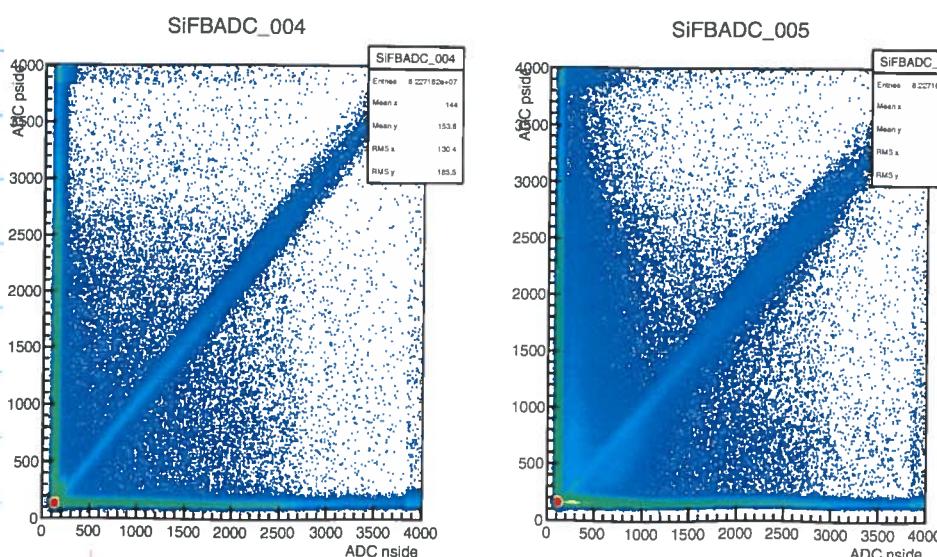
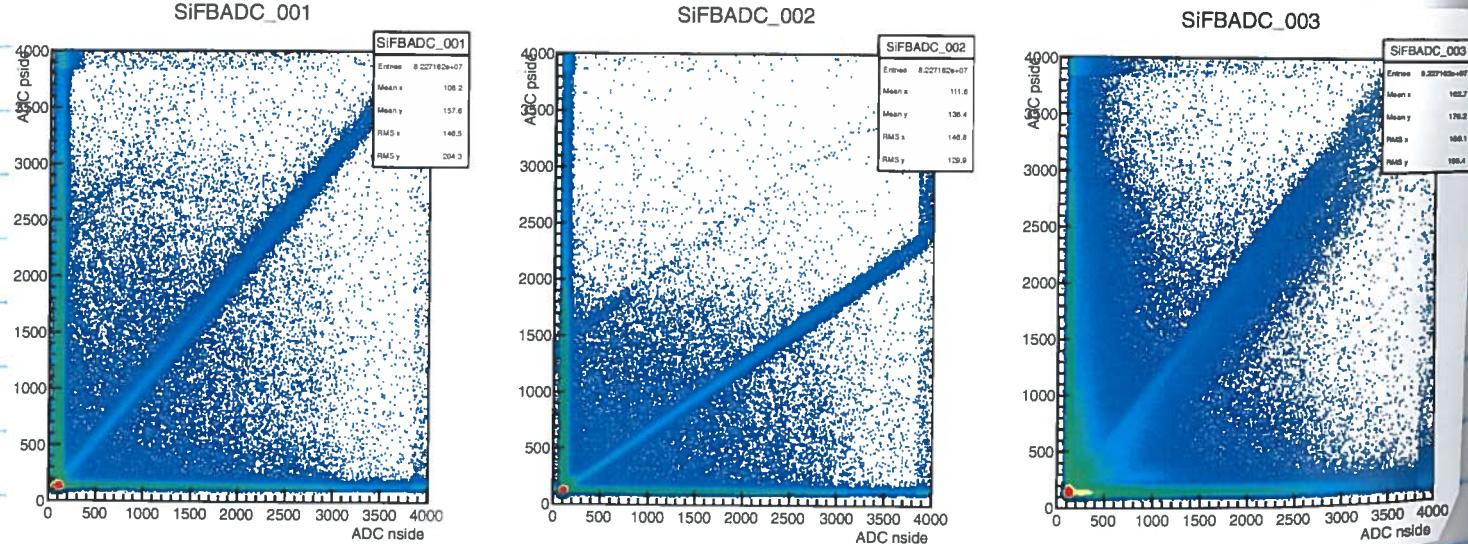
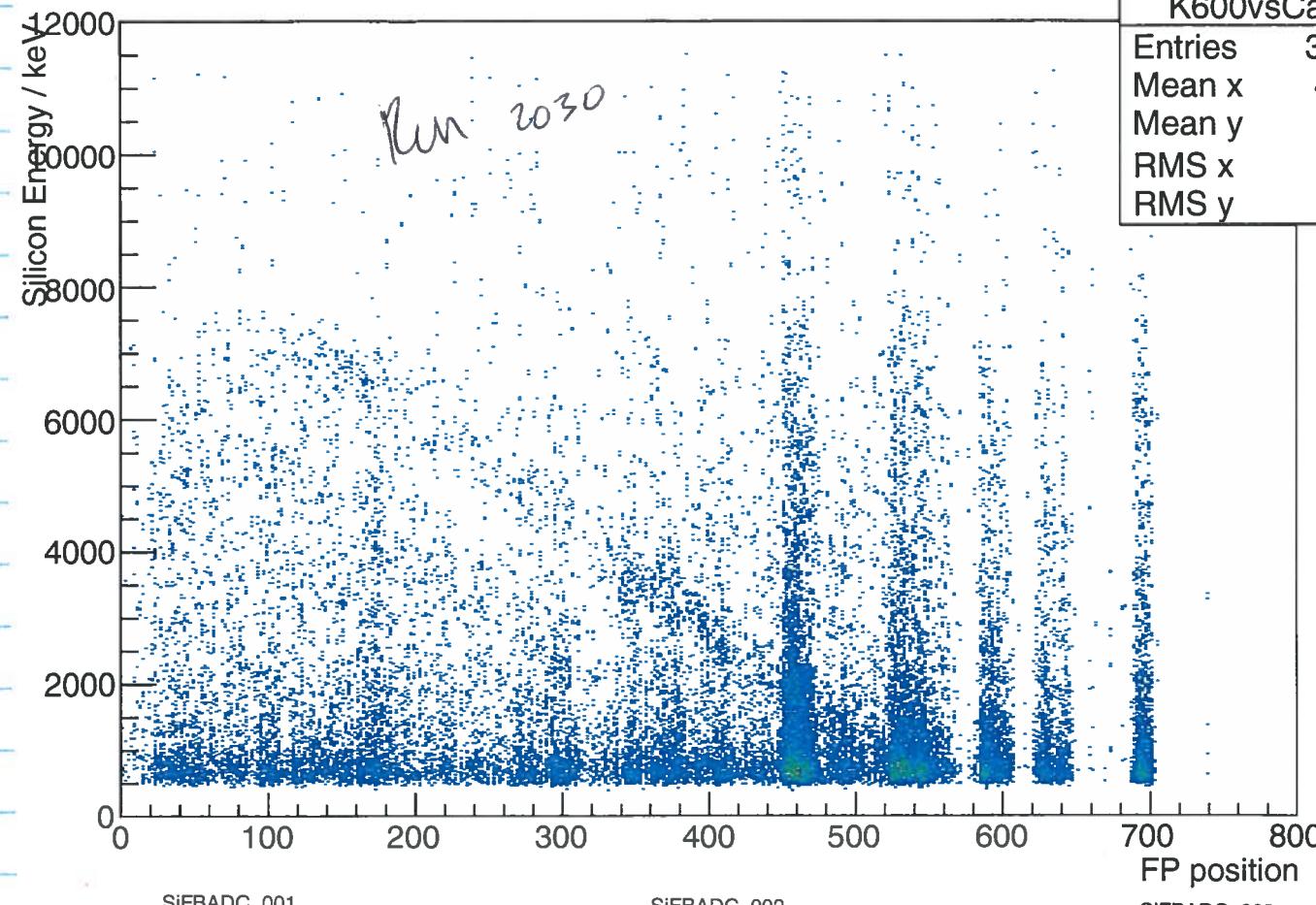
X2 96.0

### AncDetectors/Ancillary Detector Rates



# K600 position vs Si Calibrated E

129



Run 2030

K600vsCal  
Entries 38  
Mean x 4  
Mean y 1  
RMS x 1  
RMS y 1

- 4 June 2016 : (13:4)

Quad -439.441 A  
D1 391.410  
H -29.317  
D2 389.967  
K 6.342

Quad 65 22.5 A

VDC 1 -3.56 uV  
VDC 2 -3.65 uV

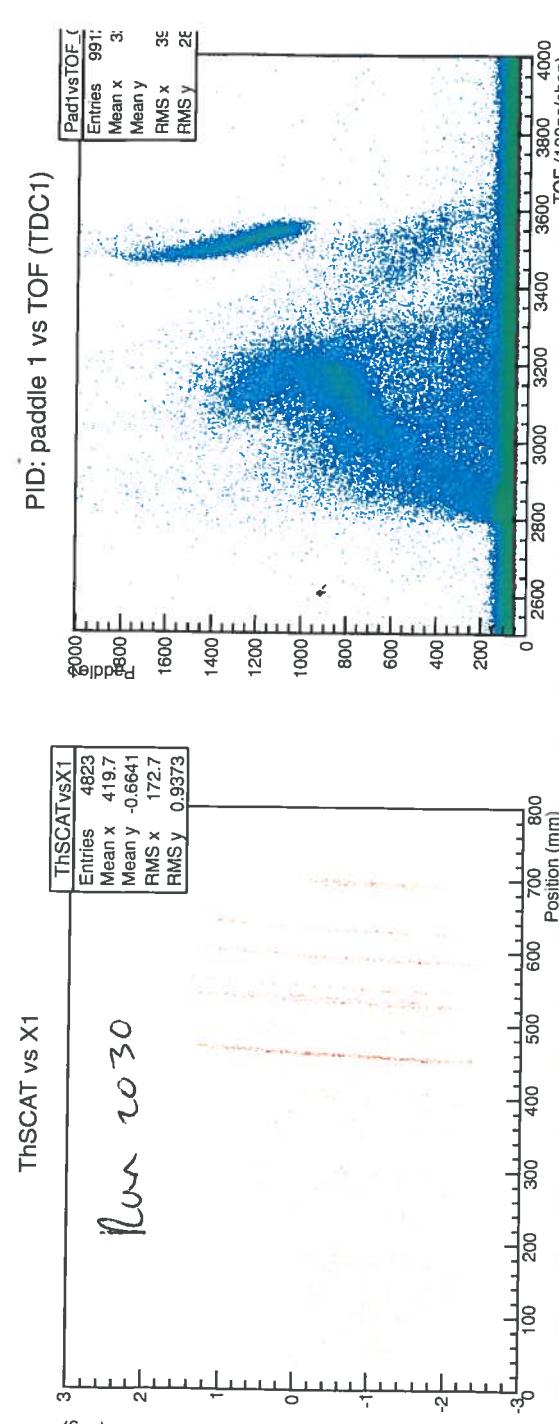
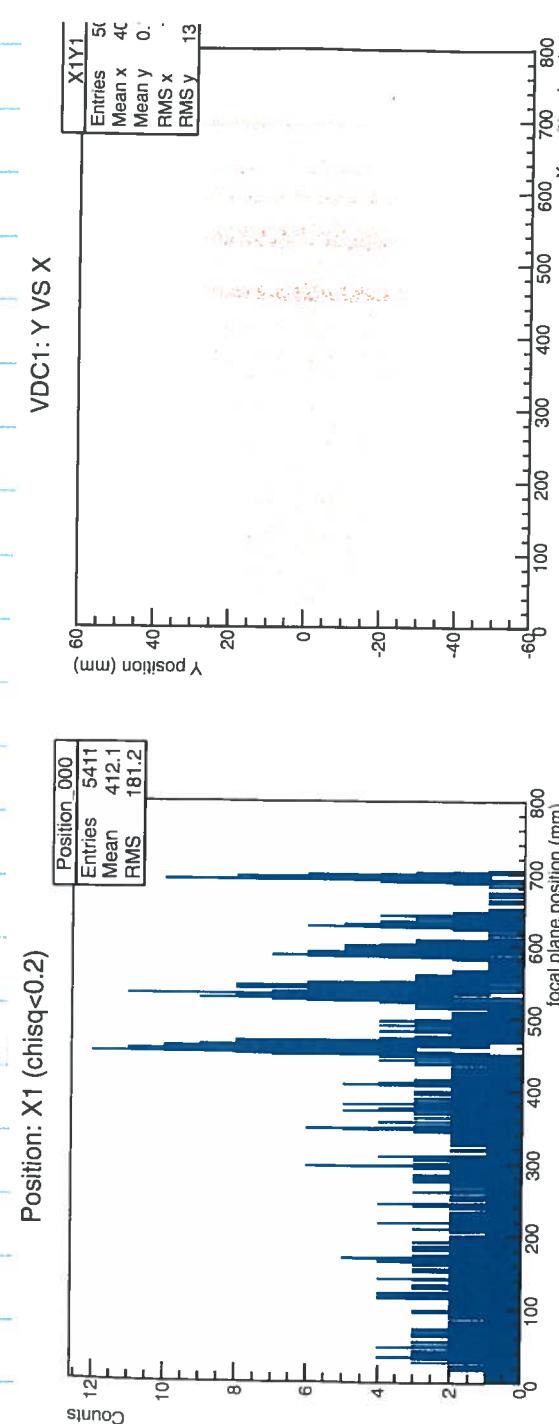
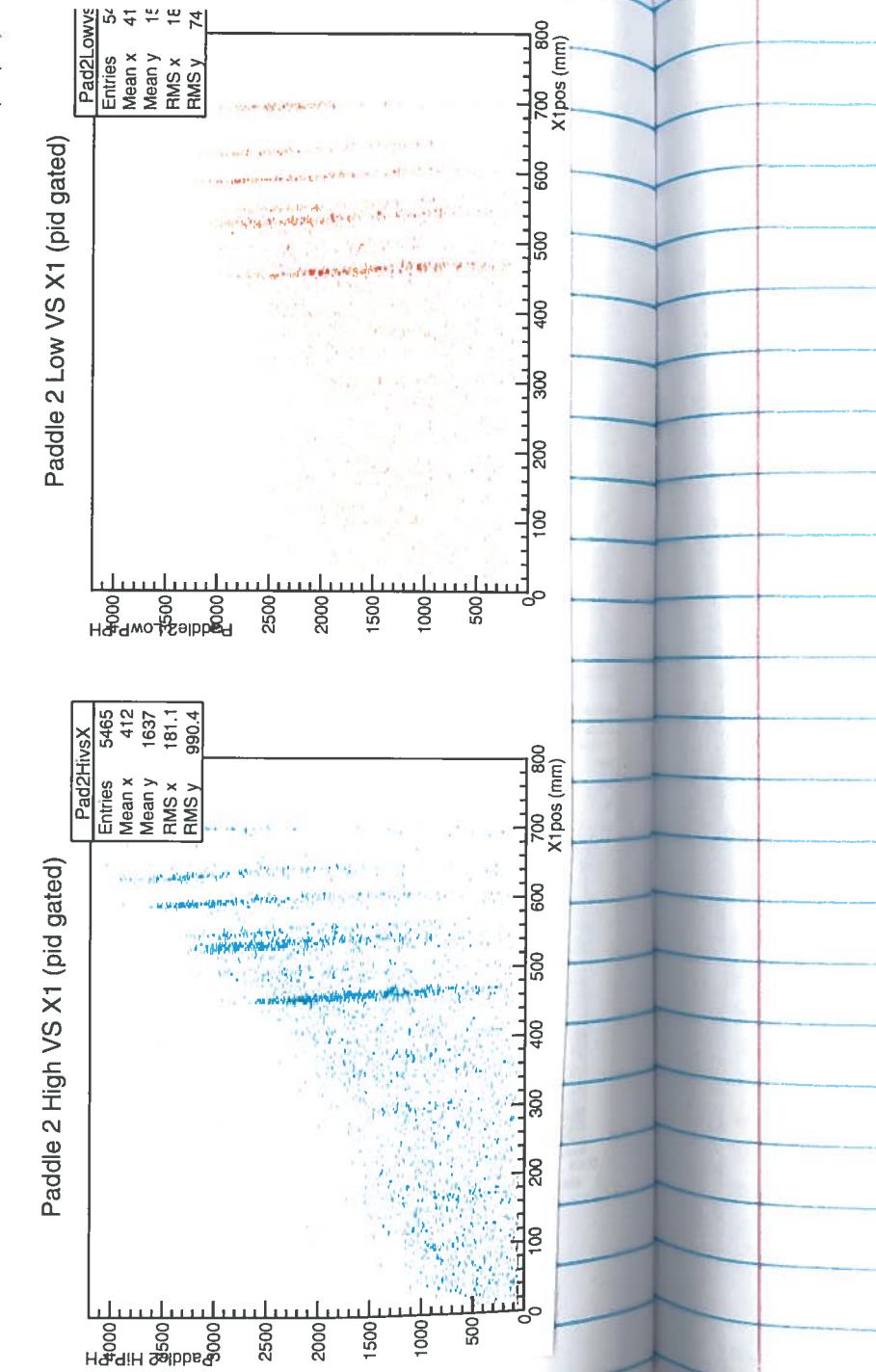
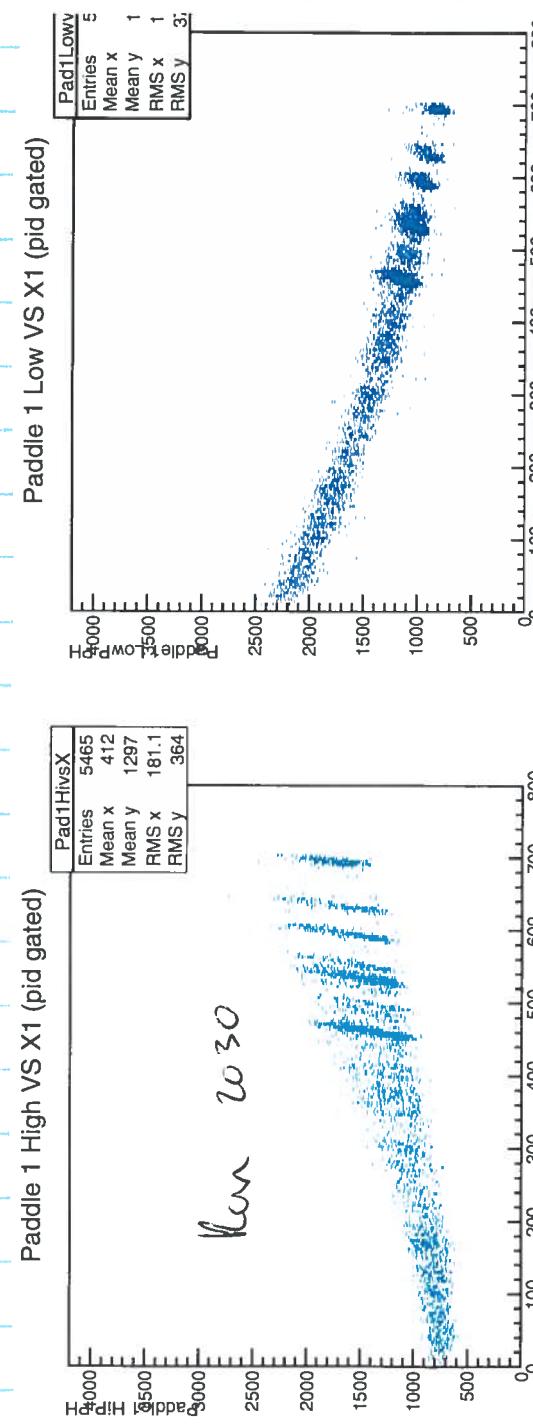
Pad1 HiP 1460 V  
LoP 1450  
Pad2 HiP 1400  
LoP 1600

Thresholds:

X1 10 V  
U1 9.4  
X2 9.0

Run comment: <sup>24</sup>Mg data  
Run #: 2031  
Start: 14:29 Current: 4.9 nA Trigger rate: 206 Hz  
Stop: 15:07 CI Range: 20 nA Trigger evts: 329018  
Target: <sup>24</sup>Mg Scaler evts: 2196  
draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
Si leakages (uA) 1: 1.693 2: 1.118 3: 1.170 4: 1.150 5: 1.323  
Si rates (kHz) 1: 18.0 2: 19.2 3: 25.1 4: 24.0 5: 18.4

K600 angle: 0 deg	Mental Health Level:
Q: S A	😊 😐 😞
D1: A A	
H: M A	
D2: E A	
K: A	
D2 NMR	
VDC efficiency X1 94.3	
U1 96.4	
X2 94.2	



-lost beam for 9 minutes @ 14:59.

Run comment: Mylar bkg

Run #: 2032

Start: 15:12 Current: 3.8 nA Trigger rate: 209 Hz  
Stop: 15:25 CI Range: 20 nA Trigger evts: 153048  
Target: Mylar #5 Scaler evts: 793

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 5.0 2: 5.7 3: 11.6 4: 5.8 5: 4.9

Si rates (kHz) 1: 50 2: 5.7 3: 11.6 4: 5.8 5: 4.9

K600 angle: 0 deg

Mental Health Level:

Q: A D1: S A H: M A D2: E A K: E A

VDC efficiency

X1 94.3

U1 90.4

X2 92.5

D2 NMR

K600 angle: 0 deg

Mental Health Level:

Q: A D1: S A H: M A D2: E A K: E A

VDC efficiency

X1 93.3

U1 91.9

X2 96.6

133

- Interlock o'clock. Started new background run.

Si rates (kHz) 1: \_\_\_\_\_

Run comment: Mylar bkg

Run #: 2033

Start: 15:29 Current: 4.2 nA Trigger rate: 180 Hz  
Stop: 16:00 CI Range: 20 nA Trigger evts: 33  
Target: Mylar #5 Scaler evts: 1631

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 6.81 2: 1.119 3: 1.169 4: 1.150 5: 1.314

Si rates (kHz) 1: 4.8 2: 5.1 3: 10.2 4: 5.2 5: 4.5

K600 angle: 0 deg

Mental Health Level:

Q: A D1: S A H: M A D2: C A K: C A

VDC efficiency

X1 93.0

U1 92.1

X2 94.9

D2 NMR

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.4

U1 96.5

X2 96.8

$^{26}\text{Mg}$  Data

Run #: 2034

Start: 16:05 Current: 4.3 nA Trigger rate: 180 Hz  
Stop: 17:07 CI Range: 20 nA Trigger evts: 719393  
Target:  $^{26}\text{Mg}$  Scaler evts: 3627

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 13.7 2: 15.0 3: 19.5 4: 18.5 5: 14.5

Si rates (kHz) 1: 13.7 2: 15.0 3: 19.5 4: 18.5 5: 14.5

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.8

U1 96.8

X2 95.4

D2 NMR

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.4

U1 97.0

X2 97.2

$^{24}\text{Mg}$  data

Run comment:  $^{24}\text{Mg}$  data

Run #: 2035

Start: 17:10 Current: 4.7 nA Trigger rate: 194 Hz  
Stop: 18:16 CI Range: 20 nA Trigger evts: 682176  
Target:  $^{24}\text{Mg}$  Scaler evts: 3832

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.700 2: 1.119 3: 1.170 4: 1.150 5: 1.327

Si rates (kHz) 1: 17.0 2: 18.8 3: 23.6 4: 22.5 5: 16.9

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 95.0

U1 97.3

X2 97.3

D2 NMR

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.6

U1 97.0

X2 95.7

Run comment: Bkg check

Run #: 2036

Start: 18:20 Current: 4.6 nA Trigger rate: 172 Hz  
Stop: 18:42 CI Range: 20 nA Trigger evts: 220452  
Target: Mylar #5 Scaler evts: 1264

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 4.8 2: 5.4 3: 10.4 4: 5.4 5: 4.5

Si rates (kHz) 1: 4.8 2: 5.4 3: 10.4 4: 5.4 5: 4.5

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 93.3

U1 91.9

X2 96.6

$^{24}\text{Mg}$  data

Run #: 2037

Start: 18:46 Current: 3.6 nA Trigger rate: 183 Hz  
Stop: 19:51 CI Range: 20 nA Trigger evts: 662838  
Target:  $^{24}\text{Mg}$  Scaler evts: 3790

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.702 2: 1.12 3: 1.172 4: 1.152 5: 1.329

Si rates (kHz) 1: 16.4 2: 17.5 3: 23.0 4: 22.1 5: 17.2

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.4

U1 96.5

X2 96.8

$^{24}\text{Mg}$  data

Run #: 2038

Start: 19:53 Current: 3.6 nA Trigger rate: 159 Hz  
Stop: 20:55 CI Range: 20 nA Trigger evts: 630530  
Target:  $^{24}\text{Mg}$  Scaler evts: 3570

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.687 2: 1.11 3: 1.160 4: 1.141 5: 1.324

Si rates (kHz) 1: 13.2 2: 14.6 3: 18.2 4: 17.5 5: 13.3

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: A A

VDC efficiency

X1 94.4

U1 97.0

X2 97.2

Bkg check

Run #: 2039

Start: 21:01 Current: 3.8 nA Trigger rate: 152 Hz  
Stop: 21:29 CI Range: 20 nA Trigger evts: 760077  
Target: Mylar #5 Scaler evts: 1633

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 3.9 2: 4.6 3: 9.5 4: 4.7 5: 4.1

Si rates (kHz) 1: 3.9 2: 4.6 3: 9.5 4: 4.7 5: 4.1

K600 angle: 0 deg

Mental Health Level:

Q: S A D1: A A H: M A D2: E A K: E A

VDC efficiency

X1 94.0

U1 92.1

X2 96.9

$^{24}\text{Mg}$  Data

Run #: 2040

Start: 21:33 Current: 4.0 nA Trigger rate: 150 Hz  
Stop: 22:33 CI Range: 20 nA Trigger evts: 635956  
Target:  $^{24}\text{Mg}$  Scaler evts: 3508

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0() OK? Yes

Run comment:  $^{24}\text{Mg}$  data

Run #: 2041  
 Start: 22:37 Current: 3.9 nA Trigger rate: 182 Hz  
 Stop: 23:35 CI Range: 20 nA Trigger evts: 631116  
 Target:  $^{24}\text{Mg}$  Scaler evts: 1402  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.700 2: 1.121 3: 1.172 4: 1.152 5: 1.377  
 Si rates (kHz) 1: 15.3 2: 16.9 3: 19.6 4: 20.8 5: 16.2

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: SA A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 93.9624  
 U1 96.8994  
 X2 96.4119  
 D2 NMR

Run comment: BACK GROUND

Run #: 2045  
 Start: 02:02 Current: 4.0 nA Trigger rate: 198.9 Hz  
 Stop: 02:22 CI Range: 20 nA Trigger evts: 235095  
 Target: Mylar #5 Scaler evts: 1130  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.692 2: 1.110 3: 1.159 4: 1.141 5: 1.330  
 Si rates (kHz) 1: 3.107 2: 5.473 3: 8.059 4: 4.245 5: 3.461

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 92.9226  
 U1 96.1388  
 X2 94.4249  
 D2 NMR

Run comment: BACKGROUND

Run #: 2042  
 Start: 23:41 Current: 3.3 nA Trigger rate: 142 Hz  
 Stop: 23:51 CI Range: 20 nA Trigger evts: 83042  
 Target: Mylar #5 Scaler evts: 539  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.687 2: 1.126 3: 1.172 4: 1.153 5: 1.335  
 Si rates (kHz) 1: 16.517 2: 6.331 3: 9.584 4: 5.667 5: 4.758

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: SA A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 93.7747  
 U1 90.3729  
 X2 94.9189  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  data | No Frontend  
 Run #: 2046  
 Start: 02:25 Current: nA Trigger rate: 215.8 Hz  
 Stop: 02:37 CI Range: 20 nA Trigger evts:  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts:  
 draw\_me\_frontback() OK? draw\_me\_TDC2D0 OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.693 2: 1.119 3: 1.169 4: 1.150 5: 1.334  
 Si rates (kHz) 1: 2: 3:

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 JUNK  
 U1  
 X2  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  data

Run #: 2043  
 Start: 23:56 Current: 3.6 nA Trigger rate: 182.5 Hz  
 Stop: 00:56 CI Range: 20 nA Trigger evts: 821993  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3510  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.697 2: 1.122 3: 1.172 4: 1.151 5: 1.333  
 Si rates (kHz) 1: 16.445 2: 17.995 3: 21.102 4: 20.519 5: 16.127

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 95.134  
 U1 96.2827  
 X2 96.084  
 D2 NMR

X X X  
 Event rate dropped to zero. Stopped run. Get message (Frontend stopped) in red. Restarted run 2047 but the frontend remains red. Restarted DAQ. Started run #2048 but event rate still zero. Stopped run. Woke Kevin up + phoned Phil.

[Yorick.tlabs.ac.za]

Run comment:  $^{24}\text{Mg}$  data

Run #: 2044  
 Start: 00:59 Current: 4.6 nA Trigger rate: 336.6 Hz  
 Stop: 01:59 CI Range: 20 nA Trigger evts: 787708  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3456  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.702 2: 1.122 3: 1.173 4: 1.153 5: 1.339  
 Si rates (kHz) 1: 15.325 2: 15.500 3: 17.804 4: 18.472 5: 16.507

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: A  
 VDC efficiency  
 X1 93.7645  
 U1 96.8687  
 X2 96.9384  
 D2 NMR

The current hypothesis with regards to the event rate drop is that there was ~~an~~ after a mis-alignment with regards to even number provided by the APC-modules. This was therefore not rectifiable through  $\phi$ .

Run 2052 - Test on

-lose spike in run rate for  
Reset  
 Run number 2052

Run resumed.

Slow run was short and first after  
 the VME restart, consider discarding the  
run

Run 2053 ~~Test run with no target~~

↳ Reason is the background may be  
 quite high.

(MT run)

> 1000 events/s on MT!

↳ going for "beam tuning" now,

Tuned Halo on empty frame.  
 $\approx$  40 counts per nA

Run 2054 Junk run. Also RF Trip.  
 Halo now better

Run comment: <sup>24</sup>Mg data

Run #:	2054	Current:	3.6 nA	Trigger rate:	166 Hz
Start:	03:39	Stop:	03:43	CI Range:	20 nA
Target:					
draw_me_frontback() OK?	No				
draw_me_TDC2D0 OK?					
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No					
Si leakages (uA)	1: 1.686	2: 1.109	3: 1.158	4: 1.140	
Si rates (kHz)	1: _____	2: _____	3: _____	4: _____	

K600 angle: 0 deg  
 Mental Health Level:  
    
 VDC efficiency  
 X1 \_\_\_\_\_  
 U1 \_\_\_\_\_  
 X2 \_\_\_\_\_

5: 1.326  
 5: \_\_\_\_\_

STOPPED and started new run.

Run 2055 - junk Run 2054 also junk  
 (the "Go" did not go, thus the target  
 remained the empty frame. Target to position #3

Run comment: <sup>24</sup>Mg

Run #:	2056	Current:	4.2 nA	Trigger rate:	166 Hz
Start:	04:00	Stop:	04:20	CI Range:	20
Target:	<u><sup>24</sup>Mg #3</u>				
draw_me_frontback() OK?	YES				
draw_me_TDC2D0 OK?	YES				
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No					
Si leakages (uA)	1: 1.690	2: 1.122	3: 1.172	4: 1.154	
Si rates (kHz)	1: 16.115	2: 17.904	3: 20.590	4: 21.785	

K600 angle: 0 deg  
 Mental Health Level:  
    
 VDC efficiency  
 X1 95.03  
 U1 96.4363  
 X2 94.521  
 5: 1.333  
 5: 16.878

Now things look normal after

- 1) VME restart
- 2) DAQ restart
- 3) Halo tune
- 4) RF recovery
- 5) Putting the actual target in (#3)

Runs 2046 → 2055 are all junk. Run  
 # 2056 is good. OR NOT!  
 Mit lost in group 3 from Li<sup>+</sup> buffer overflow  
 TDC Module [3], TDC chip [2]. I don't  
 know if this is serious — decided to stop  
 Run # 2056 and restart.

Run comment:  $^{24}\text{Mg}$  data

Run #: 2057

Start: 06:23 Current: 6.2 nA Trigger rate: 184 Hz

Stop: 05:22 CI Range: 20 nA Trigger evts: 543383

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3423

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.698 2: 1.124 3: 1.174 4: 1.155

Si rates (kHz) 1: 9.776 2: 11.797 3: 12.506 4: 13.003

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 94.8195

U1 96.966

X2 93.1646

D2 NMR

5: 1.338

5: 10.131

Run comment:  $^{24}\text{Mg}$  data

Run #: 2058

Start: 05:24 Current: 2.2 nA Trigger rate: 182 Hz

Stop: 06:24 CI Range: 20 nA Trigger evts: 580541

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3469

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.699 2: 1.120 3: 1.170 4: 1.151

Si rates (kHz) 1: 17.425 2: 27.201 3: 30.708 4: 28.783

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 94.9363

U1 97.037

X2 92.2982

D2 NMR

5: 1.338

5: 20.947

Run comment: Background

Run #: 2059

Start: 06:29 Current: 5.0 nA Trigger rate: 192 Hz

Stop: 06:47 CI Range: 20 nA Trigger evts: 189710

Target: Mylar #5 Scaler evts: 1053

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.690 2: 1.114 3: 1.162 4: 1.144

Si rates (kHz) 1: 5.287 2: 8.022 3: 11.396 4: 7.106

K600 angle: 0 deg

Q: S A

D1: M A

H: E A

D2: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 96.1284

U1 90.6695

X2 91.5395

D2 NMR

5: 1.335

5: 5.854

Run comment:  $^{24}\text{Mg}$  data

Run #: 2060

Start: 06:53 Current: 4.2 nA Trigger rate: 200 Hz

Stop: 07:43 CI Range: 20 Trigger evts: 501883

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 2949

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.701 2: 1.126 3: 1.176 4: 1.158

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 95.0264

U1 96.9915

X2 92.3679

D2 NMR

5: 1.342

Blew gone - run stopped

Run comment:  $^{24}\text{Mg}$  data

Run #: 2061

Start: 07:53 Current: 2.4 nA Trigger rate: 147 Hz

Stop: 08:53 CI Range: 20 Trigger evts: \_\_\_\_\_

Target:  $^{24}\text{Mg}$  #3 Scaler evts: \_\_\_\_\_

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.705 2: 1.124 3: 1.171 4: 1.155

Si rates (kHz) 1: 13.451 2: 17.237 3: 21.483 4: 22.258

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

X2 \_\_\_\_\_

D2 NMR

5: 1.342

5: 16.692

Run comment:  $^{24}\text{Mg}$  data

Run #: 2061

Start: 07:53 Current: 2.4 nA Trigger rate: 147 Hz

Stop: 08:53 CI Range: 20 Trigger evts: \_\_\_\_\_

Target:  $^{24}\text{Mg}$  #3 Scaler evts: \_\_\_\_\_

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.705 2: 1.124 3: 1.171 4: 1.155

Si rates (kHz) 1: 13.451 2: 17.237 3: 21.483 4: 22.258

K600 angle: 0 deg

Q: S A

D1: M A

H: E A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

X2 \_\_\_\_\_

D2 NMR

5: 1.342

5: 16.692

\* Intermittent rate event, could be related with the TDC error.

Run comment:  $^{24}\text{Mg}$  data

Run #: 2062

Start: 09:29 Current: 4.1 nA Trigger rate: 167 Hz

Stop: 10:32 CI Range: 20 nA Trigger evts: 646738

Target:  $^{24}\text{Mg}$  Scaler evts: 3666

draw\_me\_frontback() OK? YES draw\_me\_TDC2D0 OK? YES

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.706 2: 1.128 3: 1.178 4: 1.157

Si rates (kHz) 1: 18.8 2: 37.2 3: 38.2 4: 33.0

K600 angle: 0 deg

Q: S A

D1: M A

H: E A

D2: E A

K: A A

Mental Health Level:

😊 😊 😥

VDC efficiency

X1 96.3

U1 97.2

X2 97.1

→ Normal running resumed. Halo on SiFBADC spectra look acceptable (as before).

→ Took out X2-2 & X2-4 (TDC module 003 channels 48-63 & 80-95) since error said TDCModule[3]. Look in TDC003 spectrum and saw 2 sets of channels completely saturated. Unplugged & plugged corresponding preamps (while all power to VDCs were off).

first error occurrence:

Sun Jun 5 04:05:37 2016 [h600fevme, ERROR]  
 [h600fevme.c:1778: sortTDCData, ERROR]  
 TDC-ERROR: hit lost in group 3 (z) from L1  
 buffer overflow TDC Module [3], TDC Chip [z].

Error continued until 08:50:40.

Run comment: Normal data

Run #: 2063  
 Start: 10:34 Current: 3.6 nA Trigger rate: 165 Hz  
 Stop: 10:57 CI Range: 20 nA Trigger evts: 215831  
 Target:  $^{26}\text{Mg}$  Scaler evts: 1354  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.710 2: 1.122 3: 1.172 4: 1.153 5: 1.346  
 Si rates (kHz) 1: 15.2 2: 46.8 3: 522 4: 32.1 5: 22.6

K600 angle: 0 deg  
 Mental Health Level:  
 Q: A D1: S A H: M A D2: E A K: A  
 VDC efficiency X1: 93.9 U1: 97.3 X2: 98.0  
 D2 NMR

\*\* EnMet Ver5.7 Oct 2013 \*\* Energie\_NMR.txt

\*\* BEREKENDE ENERGIE \*\*\*\* CALCULATED ENERGY \*\*

2016/06/05

Versnelde deeltje

Accelerated particle :  
 Element = H  
 Atoomgetal = Atomic Number = 1  
 Massagetal = Mass Number = 1  
 Rel. Atoommassa = Rel. Atomic Mass = 1.00782  
 Natuurlike voorkoms = Natural Abundance = 99.98 %  
 Ladingsgetal Q = Charge State Q = 1

1 Tesla = 42.5759 MHz [Linear Relation]

BEAM ENERGY FROM NMR-READING/S (frequency) :

BEAM ENERGY FROM NMR-READING/S (field):

B3P Beam Energy = 99.63 MeV from NMR = 0.74006 Tesla

Page 109 → Was 99.63 MeV.  
 99.  
 98.59.

The beam went. Looks like a slight shift in the beam energy.

$98.59 \rightarrow 99.63$  MeV.

Need to check that the field change is OK.

Spec'd: 98.59 MeV  $\rightarrow$  D1 268.01 A  
 99.63 MeV  $\rightarrow$  D1 269.49 A  $\Rightarrow$  1.5 A shift

D1 is currently: 391.41 A  
 Increase by 1.5 A

To 392.91 A.

$Q: -441.125 \text{ A}$   
 $D1: 392.91 \text{ A}$   
 $H: -29.439 \text{ A}$   
 $D2: 391.462 \text{ A}$   
 $K: 6.367 \text{ A}$

$O_n 4S \rightarrow 1 \text{ nA}$

Into spectro  $0.8 \text{ nA}$ .

$150 \text{ Hz}$  for  $1 \text{ nA}$ .

13-15 Now  $50 \text{ Hz}$  for  $1 \text{ nA}$ .

No quads have changed.

B1P+B3P up ~ ft

$D: 183000 \text{ V}$

Going to put  $^{24}\text{Mg} \#3$  in.  
1 nA

Ran 2064.  $50 \text{ Hz}$ .

Now turned VDCs on.

Need to change the delay a  
bit.  
↳ Done.

New ODB gates

ToF: ~~[3620, 3700]~~

Pad1: [850, 1900]

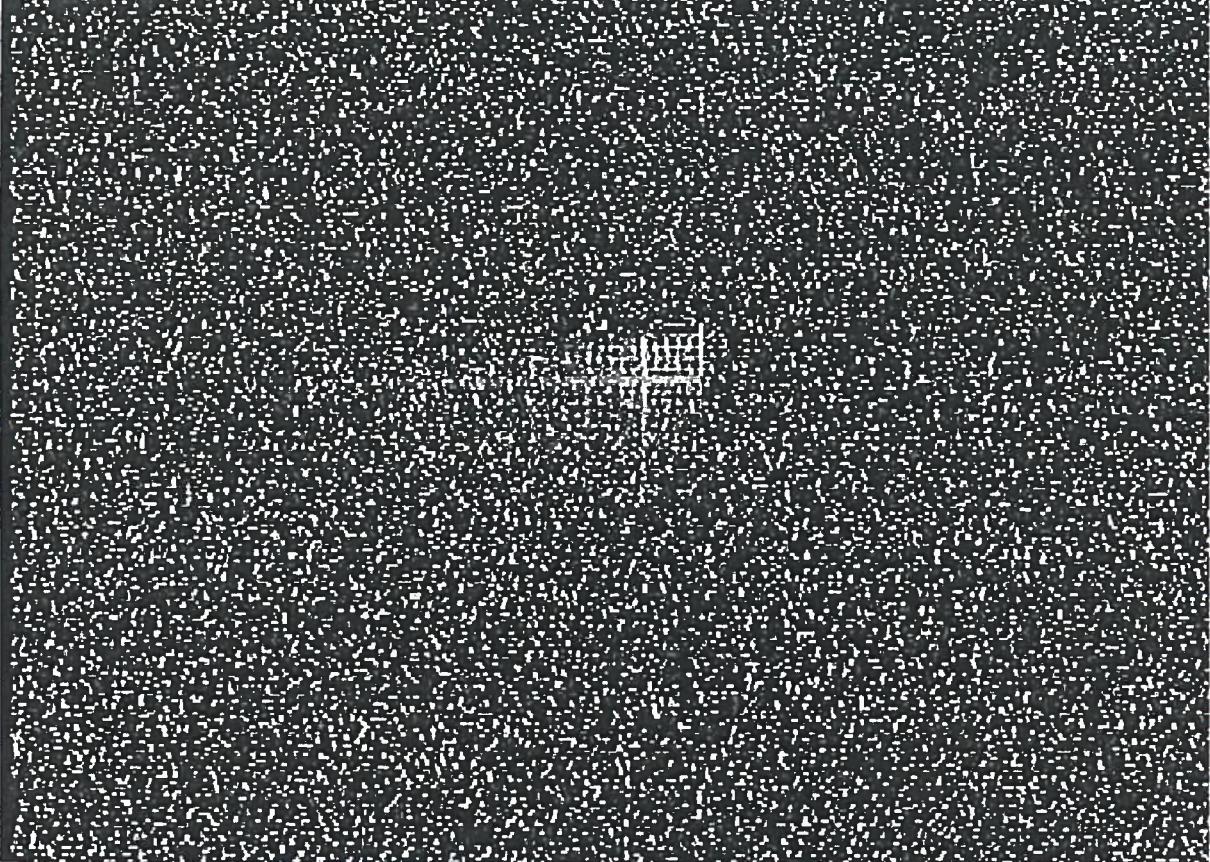
ToF: [3360, 3460]

Stopped, now that we're happy  
with the ToF.

MOAR BEEM.

S - Line Mesh

12:26:05 PM 06.05.2016



S - Line Target

12:25:47 PM 06.05.2016

Run comment: <sup>24</sup>Mg #3Run #: 2065Start: 13:27Stop: Target: <sup>24</sup>Mg #3

draw\_me\_frontback() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

Si rates (kHz)

Current: 5

nA

Trigger rate: 200 HzCl Range: 20n

Trigger evts:

Scaler evts:

draw\_me\_TDC2D() OK?

Si: /2: /3: /4: /5: /Si: /2: /3: /4: /5: /

K600 angle: 0 deg

Q:  AD1:  AH:  AD2:  AK:  A

D2 NMR

Mental Health Level:

😊 😊 😕

VDC efficiency

X1 96U1 96X2 99

Run comment: Try to get good data again

Run #: 2066Start: 13:52Stop: 14:53Target: <sup>24</sup>Mg

draw\_me\_frontback() OK?

Yes

draw\_me\_TDC2D() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

Si rates (kHz)

Current: 3.5

nA

Trigger rate: 178 HzCl Range: 20 nATrigger evts: 649941Scaler evts: 3597Si: /2: /3: /4: /5: /Si: /2: /3: /4: /5: /

K600 angle: 0 deg

Q: See AD1:  AH: below AD2:  AK:  A

D2 NMR

Mental Health Level:

😊 😊 😕

VDC efficiency

X1 93.9U1 97.8X2 97.3

⇒ 2064, 2065 for tuning purposes. Delay changed frequently during run ∵ don't analyse.

05 June 2016 (14:03)

Q

-441.125 A

D1

392.910

H

-29.429

D2

391.462

L

6.367

VDC, paddle voltages & thresholds are as noted on p 129.

Q6S 22.5

Cup fell in @ 2:16 pm.  
Recovered ~ 1 min later.

for analysis

Run comment: Bkg run  
 Run #: 2067  
 Start: 14:56 Current: 4.6 nA Trigger rate: 184 Hz  
 Stop: 15:24 CI Range: 20 nA Trigger evts: 263961  
 Target: Mylar  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.785 2: 1.228 3: 1.287 4: 1.250  
 Si rates (kHz) 1: 4.5 2: 5.0 3: 8.1 4: 5.6  
 5: 4.6

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 95.9  
 U1 95.1  
 X2 94.9  
 D2 NMR

Run comment: Normal data run  
 Run #: 2068  
 Start: 15:28 Current: 3.4 nA Trigger rate: 148 Hz  
 Stop: 16:29 CI Range: 20 nA Trigger evts: 603566  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.783 2: 1.234 3: 1.303 4: 1.264  
 Si rates (kHz) 1: 13.1 2: 14.7 3: 15.0 4: 17.1  
 5: 14.0 6: 13.2

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 94.7  
 U1 97.7  
 X2 96.9  
 D2 NMR

-Si rates very stable.  
 Run comment: Data run  
 Run #: 2069  
 Start: 16:31 Current: 3.7 nA Trigger rate: 152 Hz  
 Stop: 17:38 CI Range: 20 nA Trigger evts: 717422  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 13.8 2: 14.7 3: 15.4 4: 17.9  
 Si rates (kHz) 1: 13.8 2: 14.7 3: 15.4 4: 17.9  
 5: 14.0

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 93.7  
 U1 97.5  
 X2 97.1  
 D2 NMR

Run comment: Bkg run  
 Run #: 2070  
 Start: 17:42 Current: 4.6 nA Trigger rate: 191 Hz  
 Stop: 18:03 CI Range: 20 nA Trigger evts: 232460  
 Target: Mylar  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.775 2: 1.223 3: 1.240 4: 1.252  
 Si rates (kHz) 1: 4.9 2: 5.3 3: 7.5 4: 6.6  
 5: 5.2

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 94.4  
 U1 97.1  
 X2 96.4  
 D2 NMR

Run comment: Data run with 24Mg  
 Run #: 2071  
 Start: 18:06 Current: 4.1 nA Trigger rate: 170 Hz  
 Stop: 19:11 CI Range: 20 nA Trigger evts: 657619  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.742 2: 1.237 3: 1.301 4: 1.262  
 Si rates (kHz) 1: 13.7 2: 14.1 3: 15.0 4: 17.6  
 5: 14.8 6: 13.8

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 93.9  
 U1 97.6  
 X2 96.9  
 D2 NMR

Run comment: My data  
 Run #: 2072

Start: 19:14 Current: 4.5 nA Trigger rate: 180 Hz  
 Stop: 20:24 CI Range: 20 nA Trigger evts: 66677697  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.785 2: 1.228 3: 1.287 4: 1.250  
 Si rates (kHz) 1: 16.4 2: 17.1 3: 17.6 4: 10.4  
 5: 16.4

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 96.9  
 U1 97.2  
 X2 97.0  
 D2 NMR

147

Run comment: Mylar Bkg check  
 Run #: 2073

Start: 20:29 Current: 3.9 nA Trigger rate: 162 Hz  
 Stop: 20:51 CI Range: 20 nA Trigger evts: 198108  
 Target: Mylar  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 4.3 2: 6.1 3: 5.5 4: 4.6  
 Si rates (kHz) 1: 1.410 2: 1.287 3: 1.250 4: 1.214  
 5: 3.9

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 94.2  
 U1 93.2  
 X2 94.7  
 D2 NMR

Run comment: 24Mg Data  
 Run #: 2074

Start: 20:56 Current: 3.5 nA Trigger rate: 128 Hz  
 Stop: 21:56 CI Range: 20 nA Trigger evts: 552713  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.786 2: 1.225 3: 1.292 4: 1.255  
 Si rates (kHz) 1: 13.0 2: 17.6 3: 13.4 4: 17.1  
 5: 14.14 6: 12.8

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 94.1  
 U1 98.1  
 X2 97.0  
 D2 NMR

Run comment: 24Mg data  
 Run #: 2075

Start: 21:58 Current: 4.1 nA Trigger rate: 167 Hz  
 Stop: 23:07 CI Range: 20 nA Trigger evts: 676622  
 Target: 24Mg  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.780 2: 1.215 3: 1.281 4: 1.244  
 Si rates (kHz) 1: 15.1 2: 20.4 3: 15.9 4: 20.5  
 5: 14.07 6: 14.6

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 95.0  
 U1 97.8  
 X2 96.8  
 D2 NMR

Run comment: Bkg run  
 Run #: 2076

Start: 23:09 Current: 3.6 nA Trigger rate: 136 Hz  
 Stop: 23:30 CI Range: 20 nA Trigger evts: 191735  
 Target: Mylar  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.780 2: 1.215 3: 1.281 4: 1.244  
 Si rates (kHz) 1: 3.9 2: 7.0 3: 4.8 4: 4.5  
 5: 3.6

K600 angle: 0 deg  
 Mental Health Level: ☺ ☺ ☹  
 Q: S A  
 D1: A A  
 H: M A  
 D2: E A  
 K: E A  
 VDC efficiency  
 X1 94.5  
 U1 95.7  
 X2 96.0  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  data run

Run #: 2077  
Start: 23:33 Current: B 3.4 nA Trigger rate: 130 Hz  
Stop: 00:33 Cl Range: 20 nA Trigger evts: 6302444  
Target: 24 My Scaler evts: 3485  
draw\_me\_frontback() OK? \_\_\_\_\_ draw\_me\_TDC2D() OK? \_\_\_\_\_  
= "Counts of ODC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ?" Yes No

K600 angle:	0 deg	Mental Health Level:
Q:	A	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>
D1:	A	VDC efficiency
H:	A	X1 96
D2:	A	U1 98
K:	A	X2 97
D2 NMR		

Run comment: 24Mg DATA RUN  
Run #: 2082

Start: 03:15 Current: 3.8 nA Trigger rate: 160 Hz  
Stop: 04:14 CI Range: 20 Trigger evts: 629255  
Target: 24Mg #3 Scaler evts: 3493

K600 angle: 0 deg		Mental Health Level:
Q:	<u>S</u>	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>
D1:	<u>A</u>	VDC efficiency
H:	<u>M</u>	X1 <u>15</u>
D2:	<u>E</u>	X1 <u>97</u>
K:	<u> </u>	X2 <u>98</u>
D2 NMR		
4:	_____	5: _____
4:	_____	5: _____

Run comment: PyLar

Run #: 2078  
 Start: 00:35 Current: 4.2 nA Trigger rate: 160 Hz  
 Stop: 01:50 Cl Range: 20 Trigger evts: 151930  
 Target: MAR#5 Scaler evts: 864  
 draw\_me\_frontback() OK? V draw\_me\_TDC2D0 OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 41.786 2: 1.223 3: 1.

K600 angle:	0 deg	Mental Health Level
Q:	S	A
D1:	A	A
H:	I	A
D2:	E	A
K:		A
D2 NMR		
4:	1 2 5 3	5: 1.414

Run comment: 247g Data run  
Run #: 2083

Run #: 2083  
 Start: 04:14 Current: 3.4 nA Trigger rate: 170 Hz  
 Stop: 04:34 Cl Range: 20 Trigger evts: 208361  
 Target: 24.174 713 Scaler evts: 1140  
 draw\_me\_frontback() OK? \_\_\_\_\_ draw\_me\_TDC2D() OK? \_\_\_\_\_  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.744 2: 1.224 3: 1.2

K600 angle:	0 deg	Mental Health Level:
Q:	S	
D1:	A	VDC efficiency
H:	I	X1 94
D2:	C	U1 97
K:	A	X2 97
D2 NMR		
4:	1254	5: 1424
4:	29k	5: 18h

Run comment: 24 MG DATA RUN

Run #: 2079  
 Start: 00:51 Current: 4.3 nA Trigger rate: 174 Hz  
 Stop: 01:51 Cl Range: 20 Trigger evts: 563056  
 Target: 24Mg #3 Scaler evts: 3518  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.790 2: 1.222 3: 1.  
 2: 12.6 3: 13.17

K600 angle: 0 deg		Mental Health Level
Q:	<u>S</u>	<input checked="" type="radio"/>
D1:	<u>A</u>	<input checked="" type="radio"/>
H:	<u>A</u>	<input checked="" type="radio"/>
D2:	<u>M</u>	<input checked="" type="radio"/>
K:	<u>E</u>	<input checked="" type="radio"/>
D2 NMR		VDC efficiency
4:	<u>1.251</u>	X1 <u>94.32</u>
4:	<u>16.34</u>	U1 <u>97.52</u>
		X2 <u>97.1</u>
		5: <u>1.418</u>
		5: <u>13.0</u>

No beam ~~usage~~  
Run # 2084 → test run with  $^{24}\text{Mg}$   
count rate in the FP too high

Run comment: 24Mg Data n

Run #: 2080  
 Start: 01:53 Current: 3.6 nA Trigger rate: 148  
 Stop: 02:53 Cl Range: 20 Trigger evts: 58001  
 Target:  $^{24}\text{Mg} \#3$  Scaler evts: 3499  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.747 2: 1.224 3: 15.28  
 2: 16.33 3: 21.28

K600 angle: 0 deg	Mental Health L
Q: <u>S A</u> A	
D1: <u>S A</u> A	VDC efficiency
H: <u>N</u> A	X1 <u>94.55</u>
D2: <u>E</u> A	U1 <u>97.38</u>
K: <u></u> A	X2 <u>96.61</u>
D2 NMR	
4: <u>1.253</u>	5: <u>1.422</u>
4: <u>20.5</u>	5: <u>16.1</u>

Run comment: 24Mg data run  
Run #: 2085

Run #: 2085  
 Start: 04:55 Current: 4.7 nA Trigger rate: 176 Hz  
 Stop: 05:21 Cl Range: 20 Trigger evts: 203654  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 1506  
 draw\_me\_frontback() OK?  draw\_me\_TDC2D() OK?   
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ?  Yes No  
 Si leakages (uA) 1: 1.787 2: 1.214 3: 1.2  
 Si rates (kHz) 1: 15.29 2: 16.59 3: 19

K600 angle: 0 deg	Mental Health Level:
Q: <u>S</u> A	
D1: <u>A</u> A	VDC efficiency
H: <u>M</u> A	X1 <u>94.59</u>
D2: <u></u> A	U1 <u>97.35</u>
K: <u>E</u> A	X2 <u>96.46</u>
D2 NMR	
4: <u>1.245</u>	5: <u>1.414</u>
4: <u>23.15</u>	5: <u>17.50</u>

Run comment: MYLAR DATA RUN

Run #: 2081 Start: 02:55 Current: 4.0 nA Trigger rate: 172  
Stop: 03:11 CI Range: 20 Trigger evts: 153380  
Target: MYLAR #5 Scaler evts: 969  
draw\_me\_frontback() OK?  draw\_me\_TDC2D() OK?

K600 angle: 0 deg

Q: \_\_\_\_\_ A  
D1: S A  
H: A A  
D2: M A  
K: E A

D2 NMR

9 4: 1,252

5: 1.418

VDC efficiency	95.0
X1	95.0
U1	95.3
X2	95.

Beam gone again

## Magnetr field

~~D1~~ -441.125  
~~Hm~~ Q -441.125  
 D1 392.910  
 H -29.429  
 D2 391.462  
 K 6.367

Next logbook.

## VDC and Faraday Voltage

VDC 1 - 3.56  
 VDC 2 - 3.65

Pad 1 lowP highP 1460  
 lowP 1450

Pad 2 highP 1400  
 lowP 1600

SU-02 & SU-14 closed.  
 Crates & Si bias off.

==== Stop (6:00)

**Experiment:** PR254  $^{24}\text{Mg}$  (p,t)  
**Principal researcher:** Philip Adsley [padsley@gmail.com](mailto:padsley@gmail.com)  
**Date:** May - June 2016  
**List of collaborators:** (Name, Surname, e-mail address and Institution)

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 KCW Li  
 L Pellegrini [luna.pellegrini@wits.ac.za](mailto:luna.pellegrini@wits.ac.za)  
 DJ Marin-Lambarri  
 V Pesudo  
 GF Steyn  
 Bernadette Rebeco  
 Mohammed Kamil  
 Justice Mukosso  
 SANDILE JONATHAN  
 Nakheza MKGOLIBHO

Date	10 - 13 June 2016			
Weekend #	3			
Targets	#	Material	Thickness	Thickness measurement method
	1	Vinyl		
	2	$^{27}\text{Al}$	$810 \mu\text{g/cm}^2$	
	3	$^{24}\text{Mg}$	$700 \mu\text{g/cm}^2$	
	4	C	$1 \mu\text{g/cm}^2$	
	5	Mylar	$100 \mu\text{g/cm}^2$	
	6	uT		
Target perpendicular to beam [°]				
Target perpendicular to camera [°]				

Additional Notes:

Beam	Energy [MeV]	100
Pulse selection (yes/no)	1/5	
Injector (SPC1 or SPC2)	SPC2	
SSC Transmission	FC 19J	
	FC 1X	
	FC 11X	
	FC 4P	
	FC 4S	
	FC Target	

Additional Notes:

Scattering chamber beamstop	In beam position	
	Out of beam position	/

Additional Notes:

Detector Setup	Order of detectors	Detectors	Sketch
	VDC 1	X	
		U	
	VDC 2	X	
		O	
	Paddle 1	1/4"	
	Paddle 2	1/2"	
Focal Plane (HD or MD)			MD
Kapton window (HD or MD)			MD

Additional Notes:

X2 = old VDC.

Collimator Carousel	#	In perspex	In beam
	1		
	2		
	3		
	4		
	5		
	6		
	Configuration (not 0 deg/=0 deg)		

Additional Notes:

Spectrometer Parameters	Angle	0°
Magnets settings	Q	
	D1	
	H	
	D2	
	K	
Superknob settings	Dipole 1	
	D1/D2	
	D1/Q	
	D1/K	
	D1/H	
	SP Interlock control (Enable/ Disable)	

Additional Notes:

08/06/2016 (12:00)

-  $^{228}\text{Th}$  calibration : run 2087  
 2-4 kHz rate? Stopped. Turned off detectors.

Si leakages: D<sub>1</sub> 1.696  $\mu\text{A}$   
 2 1.168  
 3 1.252  
 4 1.196  
 5 1.371

Si Thresholds: D<sub>1</sub>, P -765 -46 mV  
 2 -36  
 3 -63  
 4 -54  
 5 -83 (Before)

→ Turned up Si detector thresholds to fix high rate.

Si thresholds: D<sub>1</sub>, P -76 mV  
 2 -131  
 3 -64  
 4 -85  
 5 -121

→ Rate went up again to ~4.5 kHz  
 New Si thresholds: D<sub>1</sub>, P -96 mV

2 -317 ← !!  
 3 -80  
 4 -131  
 5 -121

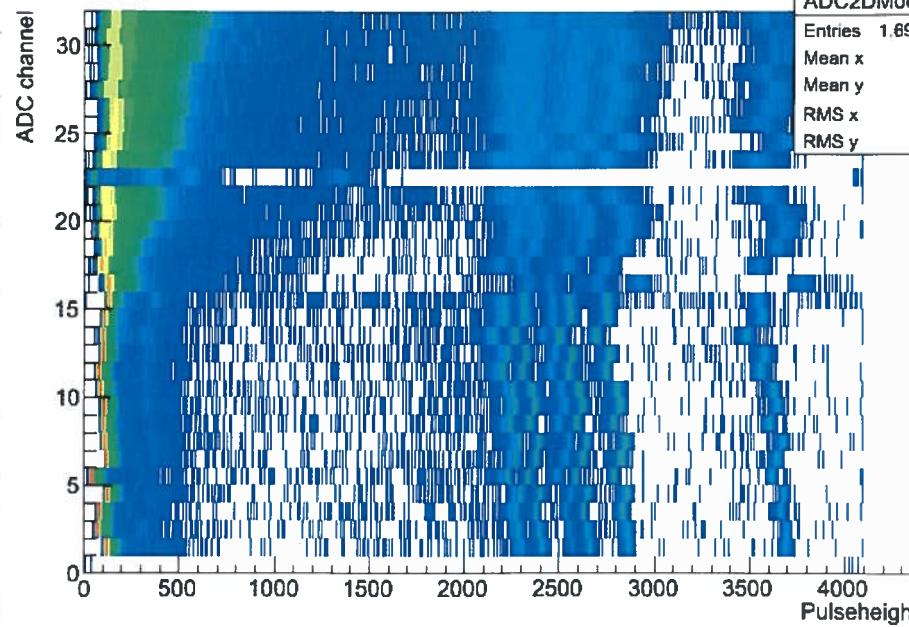
Run 2089 became noisy after 1h35m.

Start run 2089 2090.

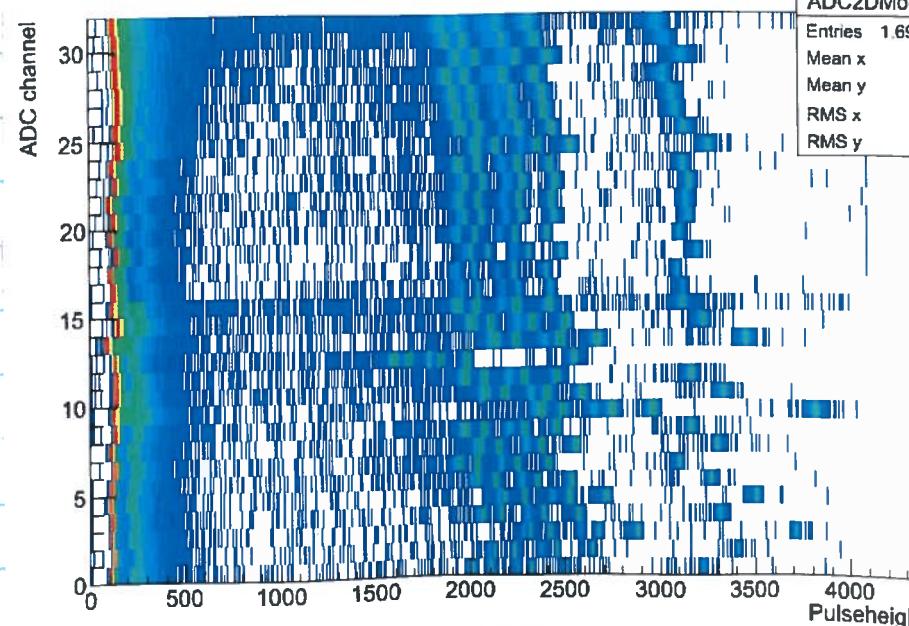
Begin 14:55 & End 17:43

→ Water & magnets diverted to A-line for Arno experiment. Need to remember to revert on Friday 10 June.

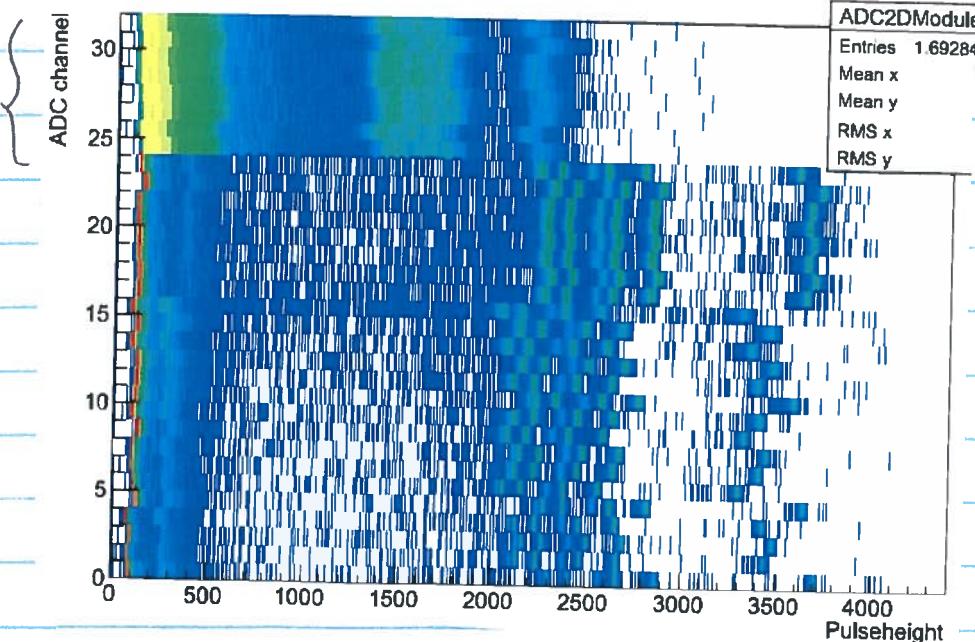
ADC2DModule\_000



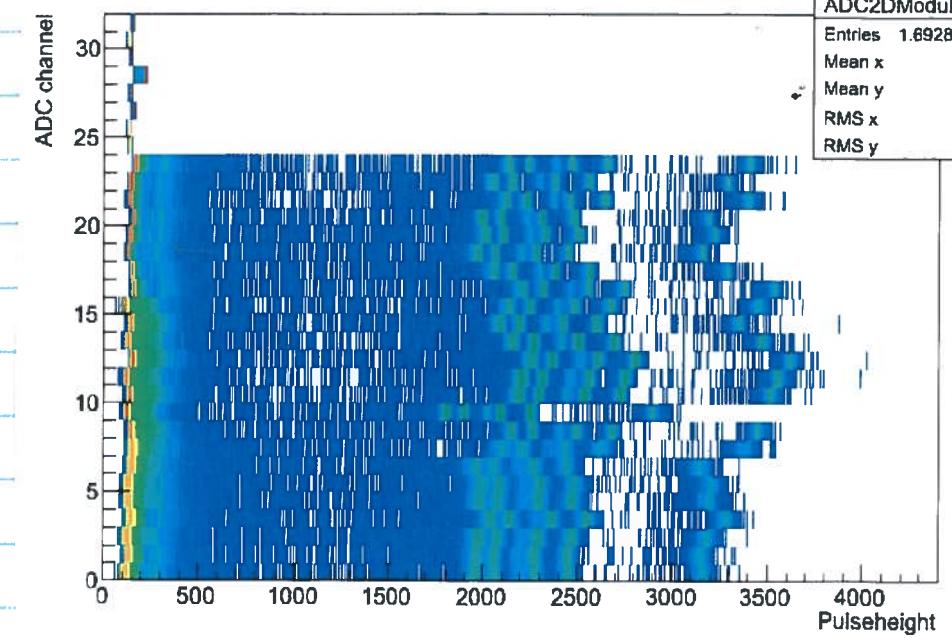
ADC2DModule\_001

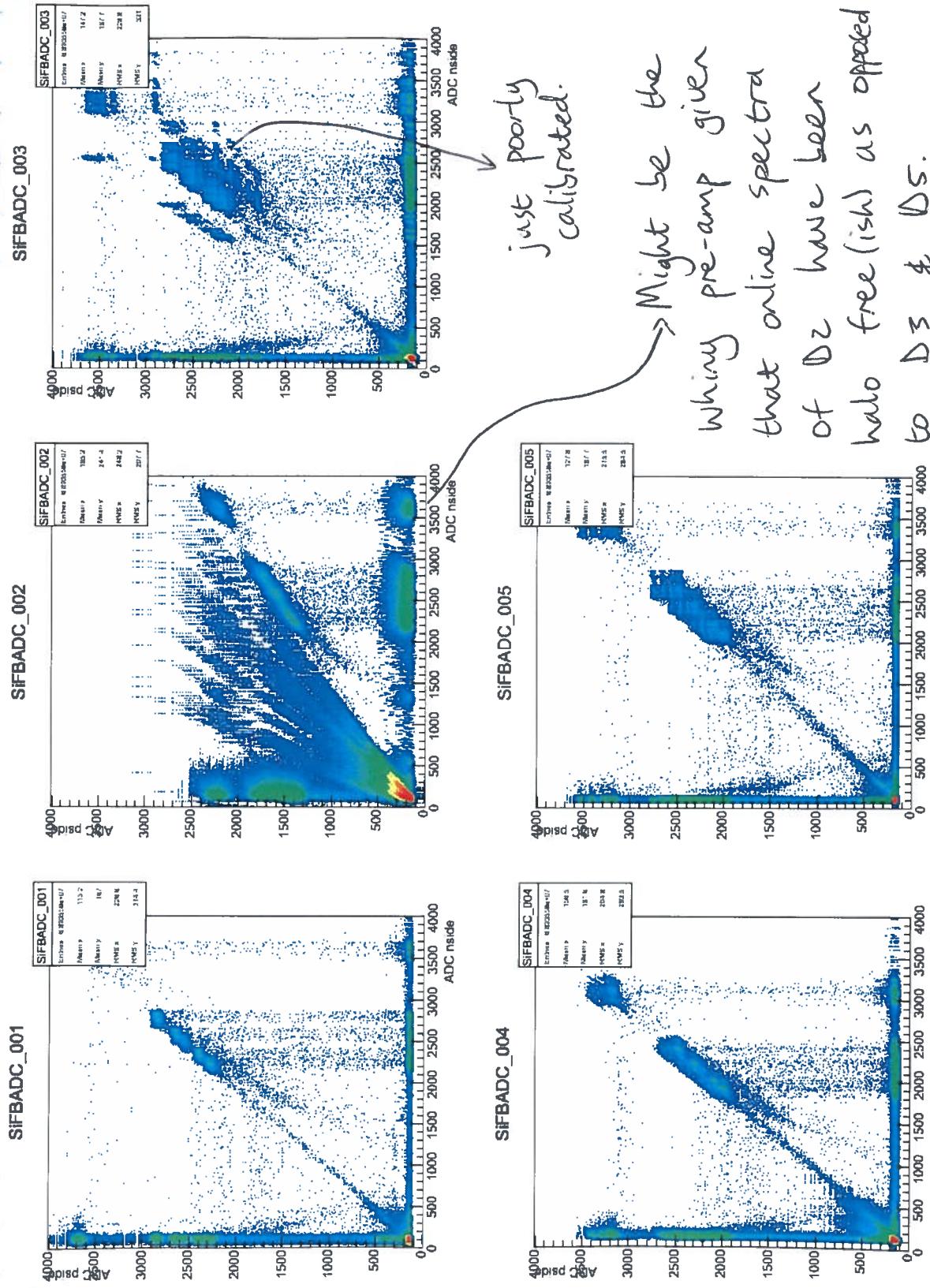


ADC2DModule\_002



ADC2DModule\_003





Weeked 3 Beam

10/06

- Beam tuning on S-line harps 12:00
- Beam energy measured at 19.18 MeV.

12:15 Look at harps in S-line

Seems as if we don't have enough of a  
wurst as harp 3S.  
Dink tuning...

Conditions : lab instantaneous current 143.1 A

( $\oplus$ ) 11600 V

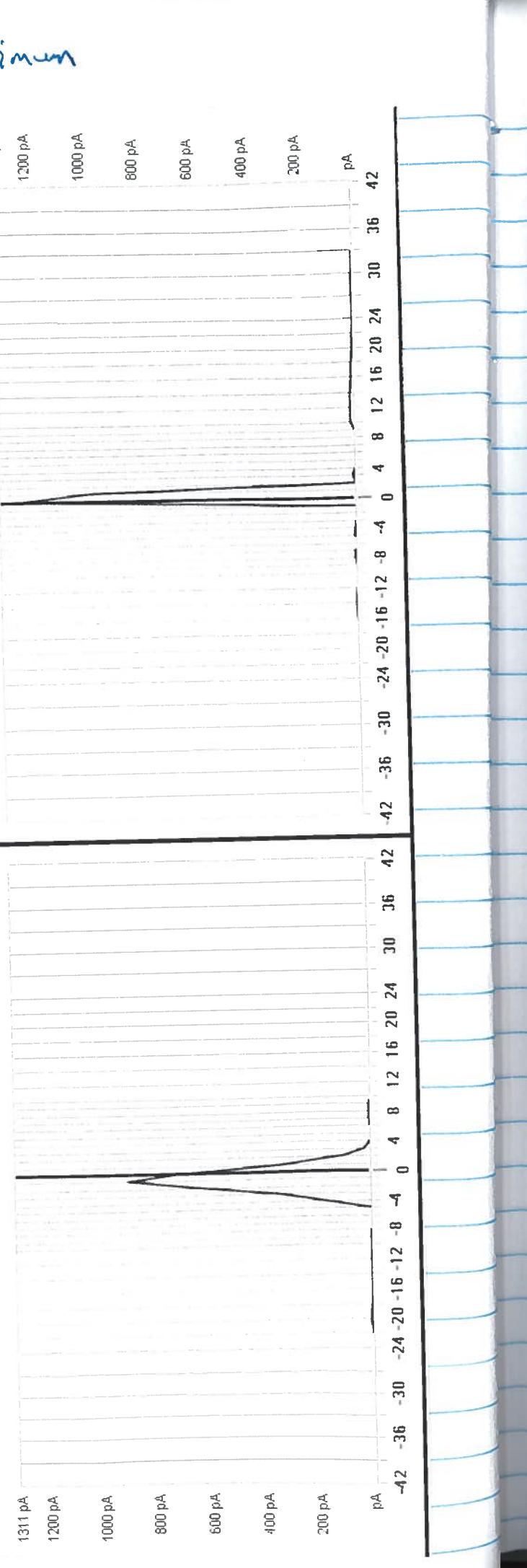
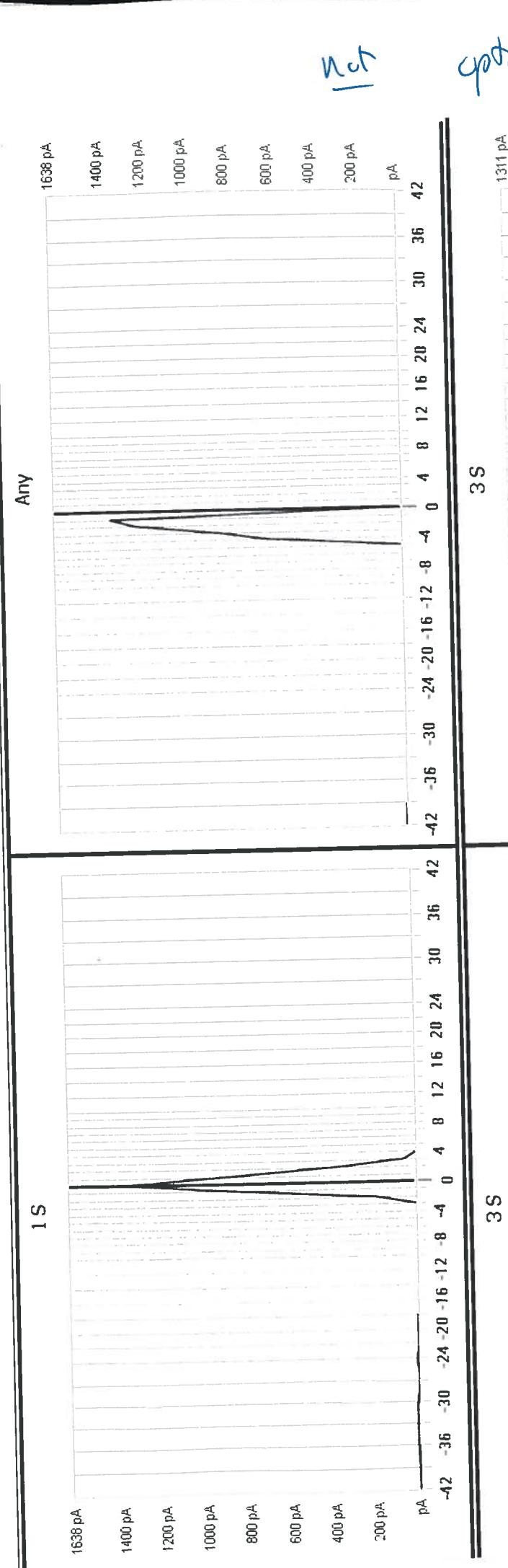
SSC D Volts : 183190 SSC RF freq 19.664175 MHz

SSC Phase : 226.1

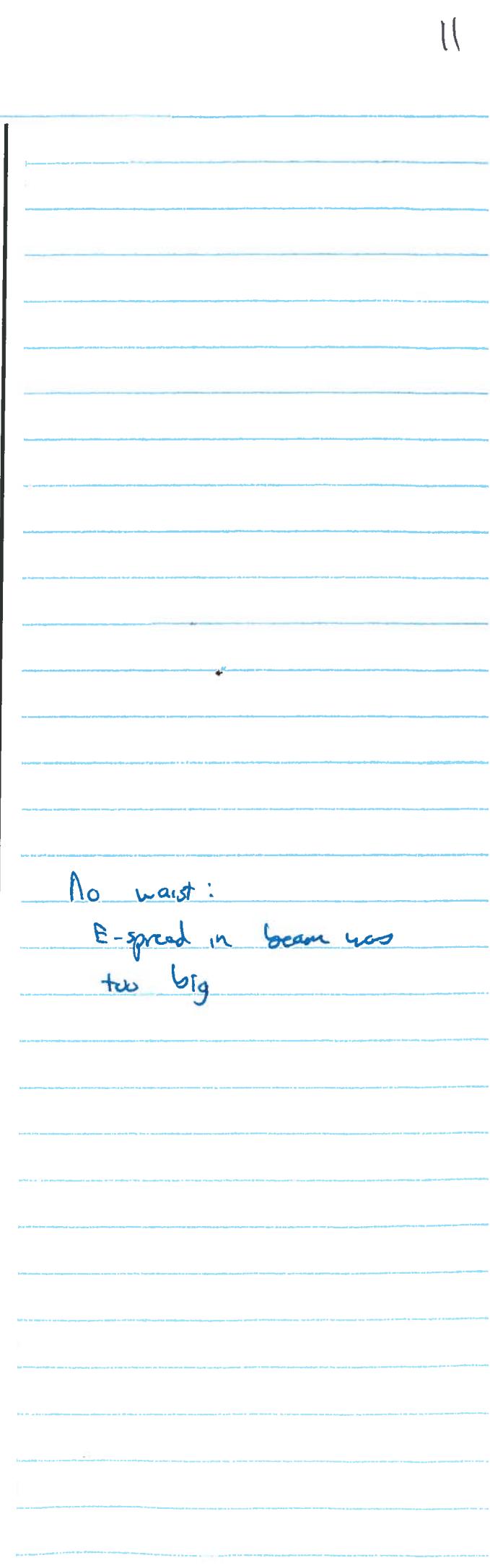
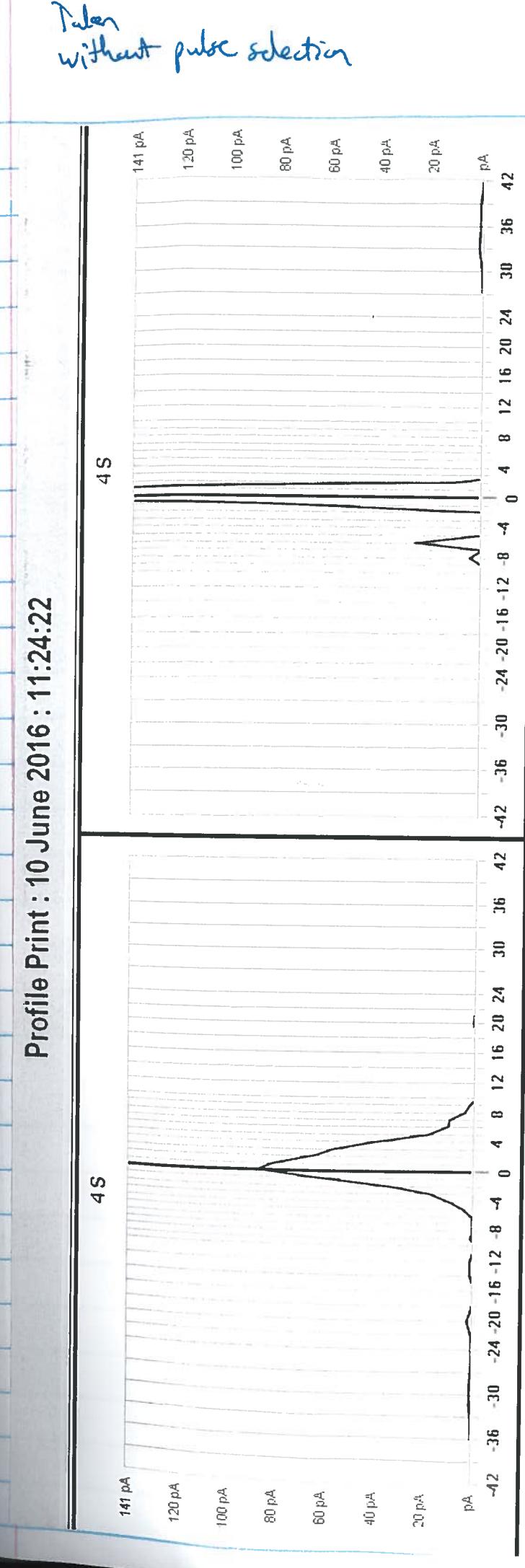
Magnet hall Probes : B1P 80.23 kG  
 B3P 7.29  
 Q1S 2.783  
 Q2S 2.966  
 Q3S 1.213  
 Q4S 1.567  
 Q5S 3.361  
 Q6S 1.774

Note: we are on Paddle -1 trigger only.

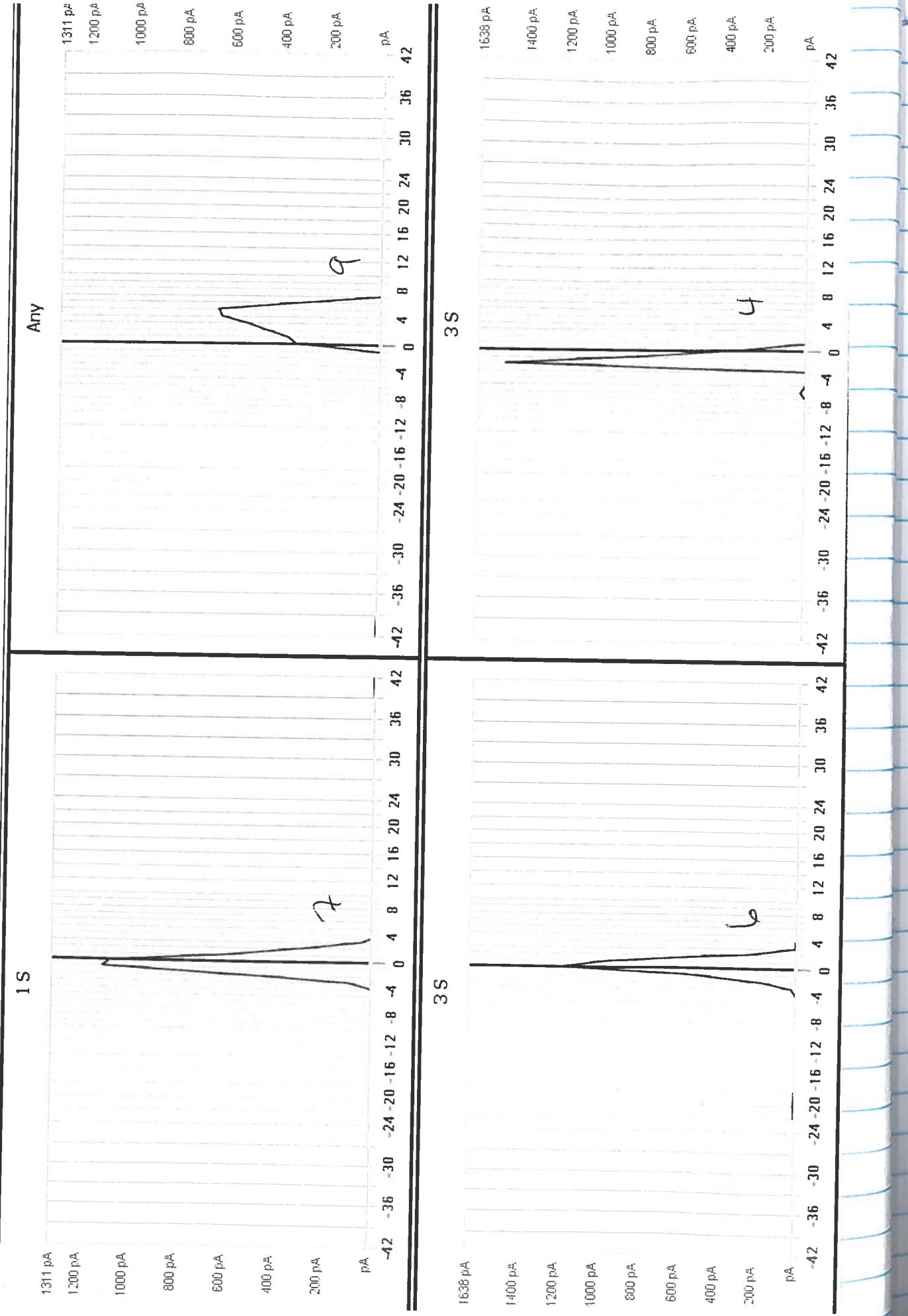
Profile Print : 10 June 2016 : 11:21:05



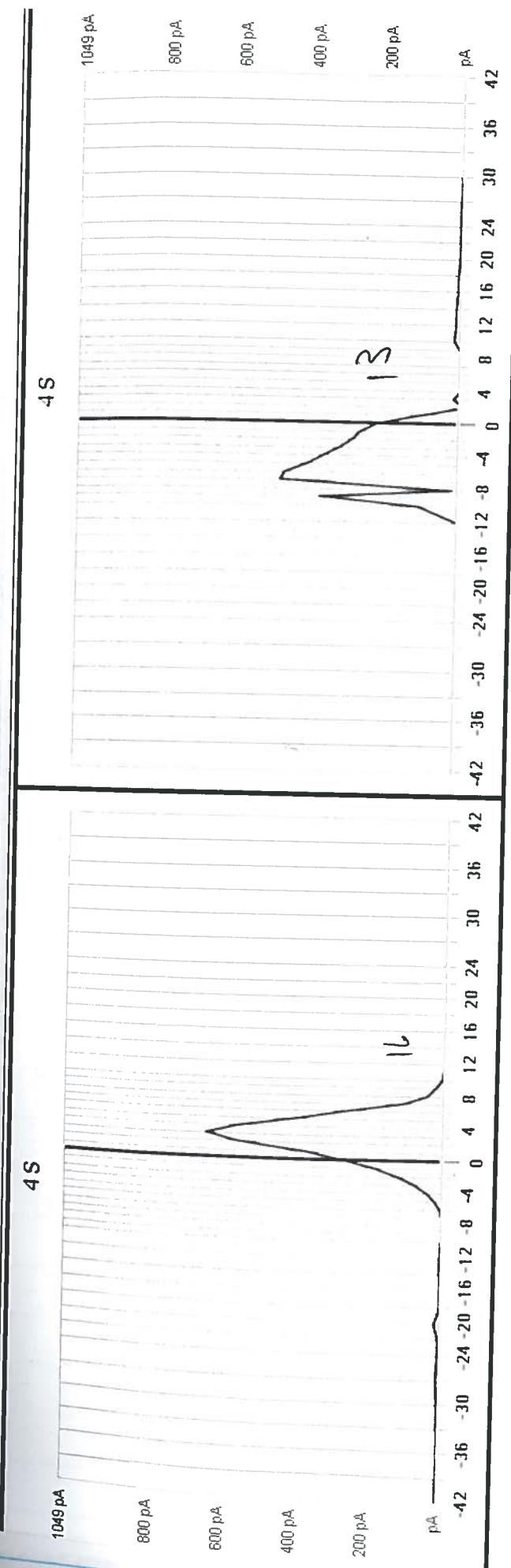
Profile Print : 10 June 2016 : 11:24:22



Profile Print : 10 June 2016 : 12:33:06



Profile Print : 10 June 2016 : 12:33:46



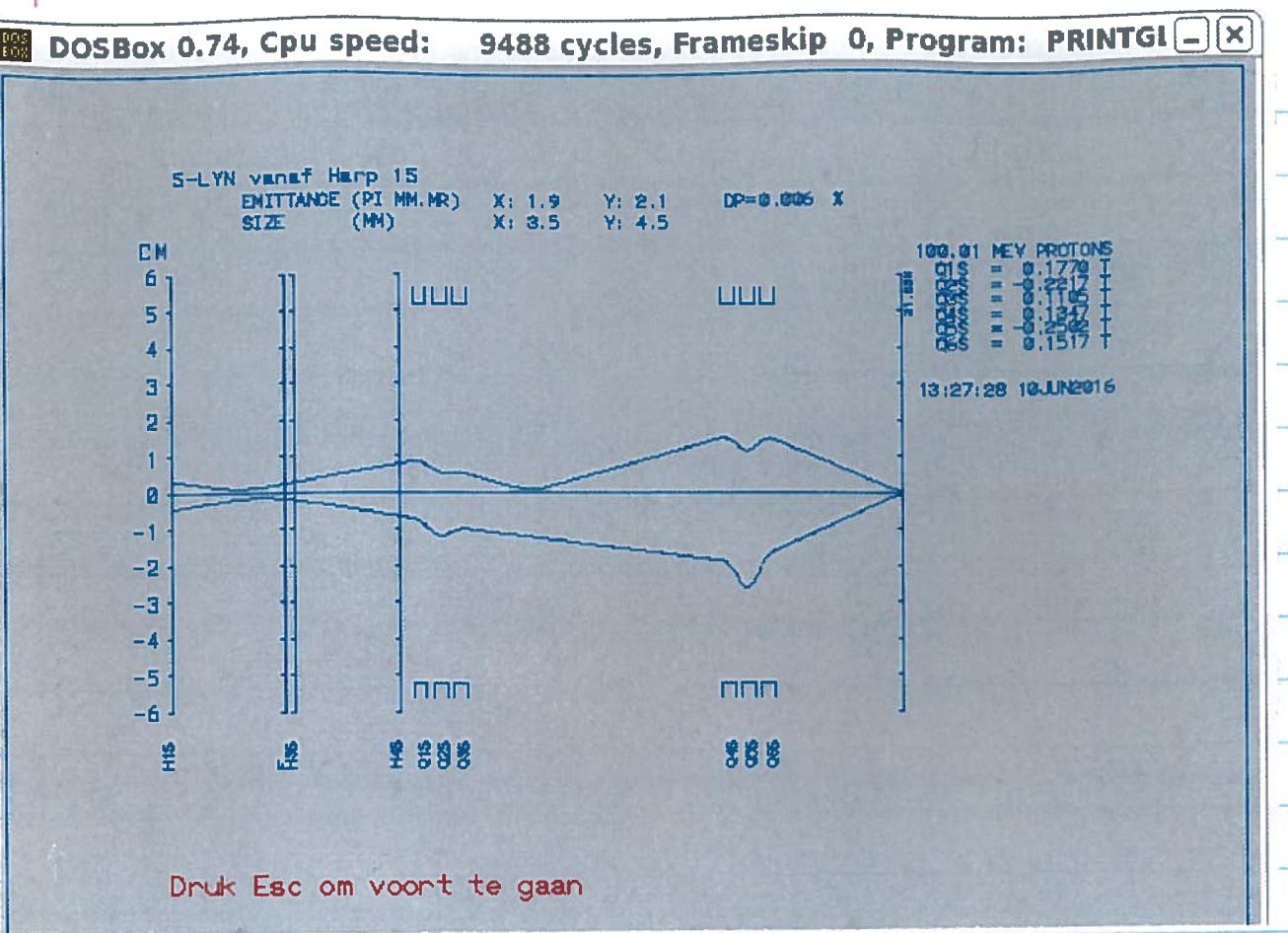
X 1. q1

Y 1.2.13

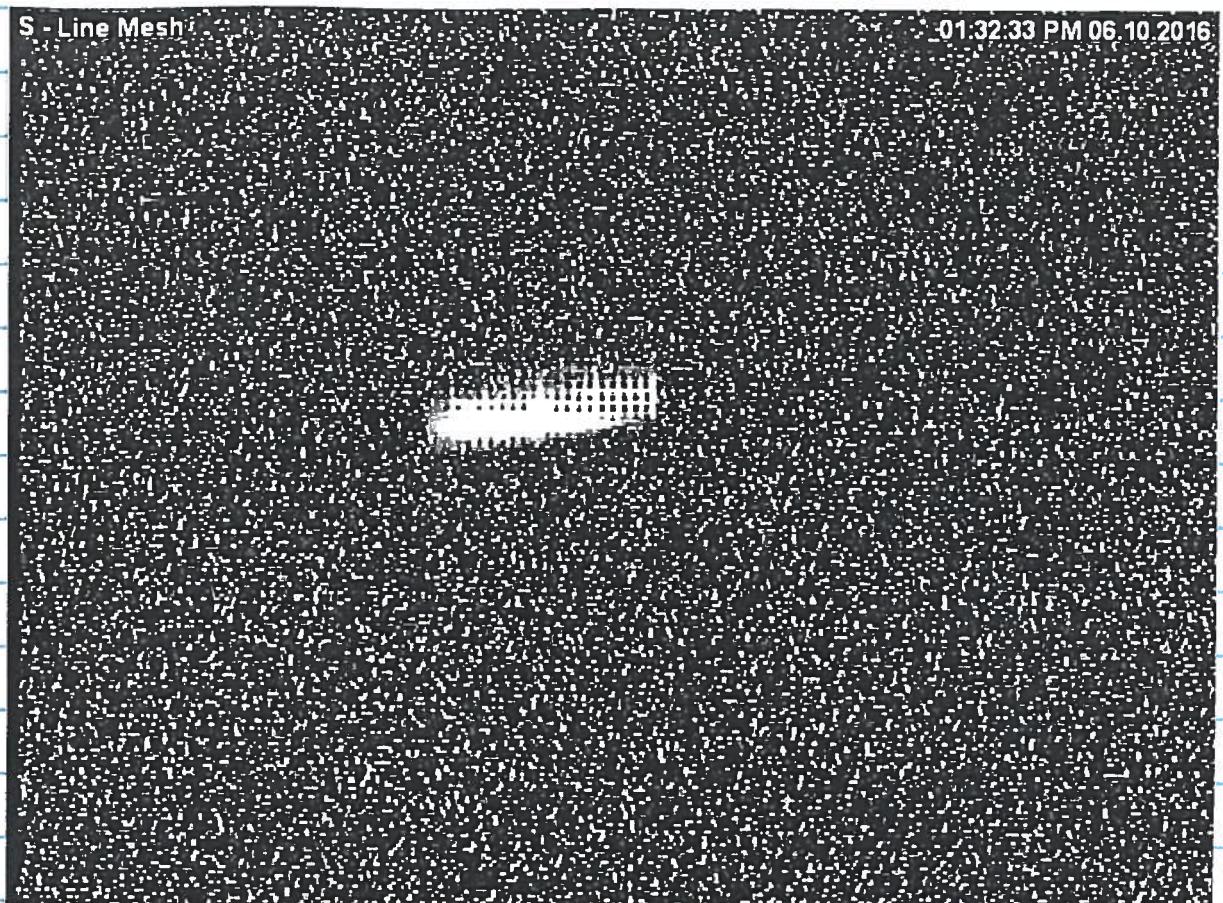
S-line grads settings changed

Q1S	27.3	2.194	big
2S	-34.6	2.844	
3S	17.0	1.428	
4S	20.7	1.628	
5S	-38.7	3.512	
6S	23.3	1.873	
	↑	Current	
	↑	full probe	

Better. We use this.



Fri 13:24 Pulse selector now turned on



Energie\_NMR.txt  
\*\* EnMet ver5.7 Oct 2013 \*\*  
\*\* BEREKENDE ENERGIE \*\*\*\* CALCULATED ENERGY \*\* 2016/06/10

Versnelde deeltjie	Accelerated particle :
Element	= H
Atoomgetal	= Atomic Number = 1
Massagetal	= Mass Number = 1
Rel. Atoommassa	= Rel. Atomic Mass = 1.00782
Natuurlike voorkoms	= Natural Abundance = 99.98 %
Ladingsgetal Q	= Charge State Q = 1

1 Tesla = 42.5759 MHz [Linear Relation]

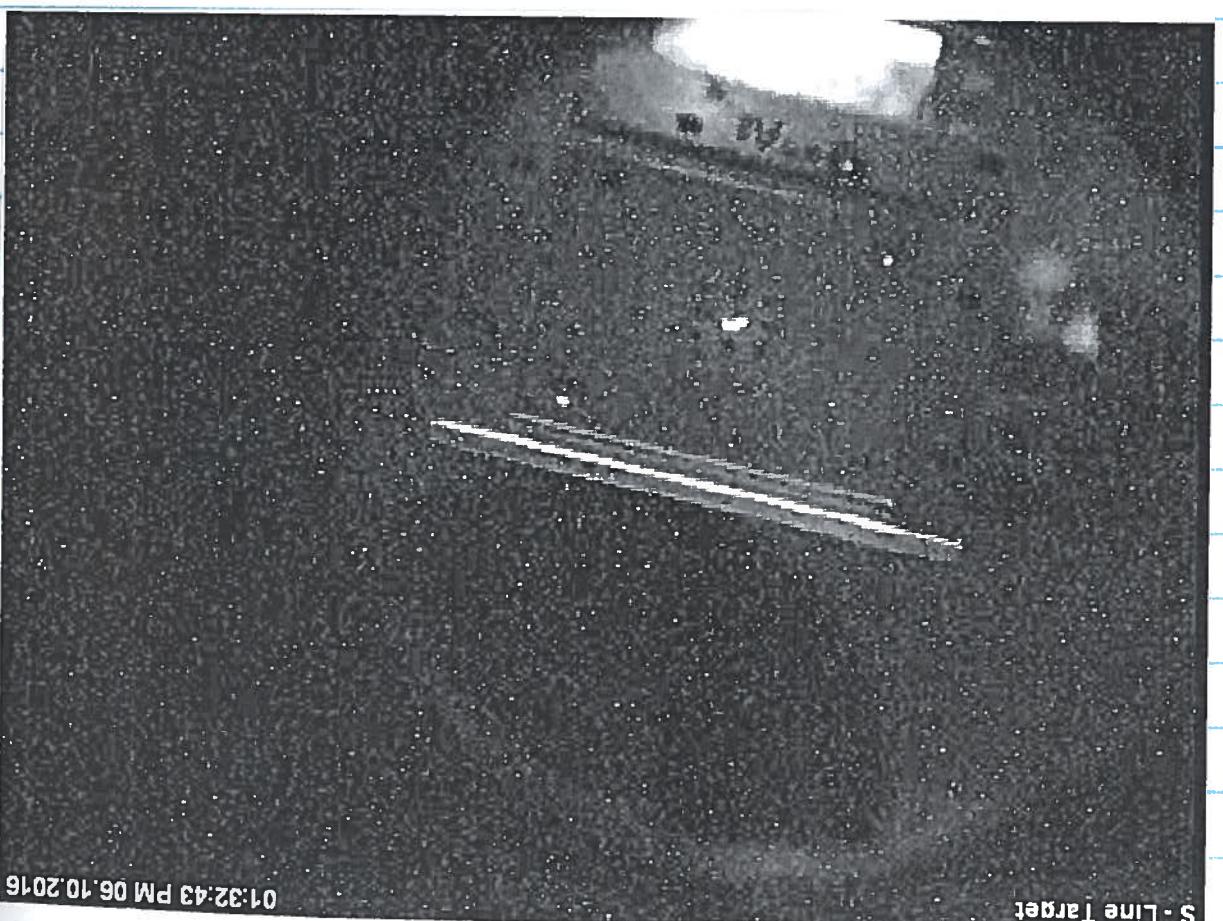
---

BEAM ENERGY FROM NMR-READING/S (frequency) :

---

BEAM ENERGY FROM NMR-READING/S (field) :

B3P Beam Energy = 99.22 MeV from NMR = 0.738471 Tesla



$C\Gamma$  range = 6 nA

Run 3006 Halo fast Only paddle on.  
 $\text{60 Hz} @ 0.8 \text{nA}$

Run 3007  $^{24}\text{Mg}$  All detectors now on.

Happy DAQ is working  
 Now on to faint beam.

Charge with Superkicks, from 392.91  
 to 268.90 for O1 superkicks

Charge paddle HV: Pad110 1460  $\rightarrow$  1605  
 Pad110 1480  $\rightarrow$  1670  
 $\uparrow$        $\uparrow$   
 pt      faint beam

Run 3002. Faint beam See nothing

3003

3004

3005

3006

(changed O1 to 270.9.)

First run where we see anything

Slots: 9X  $\times$  gap 1.1      2P  $\times$  gap 10.74  
 $\gamma$  gap 2       $\gamma$  gap 4.5  
 12X  $\times$  gap 7  
 $\gamma$  gap 7  
 1P  $\times$  gap 4.5

665

Run 3007 23.8 Peak at 607 mns  $v = 0.77$   
 $\sim 35 \text{ keV} @ 9.24 \text{ keV/m}$

3008	24.1	$v = 0.69 = 31 \text{ keV}$
3009	24.4	$v = 0.665 = 29 \text{ keV}$
3010	24.7	$v = 0.57 = 26 \text{ keV}$
3011	25.0	$v = 0.55 = 25 \text{ keV}$
3012	25.3	$v = 0.58$
3013	24.9	$v = 0.57$
3014	25.0	$v = 0.57 = 26 \text{ keV}$
3015	$\phi_{sc} = 227.5$	$v = 0.55 = 25 \text{ keV}$
3016	$\phi_{sc} = 227.5$ Lay in action	$v = 0.546 = 24.7$
3017	"	$0.535 = 24$
3018	"	$0.535 = 24$
3019	"	$0.538$

3020      23.6  
 3021       $\phi_{sc} = 227.1$   $5\text{C voltage } 183140$       0.518  
 23.3

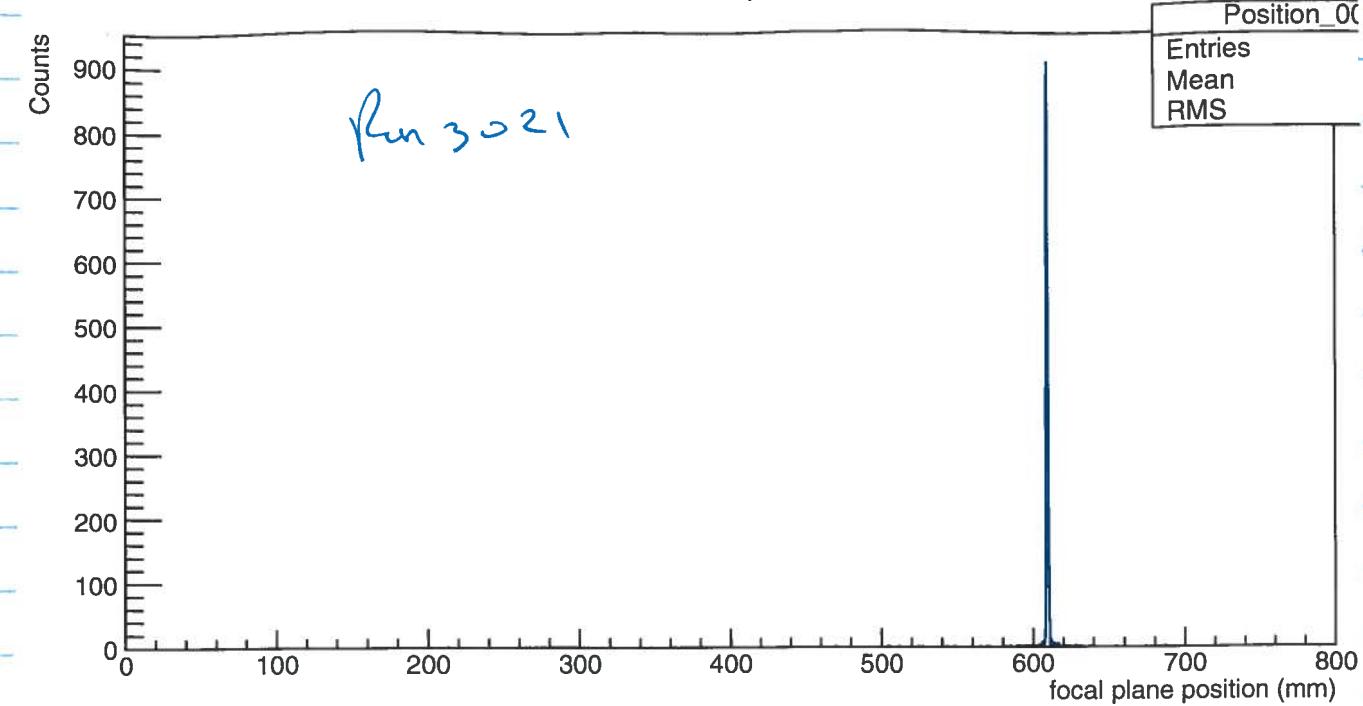
DONE with FAINT BEAM.

Put O1 fields back to 392.91 with superkicks.

$\rightarrow$  cycle K600 magnets

$\rightarrow$  put P1 HV back to pre-faint beam settings

Position: X1 (chisq<0.2)



Magnets have finished setting.

Q : -441.125 A  
 D1 : 392.910 A  
 H : -29.429 A  
 D2 : 391.462 A  
 K : 6.367 A

Run 3022: Not with a target in place.  
 Was listed as  $^{24}\text{Mg}$ .

$^{24}\text{Mg}$  singles check

Run #: 3023

Start: 16:28 Current: 6.5 nA Trigger rate: 150 Hz

Stop: 17:00 CI Range: 20.1 Trigger evts: 375479

Target:  $^{24}\text{Mg}$  #3 Scaler evts: 1853

draw\_me\_frontback() OK? draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_

K600 angle: 0 deg

Q: -441.125 A

D1: 392.910 A

H: -29.429 A

D2: 391.462 A

K: 6.367 A

D2 NMR

Mental Health Level:

😊 😊 😊

VDC efficiency

X1 94

U1 98

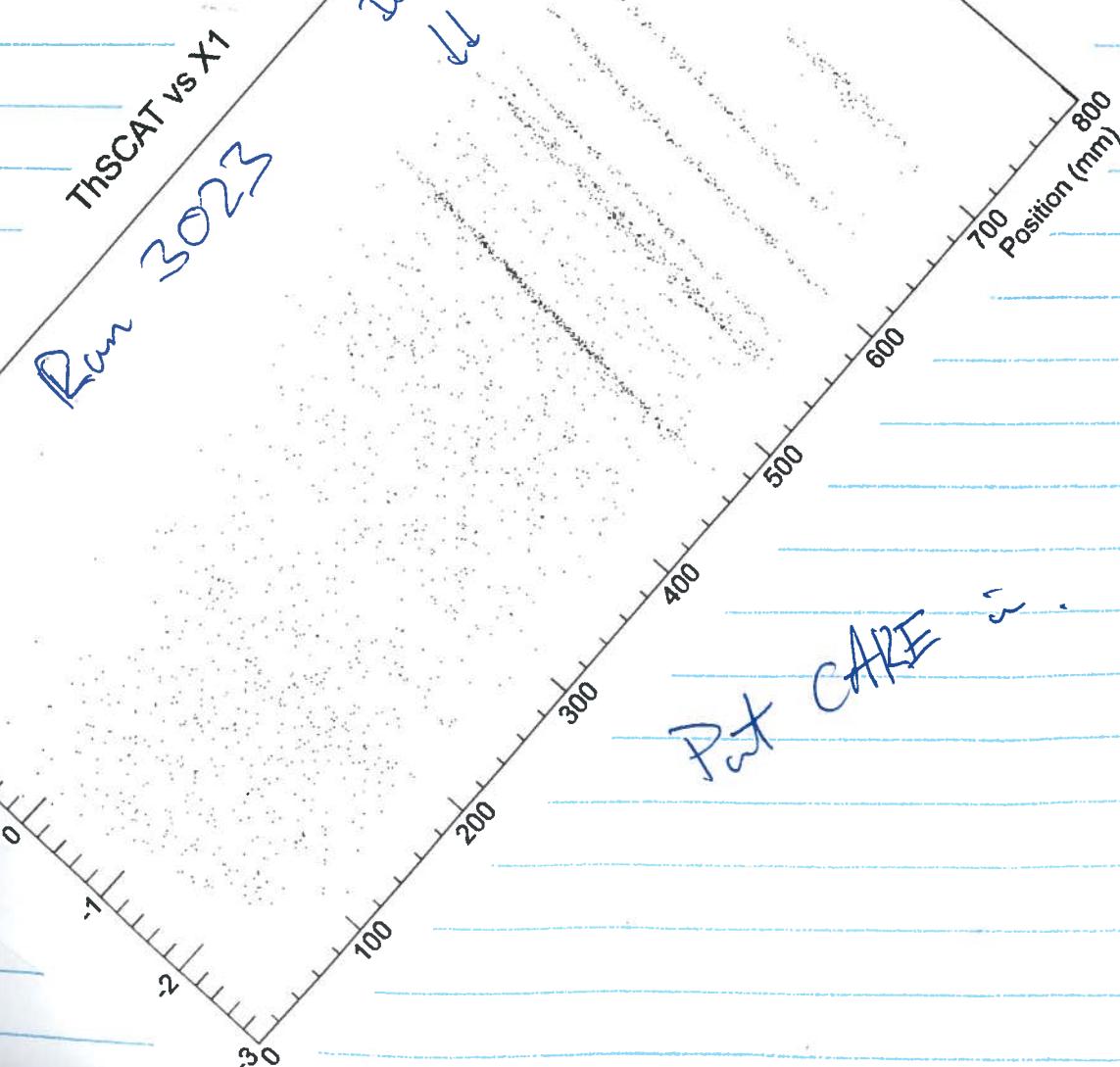
X2 96

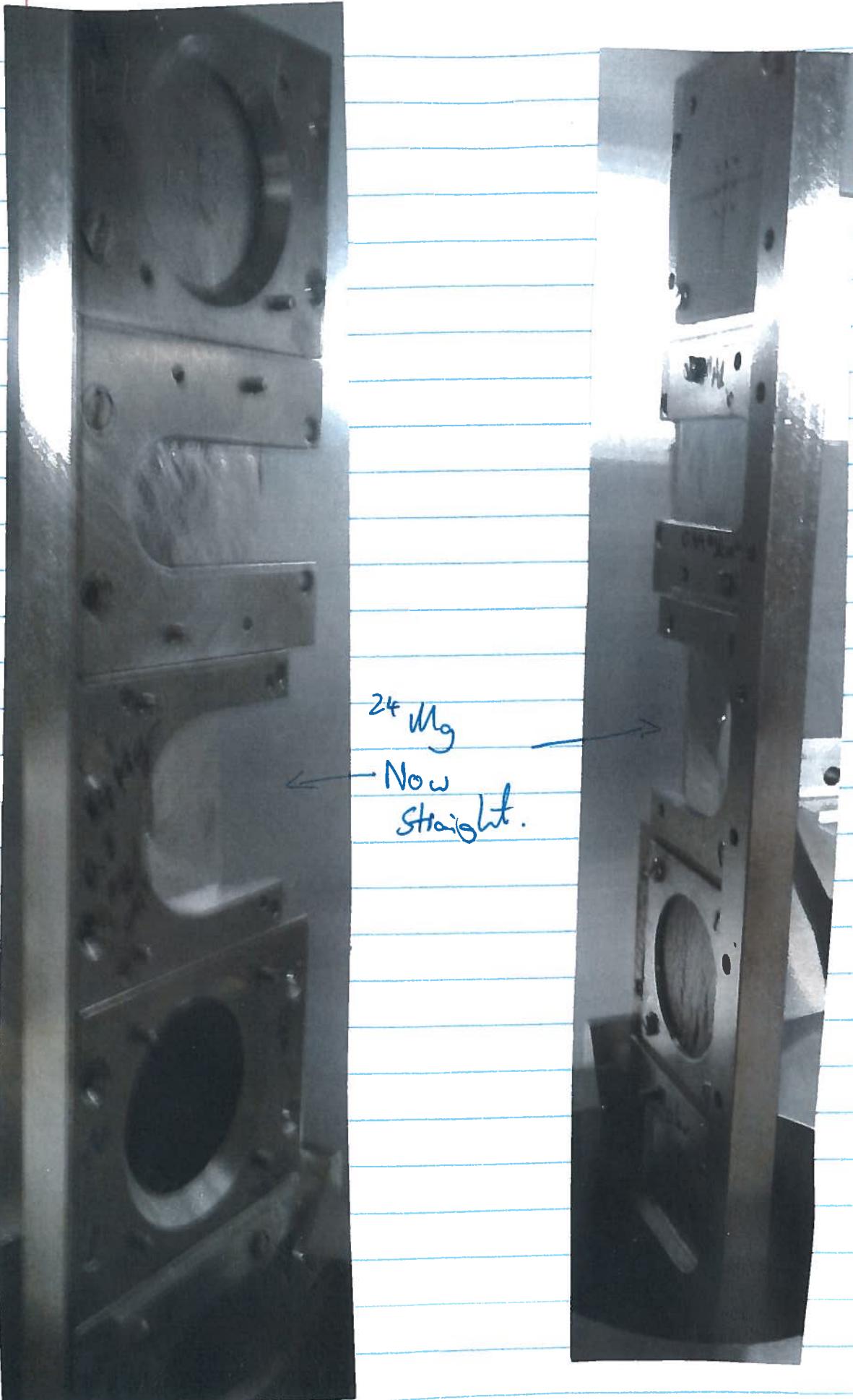
5: \_\_\_\_\_

5: \_\_\_\_\_

ThSCATvsX1  
 Entries  
 Mean x  
 Mean y  
 RMS x  
 RMS y

2186  
 412.1  
 -0.6372  
 -0.1772  
 0.9459





CAKE put into the chamber.

Pumped down → Need to check  
bias + set thresholds.

### Thresholds

1P	-50	mV
2	-50	
3	-85	
4	-42	
5	-64	
1/2 N	-65	
3/4 N	-57	
5 N	-20	

Holo check w/ MT

1.4 nA. → Now 4 nA.

Trigger rate: 190 Hz

Looks good. Was run 3024.

Run comment:  $^{24}\text{Mg}$  data.

Run #: 3025

Start: 18:35 Current: 4.0 nA Trigger rate: 190 Hz

Stop: 19:51 CI Range: 20n Trigger evts: 1.117M

Target:  $^{24}\text{Mg} \#3$  Scaler evts: 4124

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.685 2: 1.40 3: 209

Si rates (kHz) 1: 20.9 2: 18.8 3: 22.3

K600 angle: 0 deg  
Q: -441.125 A  
D1: 392.910 A  
H: -24.429 A  
D2: 391.662 A  
U1: 96.8 A  
K: 6.367 A  
X2: 97.2 A

Mental Health Level: ☺ ☺ ☺

VDC efficiency X1: 93.1  
X2: 97.2

D2 NMR

5: 1.347

4: 1.166

5: 24.0

4: 1.209

5: 47.5

Run comment:  $^{24}\text{Mg}$  data

Run #: 3026

Start: 20:00 Current: 3.6 nA Trigger rate: 192 Hz

Stop: 21:04 CI Range: 20 nA Trigger evts: 1.207M

Target:  $^{24}\text{Mg}$  Scaler evts: 3727

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.719 2: 1.175 3: 1.236

Si rates (kHz) 1: 14.6 2: 14.0 3: 15.2

K600 angle: 0 deg  
Q: 5 A  
D1: A A  
H: M A  
D2: C A  
U1: 91.2 A  
K: E A  
X2: 97.2 A

Mental Health Level: ☺ ☺ ☺

VDC efficiency X1: 91.2  
X2: 97.2

D2 NMR

5: 1.371

4: 1.199

5: 17.2

4: 1.236

5: 32.4

Run comment: Bug

Run #: 3027

Start: 21:07 Current: 7.1 nA Trigger rate: 377 Hz

Stop: 21:23 CI Range: 20 nA Trigger evts: 414845

Target: Mylar Scaler evts: 969

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 7.4 2: 6.8 3: 7.8

Si rates (kHz) 1: 7.4 2: 6.8 3: 7.8

K600 angle: 0 deg  
Q: 5 A  
D1: A A  
H: M A  
D2: E A  
U1: 91.8 A  
K: E A  
X2: 95.9 A

Mental Health Level: ☺ ☺ ☺

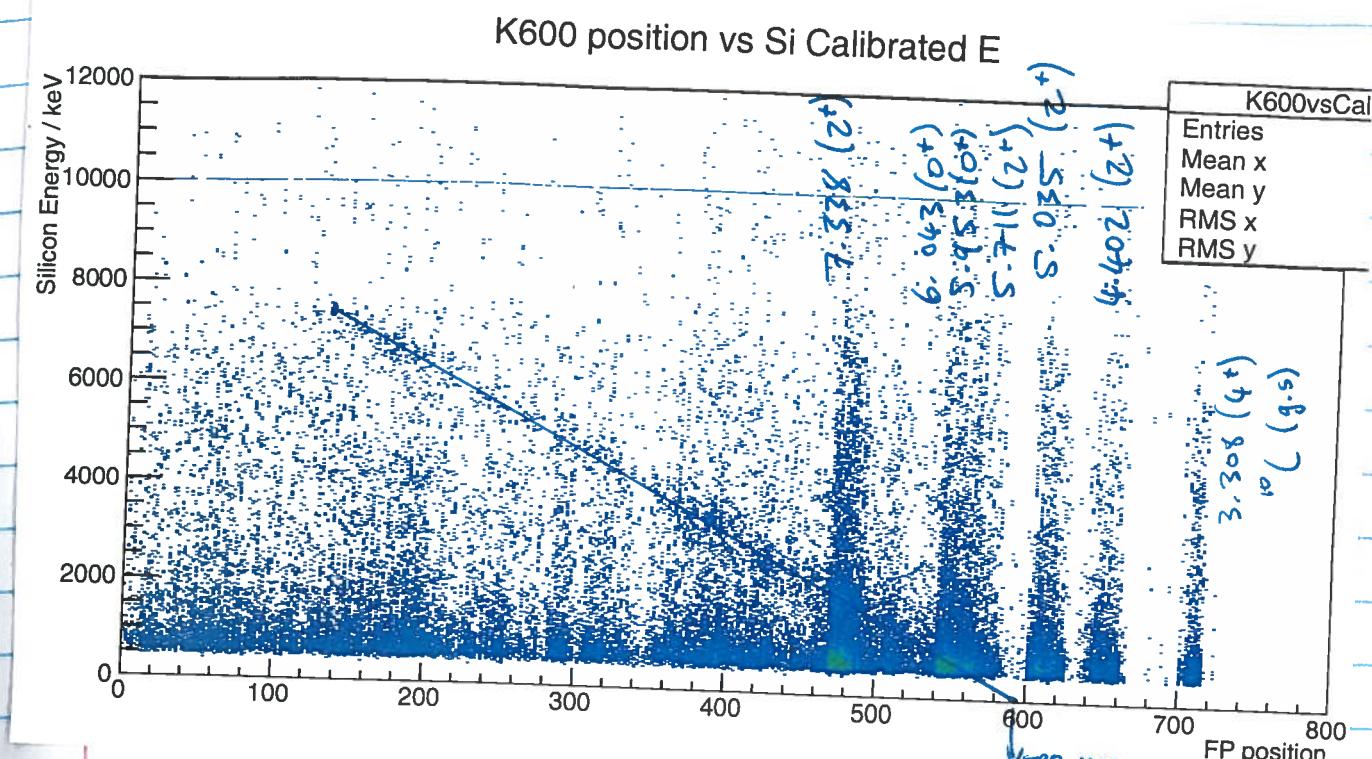
VDC efficiency X1: 91.8  
X2: 95.9

D2 NMR

5: 7.9

4: 12.3

→ 3026: Mylar run.  
forgot to change target to  $^{24}\text{Mg}$ . Just 2 min.



Run comment:  $^{24}\text{Mg}$  data

Run #: 3029

Start: 21:31 Current: 4.5 nA Trigger rate: 750 Hz

Stop: 21:33 CI Range: 20n Trigger evts: 71281

Target:  $^{24}\text{Mg} \#3$  Scaler evts: 109

draw\_me\_frontback() OK? draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

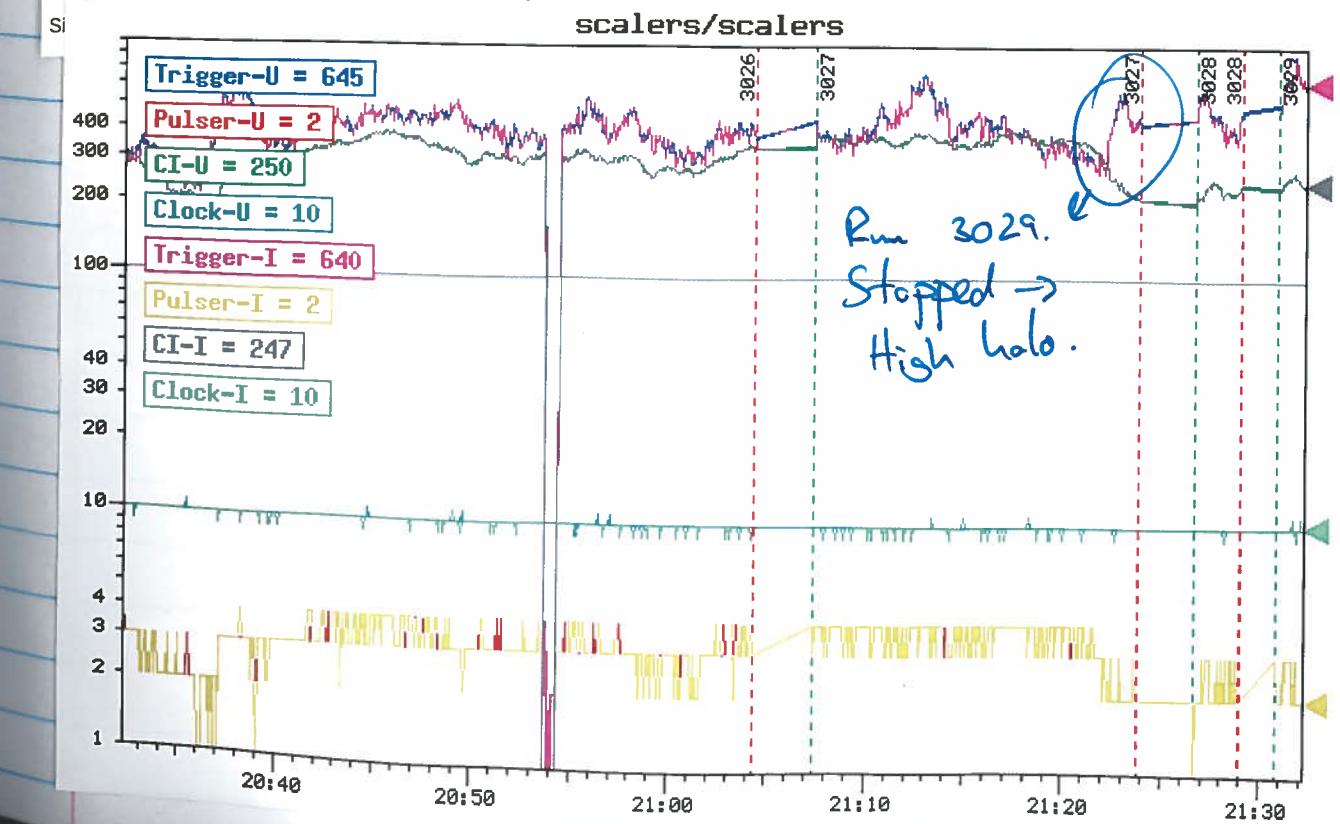
Si leakages (uA) 1: 1.1 2: 1.1

K600 angle: 0 deg  
Q: A A  
D1: S A  
H: A A  
D2: M A  
U1: E A  
K: F A  
X2: E A

Mental Health Level: ☺ ☺ ☺

VDC efficiency X1: 91.2  
X2: 97.4

D2 NMR



Run 3030 : halo tune. Start with 700 @ 5 nA

End with 300 cts for 6 nA.

Run comment: <sup>24</sup>Mg data

Run #: 3031  
Start: 21:52 Current: 6.5 nA Trigger rate: 301 Hz  
Stop: 23:04 CI Range: 20 nA Trigger evts: 1182 M  
Target: <sup>26</sup>Mg Scaler evts: 4232  
draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.735 2: 1.197 3: 1.258 4: 1.223  
Si rates (kHz) 1: 23.0 2: 23.9 3: 21.4 4: 61.1

K600 angle: 0 deg Mental Health Level:  
Q: A D1: S A H: M E A D2: E A K: A  
VDC efficiency X1 91.5 U1 97.8 X2 94.3  
D2 NMR

Run comment: <sup>24</sup>Mg data

Run #: 3032  
Start: 23:06 Current: 3.5 nA Trigger rate: 153 Hz  
Stop: 23:58 CI Range: 20 nA Trigger evts: 826044  
Target: <sup>24</sup>Mg Scaler evts: 3082  
draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.752 2: 1.206 3: 1.268 4: 1.235  
Si rates (kHz) 1: 15.0 2: 14.5 3: 25.1 4: 51.7

K600 angle: 0 deg Mental Health Level:  
Q: A D1: S A H: M A D2: E A K: A  
VDC efficiency X1 92.9 U1 94.4 X2 93.5  
D2 NMR

Run comment: Bkg

Run #: 3033  
Start: 00:01 Current: 6.7 nA Trigger rate: 264 Hz  
Stop: 00:18 CI Range: 20 nA Trigger evts: 244633  
Target: Mylar Scaler evts: 955  
draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.751 2: 1.204 3: 1.264 4: 1.231  
Si rates (kHz) 1: 6.9 2: 8.7 3: 13.0 4: 15.1

K600 angle: 0 deg Mental Health Level:  
Q: A D1: S A H: M A D2: E A K: A  
VDC efficiency X1 91.8 U1 92.0 X2 95.0  
D2 NMR

Run comment: Halo check

Run #: 3034  
Start: 00:17 Current: 6.4 nA Trigger rate: 272 Hz  
Stop: 00:26 CI Range: 20 Trigger evts: \_\_\_\_\_  
Target: Empty Scaler evts: \_\_\_\_\_  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.767 2: 1.204 3: 1.263 4: 1.231  
Si rates (kHz) 1: 97.0 2: 4.5 3: 10 4: 15

K600 angle: 0 deg Mental Health Level:  
Q: A D1: S A H: M A D2: E A K: A  
VDC efficiency X1 90 U1 relevant X2 See notes  
D2 NMR

Run comment: <sup>24</sup>Mg data

Run #: 3035  
Start: 00:25 Current: 6 nA Trigger rate: 270 Hz  
Stop: 01:31 CI Range: 20 Trigger evts: 1054304  
Target: <sup>24</sup>Mg #3 Scaler evts: \_\_\_\_\_  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.776 2: 1.228 3: 1.287 4: 1.254  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:  
Q: A D1: S A H: M A D2: E A K: E A  
VDC efficiency X1 93 U1 97 X2 96  
D2 NMR

Run comment: Mg

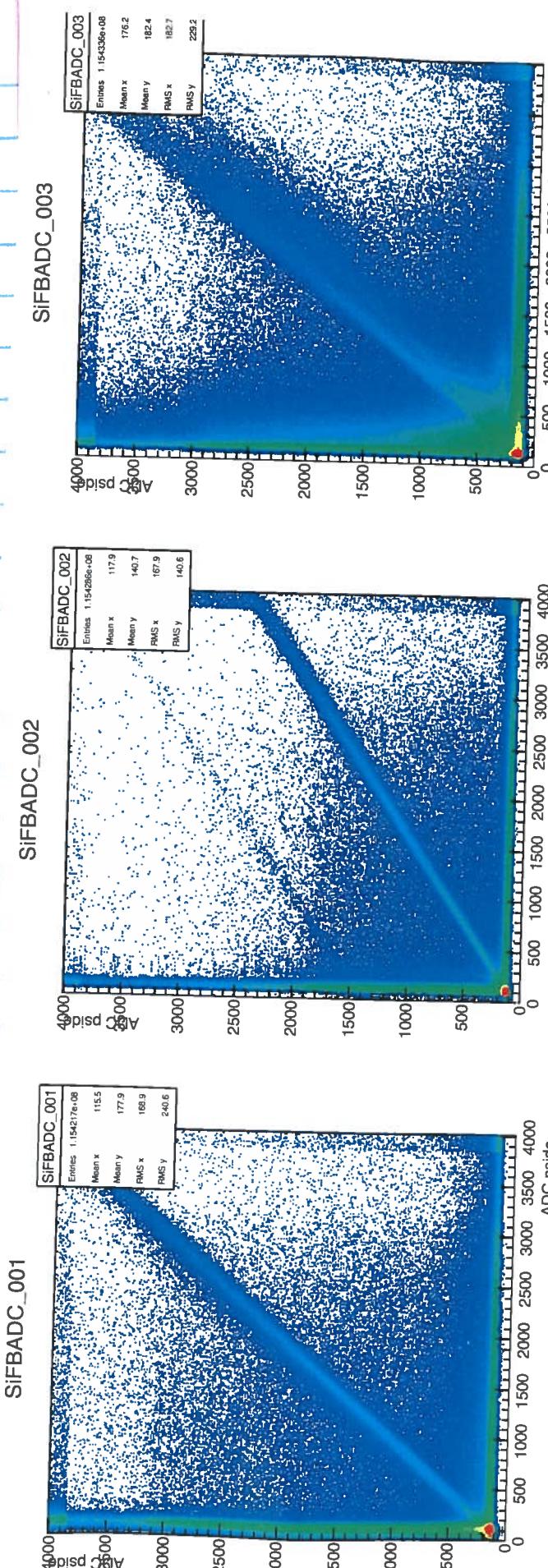
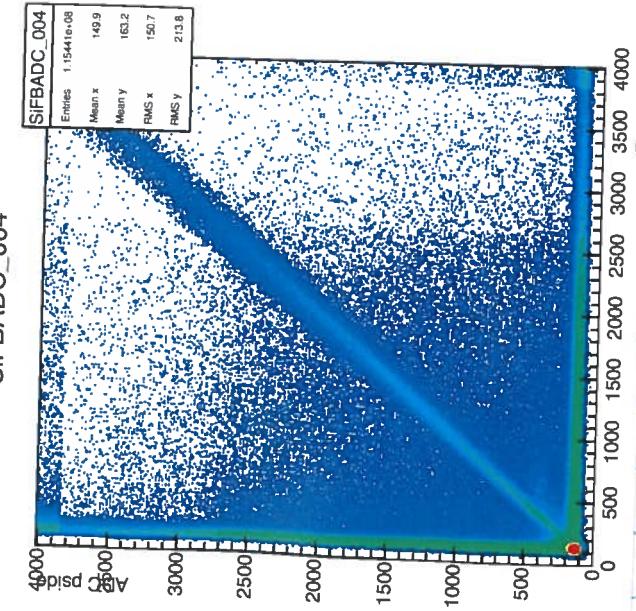
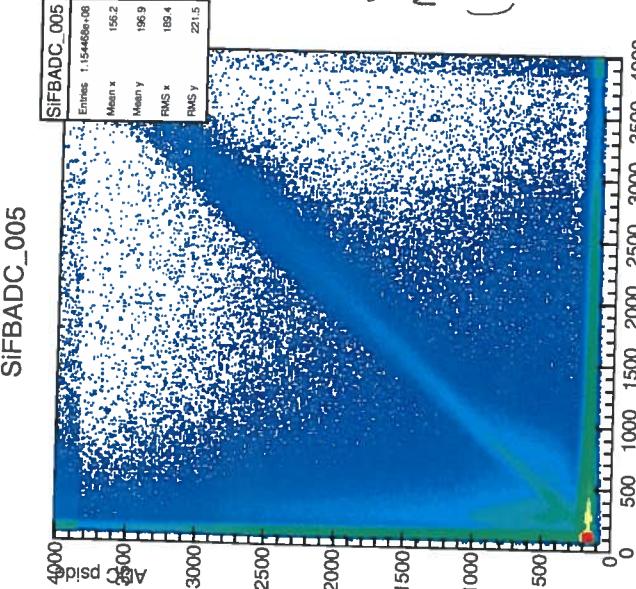
Run #: 3036  
Start: 01:32 Current: 7 nA Trigger rate: 323 Hz  
Stop: 02:33 CI Range: 20 Trigger evts: 926316  
Target: <sup>24</sup>Mg #3 Scaler evts: \_\_\_\_\_  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.796 2: 1.226 3: 1.285 4: 1.255  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:  
Q: S A D1: M A H: Y A D2: E A K: A  
VDC efficiency X1 94.24 U1 97.29 X2 96.41  
D2 NMR

Run comment: \_\_\_\_\_

Run #: \_\_\_\_\_  
Start: \_\_\_\_\_ Current: \_\_\_\_\_ nA Trigger rate: \_\_\_\_\_ Hz  
Stop: \_\_\_\_\_ CI Range: \_\_\_\_\_ Trigger evts: \_\_\_\_\_  
Target: \_\_\_\_\_ Scaler evts: \_\_\_\_\_  
draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg Mental Health Level:  
Q: \_\_\_\_\_ A D1: \_\_\_\_\_ A H: \_\_\_\_\_ A D2: \_\_\_\_\_ A K: \_\_\_\_\_ A  
VDC efficiency X1 \_\_\_\_\_ U1 \_\_\_\_\_ X2 \_\_\_\_\_

**SiFBADC\_004****SiFBADC\_005**

→ spectra as weekend before  
→ D2 spectrum looks  
good again. Koran  
method probably worked  
(plug in & out)

**Online RUN 3035****Run comment: MYLAR.**

Run #: 3037 Start: 02:36 Current: 5 nA Trigger rate: 217 Hz Stop: 02:51 CI Range: 20 Trigger evts: 195553 Target: #5 Scaler evts: draw\_me\_frontback() OK? OK draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg  
Q: A D1: A H: A D2: S A K: A D2 NMR  
Mental Health Level:  
VDC efficiency X1 96 U1 93 X2 93

**Run comment: Mg**

Run #: 3038 Start: 2:52 Current: 6 nA Trigger rate: 788 Hz Stop: 3:52 CI Range: 20 Trigger evts: 998577 Target: Mg #3 Scaler evts: 3502 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.811 2: 1.238 3: 1.298 4: 1.267  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg  
Q: S D1: D H: M D2: E A K: A D2 NMR  
Mental Health Level:  
VDC efficiency X1 93.8 U1 97.01 X2 97.02

**Run comment: Mg**

Run #: 3039 Start: 3:55 Current: 7 nA Trigger rate: 362 Hz Stop: 5:02 CI Range: 20 Trigger evts: 1.174M Target: 24Mg #3 Scaler evts: 3aw7 draw\_me\_frontback() OK? yes draw\_me\_TDC2D() OK? yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: 1.824 2: 1.246 3: 1.306 4: 1.276  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg  
Q: S D1: A H: M D2: E A K: A D2 NMR  
Mental Health Level:  
VDC efficiency X1 93.84 U1 97.00 X2 96.74

**Run comment: MYLAR**

Run #: 3040 Start: 05:05 Current: 6 nA Trigger rate: 284 Hz Stop: 5:23 CI Range: 20 Trigger evts: 283371 Target: MYLAR #5 Scaler evts: draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_  
Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg  
Q: S D1: A H: M D2: E A K: A D2 NMR  
Mental Health Level:  
VDC efficiency X1 \_\_\_\_\_ U1 \_\_\_\_\_ X2 \_\_\_\_\_

# Run 3041 Halo check

Start Rate 221 at 6 nA  
Stop 277 at 6 nA

Run comment: Mg

Run #: 3041  
Start: 5:29 Current: 6 nA Trigger rate: 201 Hz  
Stop: 6:18 CI Range: 20 Trigger evts: 863446  
Target:  $^{24}\text{Mg}$  #3 Scaler evts: 2867

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)	1: 1.827	2: 1.249	3: 1.308	4: 1.279	5: 1.448
Si rates (kHz)	1: 20	2: 28	3: 25	4: 55	5: 23

K600 angle: 0 deg  
Q: S A  
D1: A A  
H: M A  
D2: E A  
U1: 97.3  
X1: 93.5  
K: A  
X2: 96.6

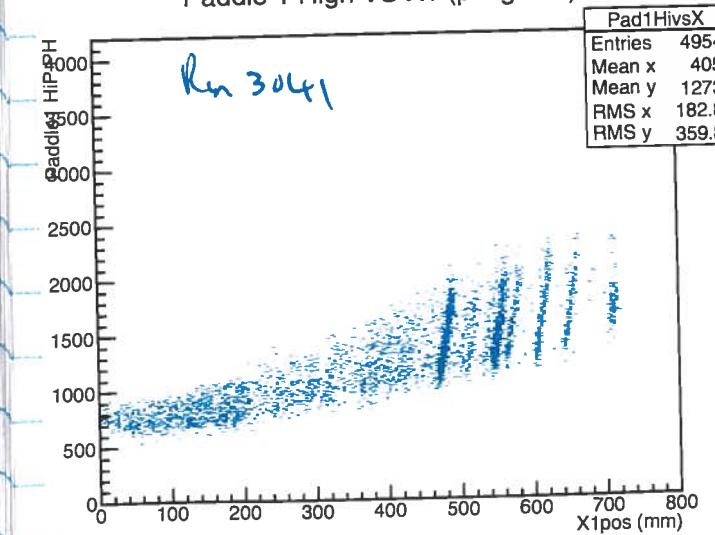
Mental Health Level:  
VDC efficiency  
D2 NMR

Rate in Si 1 sometimes very high.

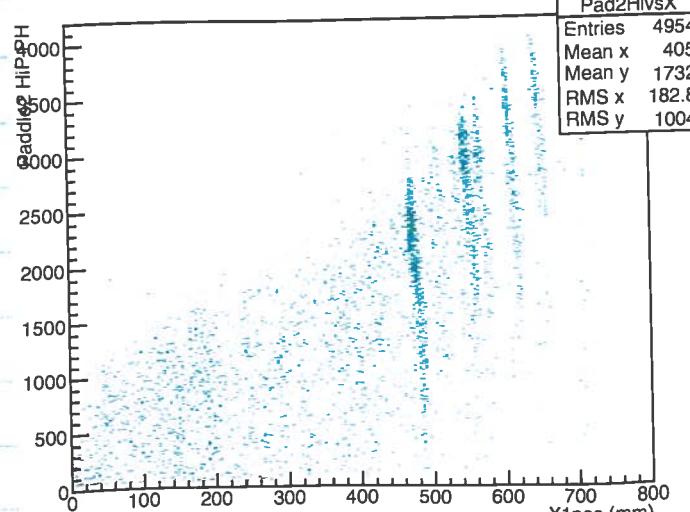
But basics of frontback looks ok.

Worried about TDC int of Si being.. too noisy. Inner rings?

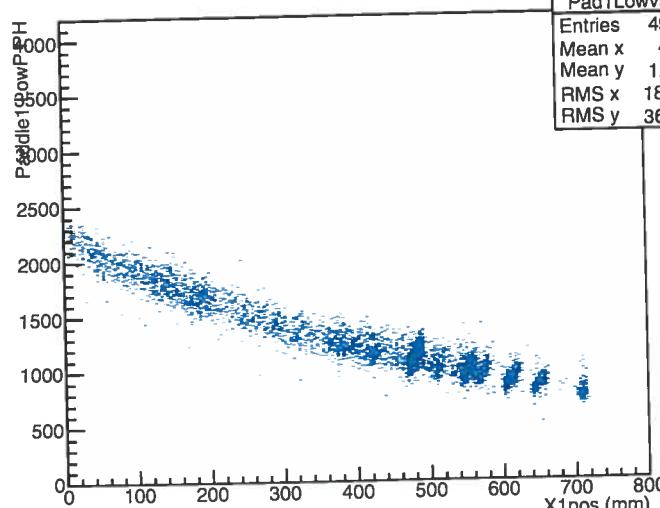
Paddle 1 High VS X1 (pid gated)



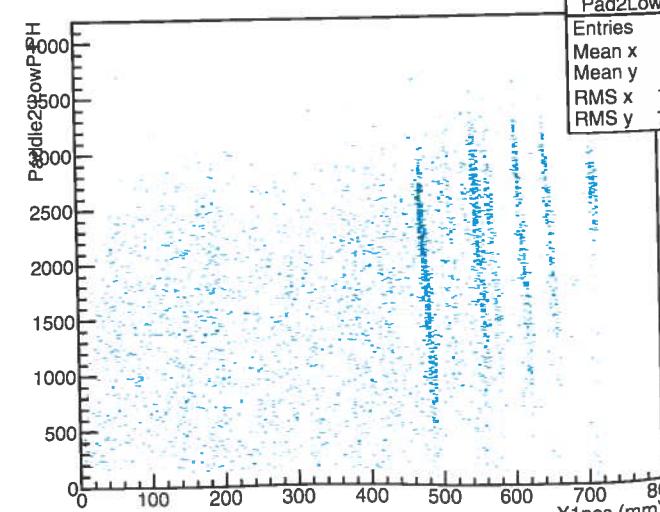
Paddle 2 High VS X1 (pid gated)



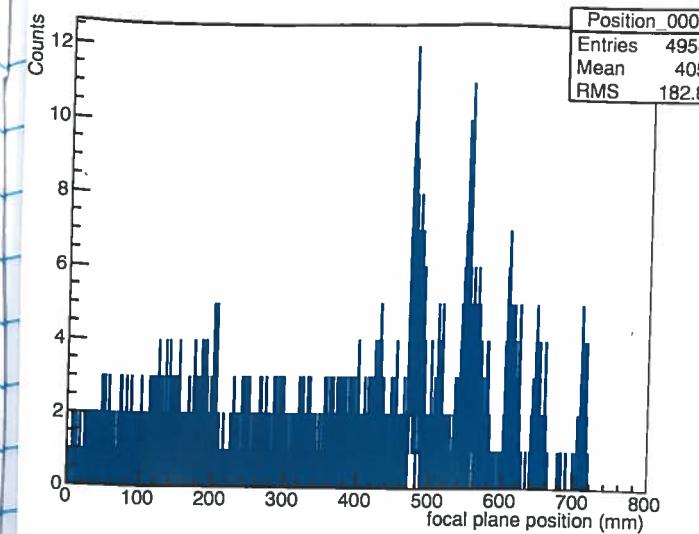
Paddle 1 Low VS X1 (pid gated)



Paddle 2 Low VS X1 (pid gated)

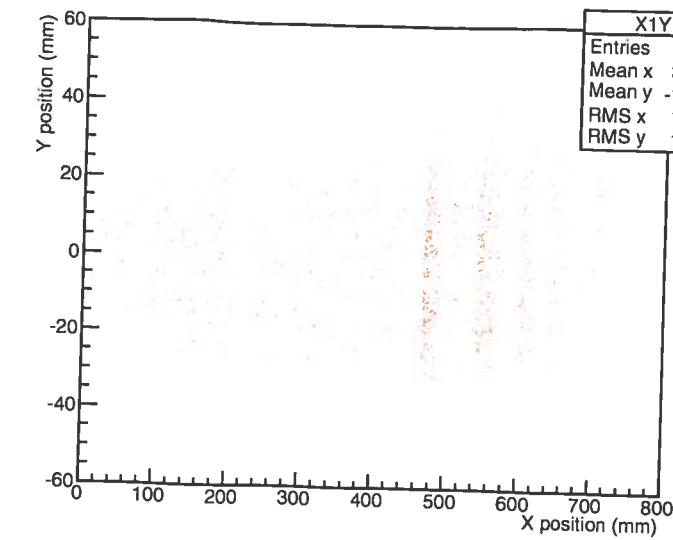


Position: X1 (chisq<0.2)

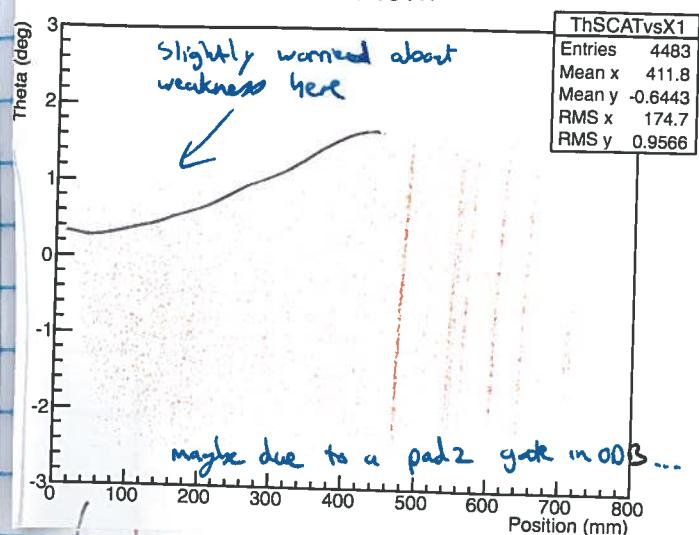


Run 3041

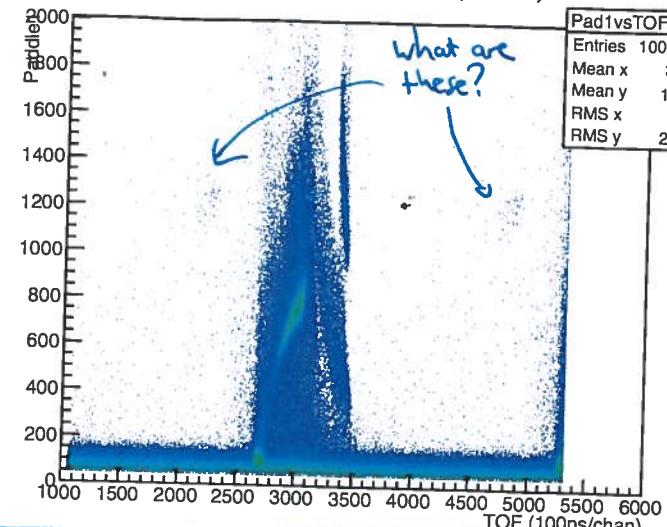
VDC1: Y VS X



ThSCAT vs X1



PID: paddle 1 vs TOF (TDC1)



Run comment: Halo

Run #: 3043 Start: 6:21 Current: 6 nA Trigger rate: 228 Hz

Stop: Target: MT Trigger evts: Scaler evts:

draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)	1: 1.810	2: 1.233	3: 1.291	4: 1.263	5: 1.432
Si rates (kHz)	1: 1.4	2: 1.5	3: 2.2	4: 4.0	5: 2.6

K600 angle: 0 deg  
Q: S A  
D1: A A  
H: M A  
D2: M A  
U1: A  
X1: A  
K: A  
X2: A

Mental Health Level:  
VDC efficiency  
D2 NMR

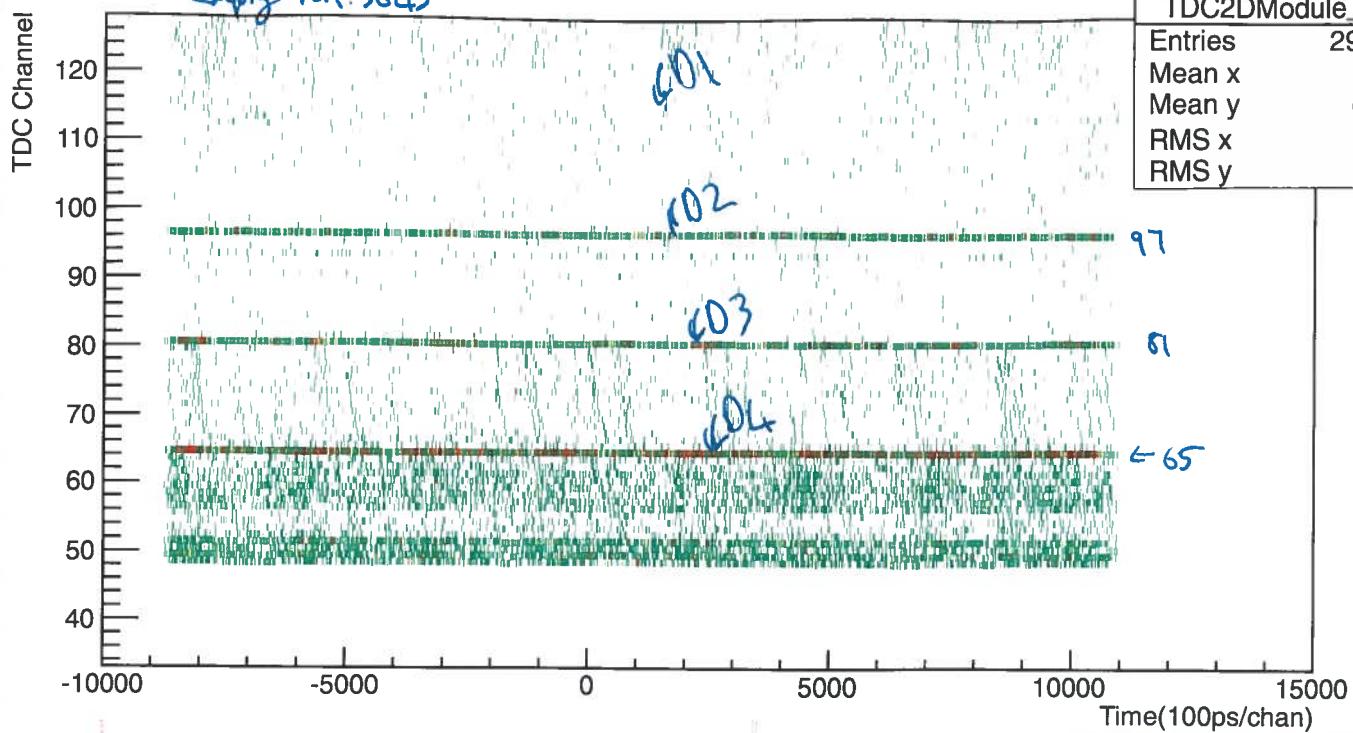
Not good!

Focalplane rate not too bad.  
But Si rates are bad.

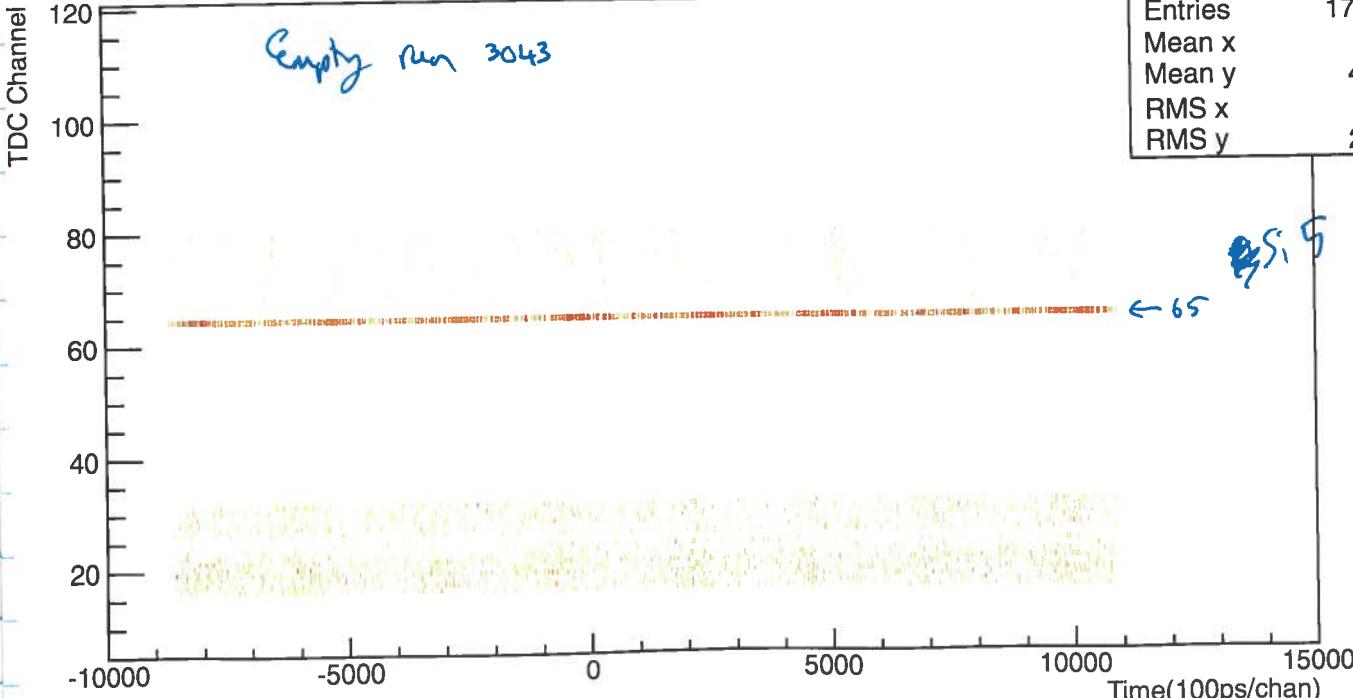
Opened gates in online ODB.

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TDC2DModule\_006



TDC2DModule\_005



The inner ring of 4 of the Si detectors seems to be  
counting hard.

This is also seen in Run 3042 (Mg data)

Holo tune run : 3044 - 3055

More slits and look at ~~Si~~ Si rates.  
First s-linsltd 25; Then slit 1P.

In the end we noticed that the frequently required SSC phase+ voltage changes had a possible effect on the Si rates. Making a small change to  $\phi_{SSC}$  and  $V_{SSC}$  and moving slit 1P by hand got the Si rates down to < 1000 per detector for empty target.

Run comment:	My data		
Run #:	3056		
Start:	7:20	Current:	6.6 nA
Stop:	08:27	CI Range:	20 Trigger rate: 335 Hz
Target:	Mg	Scaler evts:	798596
draw_me_frontback() OK?	Y	draw_me_TDC2D() OK?	Y
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No			
Si leakages (uA)	1: 1.802	2: 1.260	3: 1.299 4: 1.272
Si rates (kHz)	1: 23	2: 23	3: 23 4: 88 5: 26

K600 angle: 0 deg      Mental Health Level:  
Q: -141.125 A      ☺ ☺ ☹  
D1: 392.91 A      VDC efficiency  
H: -29.429 A      X1 \_\_\_\_\_  
D2: 391.162 A      U1 \_\_\_\_\_  
K: 6.367 A      X2 \_\_\_\_\_  
D2 NMR

Now the 1st ring is not counting more than the rest.  
Also, the structure in PIP plot of p9 is not seen any more.

8:30 frontend crashed → try to start again  
but doesn't work

⇒ we do a VMF SYSRESET. IT WORKS!

Run comment:	24Mg DATA RUN		
Run #:	3059		
Start:	08:43	Current:	6.7 nA
Stop:	09:44	CI Range:	20 Trigger rate: 280 Hz
Target:	24Mg #3	Trigger evts:	934521
draw_me_frontback() OK?	Yes	Scaler evts:	3518
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No			
Si leakages (uA)	1: 1.435	2: 1.253	3: 1.312 4: 1.282
Si rates (kHz)	1: 25.1	2: 25.0	3: 26.2 4: 61.7 5: 28.0

K600 angle: 0 deg      Mental Health Level:  
Q: 54 A      ☺ ☺ ☹  
D1: 54 A      VDC efficiency  
H: 41 A      X1 91.6  
D2: 5 E A      U1 96.7  
K: 5 A      X2 96.5  
D2 NMR

Magnets:

Q	-441.125
D1	392.910
H	-29.429
D2	391.462
L	6.367
Q6S	250

VDC HV:

VDC 1	-3.56 kV
VDC 2	-3.65 kV

Paddles:

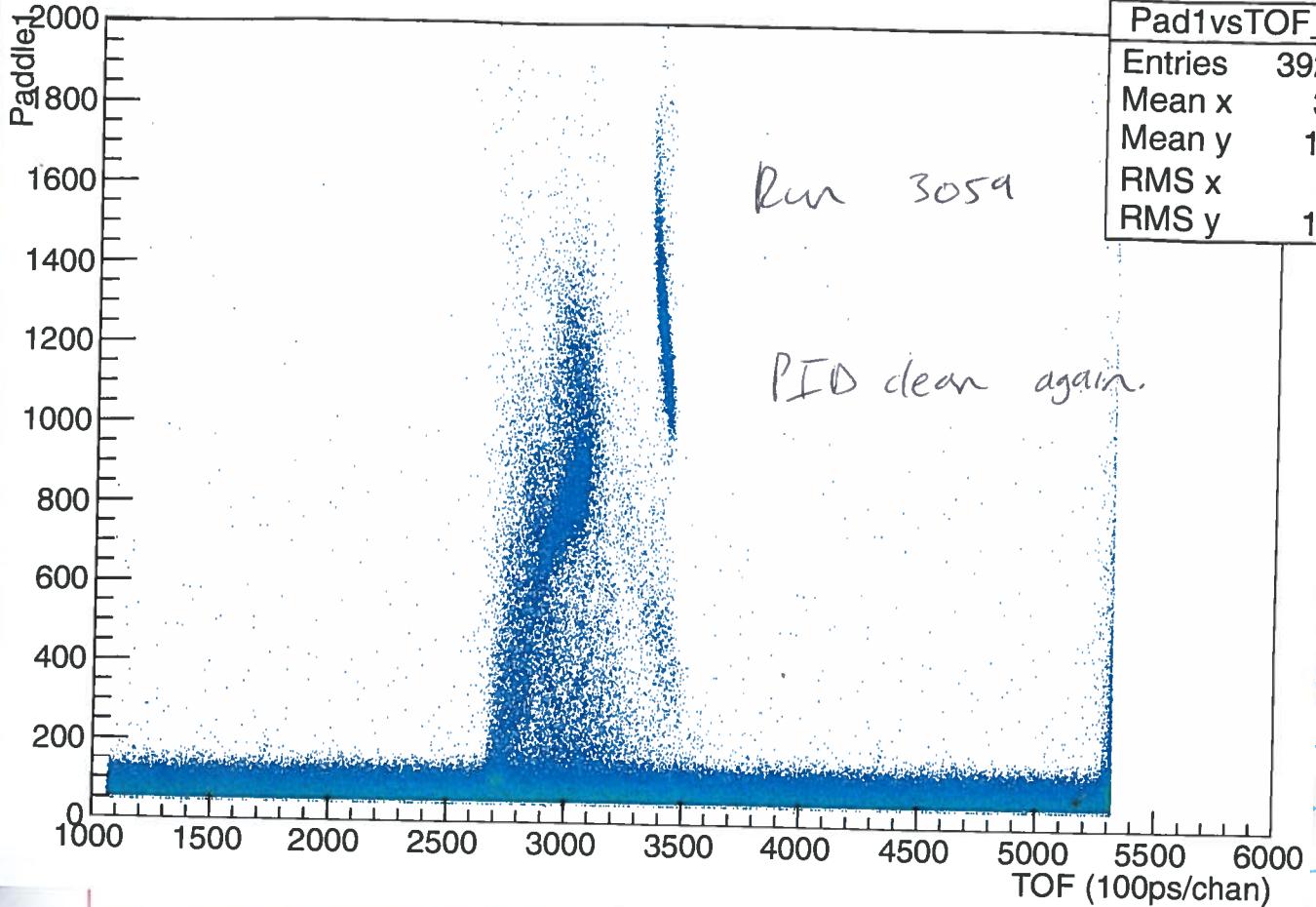
Pad1 Hi P	1460
Pad1 Lo P	1450
Pad2 Hi P	1400
Pad2 Lo P	1600

thresholds:

X1	10 V
U1	9.4 V
X2	9.0 V

PID: paddle 1 vs TOF (TDC1)

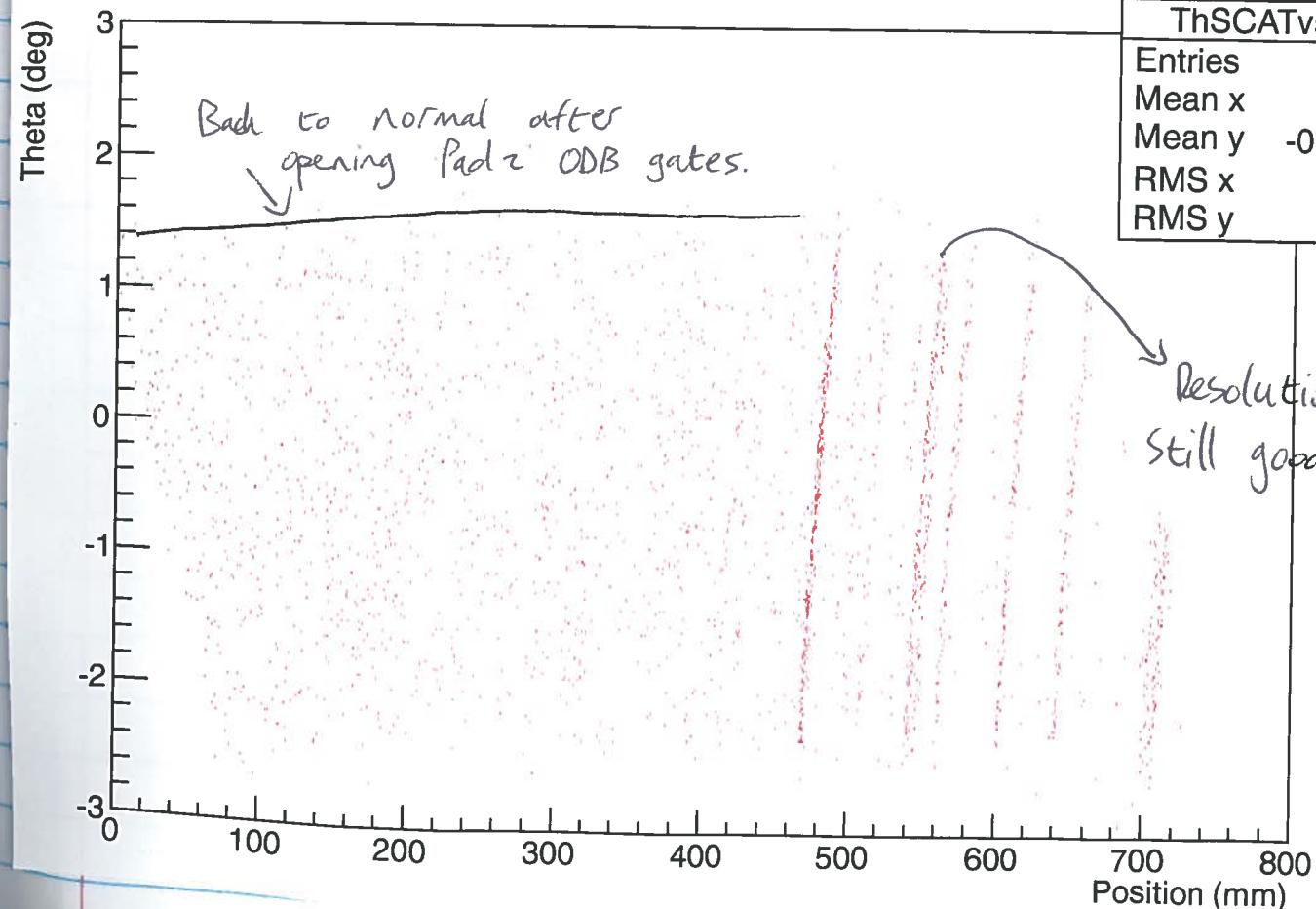
33



VDC wireplanes:

All at 500 V

Run 3051 ThSCAT vs X1



→ Run 3060: halo run.

200 cts for 5.2 nA. (Begin)

212 cts for 5.5 nA. (End)

Run comment: Blg

Run #: 3061

Start: 04:54 Current: 5.7 nA Trigger rate: 243 Hz

Stop: 10:11 CI Range: 20 nA Trigger evts: 20889

Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

1: 5.9 2: 6.0 3: 6.6 4: 9.9 5: 6.6

Si rates (kHz)

1: 5.9 2: 6.0 3: 6.6 4: 9.9 5: 6.6

K600 angle: 0 deg

Q: A D1: SA H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1: 90.5

U1: 88.1

X2: 94.9

Run comment:  $^{24}\text{Mg}$  coincidence

Run #: 3062

Start: 10:13 Current: 4.7 nA Trigger rate: 264 Hz

Stop: 11:19 CI Range: 20 nA Trigger evts: 956578

Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes

draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

1: 1.824 2: 1.248 3: 1.307 4: 1.277 5: 1.446

Si rates (kHz)

1: 16.3 2: 16.1 3: 18.8 4: 38.1 5: 18.4

K600 angle: 0 deg

Q: S D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1: 94.6

U1: 99.4

X2: 96.6

Run comment: My coincidence

Run #: 3063

Start: 11:20 Current: 6.5 nA Trigger rate: 281 Hz

Stop: 12:23 CI Range: 20 nA Trigger evts: 921477

Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes

draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

1: 16.4 2: 16.4 3: 16.6 4: 33.7 5: 15.3

Si rates (kHz)

1: 16.4 2: 16.4 3: 16.6 4: 33.7 5: 15.3

12:30 LEPS FILLED

Run comment: EMPTY - HALO CHECK

Run #: 3064

Start: 12:36 Current: 7.1 nA Trigger rate: 262 Hz

Stop: 12:42 CI Range: 20 Trigger evts: 86716

Target: EMPTY #6

draw\_me\_frontback() OK?

draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA)

1: 1 2: 1 3: 1 4: 1 5: 1

Si rates (kHz)

1: 1 2: 1 3: 1 4: 1 5: 1

K600 angle: 0 deg

Q: SA D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1:

U1:

X2:

VDC1 DRIPPED! (PHIL FAULT!) now back on

he shocked the 19" rack.

Run comment: MYLAR RUN

Run #: 3065

Start: 12:44 Current: 5.1 nA Trigger rate: 207 Hz

Stop: 12:52 CI Range: 20 Trigger evts:

Target: MYLAR #6

draw\_me\_frontback() OK? draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 2: 3: 4: 5:

Si rates (kHz) 1: 2: 3: 4: 5:

K600 angle: 0 deg

Q: SA D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1:

U1:

X2:

Run comment: MYLAR RUN

Run #: 12:52 3066

Start: 12:52 Current: 5.7 nA Trigger rate: 239 Hz

Stop: 13:02 CI Range: 20 Trigger evts: 132108

Target: MYLAR #6

draw\_me\_frontback() OK? draw\_me\_TDC2D0 OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 2: 3: 4: 5:

Si rates (kHz) 1: 2: 3: 4: 5:

K600 angle: 0 deg

Q: SA D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1: 91.30

U1: 90.16

X2: 94.42

Run comment:  $^{24}\text{Mg}$  DATA RUN

Run #: 3067

Start: 13:05 Current: 6.2 nA Trigger rate: 184 Hz

Stop: 14:09 CI Range: 20 Trigger evts: 914560

Target:  $^{24}\text{Mg}$  #3

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.832 2: 1.256 3: 1.814 4: 1.285 5: 1.455

Si rates (kHz) 1: 16.6 2: 16.7 3: 17.5 4: 41.0 5: 18.4

K600 angle: 0 deg

Q: SA D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1: 93.6

U1: 95.8

X2: 96.8

Run comment:  $^{24}\text{Mg}$  coincidences

Run #: 3068

Start: 14:10 Current: 5.8 nA Trigger rate: 231 Hz

Stop: 15:18 CI Range: 20 nA Trigger evts: 884347

Target:  $^{24}\text{Mg}$

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.853 2: 1.262 3: 1.321 4: 1.291 5: 1.469

Si rates (kHz) 1: 19.8 2: 19.3 3: 20.2 4: 47.4 5: 21.3

K600 angle: 0 deg

Q: SA D1: A H: M D2: E K: A

Mental Health Level:

☺ ☺ ☹

VDC efficiency

X1: 92.3

U1: 94.8

X2: 98.8

- Run 3069: halo check.

Start: 187 cts @ 4.7 nA. (< 40 cts for 1 nA)

End: 219 cts @ 5.4 nA. (40.5 cts for 1 nA).

Run comment: Bkg

Run #: 3070  
 Start: 15:27 Current: 3.4 nA Trigger rate: 234 Hz  
 Stop: 15:46 CI Range: 20 nA Trigger evts: 290450  
 Target: Mylar Scaler evts: 1120  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 6.0 2: 6.1 3: 7.1 4: 11.2  
 Si rates (kHz) 1: 6.0 2: 6.1 3: 7.1 4: 11.2

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: A A  
 D2: M A  
 U1: E A  
 X1: 96.3  
 U2: 92.2  
 X2: 94.7  
 VDC efficiency  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  coincidences

Run #: 3071  
 Start: 15:50 Current: 5.5 nA Trigger rate: 270 Hz  
 Stop: 17:00 CI Range: 20 nA Trigger evts: 934986  
 Target:  $^{24}\text{Mg}$  Scaler evts: 4101  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.851 2: 1.765 3: 1.324 4: 1.294  
 Si rates (kHz) 1: 19.2 2: 18.7 3: 19.6 4: 49.6

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M A  
 U1: E A  
 X1: 93.0  
 U2: 97.3  
 X2: 97.0  
 VDC efficiency  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  coincidence

Run #: 3072  
 Start: 17:01 Current: 6.5 nA Trigger rate: 259 Hz  
 Stop: 18:07 CI Range: 20 nA Trigger evts: 931260  
 Target:  $^{24}\text{Mg}$  Scaler evts: 3846  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.868 2: 1.27 3: 1.330 4: 1.300  
 Si rates (kHz) 1: 21.9 2: 21.4 3: 22.9 4: 56.1

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M E A  
 U1: E A  
 X1: 92.8  
 U2: 96.3  
 X2: 94.8  
 VDC efficiency  
 D2 NMR

→ Run 3073: Halo check

Begin: 234 cts @ 6.0 nA → 39 cts for 1 nA.  
 End: 270 cts @ 6.9 nA → 50 cts for 1 nA.

Run comment: Bkg

Run #: 3074  
 Start: 18:18 Current: 6.6 nA Trigger rate: 231 Hz  
 Stop: 18:35 CI Range: 20 nA Trigger evts: 228636  
 Target: Mylar Scaler evts: 1037  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 6.1 2: 6.0 3: 7.5 4: 10.9  
 Si rates (kHz) 1: 6.6 2: 6.6 3: 6.6 4: 6.6

PC Det

Run comment:  $^{24}\text{Mg}$  coincidence

Run #: 3075  
 Start: 18:38 Current: 6.4 nA Trigger rate: 270 Hz  
 Stop: 19:40 CI Range: 20 nA Trigger evts: 816402  
 Target:  $^{24}\text{Mg}$  Scaler evts: 3659  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.876 2: 1.276 3: 1.335 4: 1.305  
 Si rates (kHz) 1: 21.7 2: 21.8 3: 22.9 4: 54.9

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M E A  
 U1: E A  
 X1: 91.8  
 U2: 96.5  
 X2: 94.5  
 VDC efficiency  
 D2 NMR

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Run comment:  $^{24}\text{Mg}$  data

Run #: 3076  
 Start: 19:44 Current: 4.0 nA Trigger rate: 165 Hz  
 Stop: 20:55 CI Range: 20 nA Trigger evts: 1.018M  
 Target:  $^{24}\text{Mg}$  Scaler evts: 4128  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.879 2: 1.271 3: 1.329 4: 1.301  
 Si rates (kHz) 1: 11.5 2: 11.9 3: 12.4 4: 27.4

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M E A  
 U1: E A  
 X1: 95.3  
 U2: 95.0  
 X2: 92.5  
 VDC efficiency  
 D2 NMR

→ Run 3077: Halo check

Begin 198 cts for 4.5 nA. → 44 for 1 nA

18 for 4.4 → 41 for 1 nA

End 151 for 3.5 → 43 for 1 nA.

Run comment: Mylar #5

Run #: 3078  
 Start: 21:06 Current: 23.8 nA Trigger rate: 160 Hz  
 Stop: 21:28 CI Range: 20 n Trigger evts: 309254  
 Target: Mylar #5 Scaler evts: 1265  
 draw\_me\_frontback() OK? Yarp draw\_me\_TDC2D0 OK? Yuppers  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.858 2: 1.250 3: 1.316 4: 1.288  
 Si rates (kHz) 1: 3.6K 2: 3.5K 3: 4K 4: 6.7K

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M E A  
 U1: E A  
 X1: 94  
 U2: 89  
 X2: 95  
 VDC efficiency  
 D2 NMR

Run comment:  $^{24}\text{Mg}$  data

Run #: 3079  
 Start: 21:30 Current: 6.3 nA Trigger rate: 238 Hz  
 Stop: 22:34 CI Range: 20 nA Trigger evts: 851925  
 Target:  $^{24}\text{Mg}$  Scaler evts: 3723  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.877 2: 1.272 3: 1.330 4: 1.302  
 Si rates (kHz) 1: 25.3 2: 24.3 3: 25.1 4: 61.4

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A  
 D1: S A  
 H: M A  
 D2: M E A  
 U1: E A  
 X1: 93.6  
 U2: 97.8  
 X2: 94.8  
 VDC efficiency  
 D2 NMR

Run comment: My data

Run #: 3080  
 Start: 22:36 Current: 5.7 nA Trigger rate: 223 Hz  
 Stop: 23:39 CI Range: 20 nA Trigger evts: 814147  
 Target:  $^{24}\text{Mg}$  Scaler evts: 3704  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.882 2: 1.275 3: 1.333 4: 1.305 5: 1.494  
 Si rates (kHz) 1: 21.4 2: 20.9 3: 21.6 4: 51.7 5: 23.8

K600 angle: 0 deg  
 Mental Health Level:  
 Q: A D1: S A H: M A D2: E A K: A  
 VDC efficiency X1 92.4 U1 95.3 X2 94.5  
 D2 NMR

- 3081: Halo check

Begin 251 for 6.1 → 4 for 1 nA  
 212 for 5.1 → 4.5 for 1 nA  
 End 230 for 5.7 → 40 for 1 nA

Run comment: Blg

Run #: 3082  
 Start: 23:50 Current: 6.3 nA Trigger rate: 249 Hz  
 Stop: 00:06 CI Range: 20 nA Trigger evts: 21634  
 Target: Mylar  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 6.3 2: 6.1 3: 6.9 4: 11.4 5: 7.1  
 Si rates (kHz) 1: 6.3 2: 6.1 3: 6.9 4: 11.4 5: 7.1

K600 angle: 0 deg  
 Mental Health Level:  
 Q: A D1: S A H: M A D2: E A K: A  
 VDC efficiency X1 92.4 U1 96.2 X2 92.0  
 D2 NMR

$^{24}\text{Mg}$  data

Run comment: 3083  
 Run #: 3083  
 Start: 00:07 Current: 5.3 nA Trigger rate: 240 Hz  
 Stop: 01:08 CI Range: 20 nA Trigger evts: 275678  
 Target:  $^{24}\text{Mg} \#3$  Scaler evts: 3569  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.67 2: 1.27 3: 1.33 4: 1.30 5: 1.49  
 Si rates (kHz) 1: 19 2: 19 3: 20 4: 45 5: 21

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: S A H: M A D2: E A K: A  
 VDC efficiency X1 94.4 U1 96.4 X2 96.4  
 D2 NMR

$^{24}\text{Mg}$  data

Run comment: 3084  
 Run #: 3084  
 Start: 01:10 Current: 6.8 nA Trigger rate: 287 Hz  
 Stop: 02:12 CI Range: 20 nA Trigger evts: 9750744  
 Target:  $^{24}\text{Mg} \#3$  Scaler evts: 3619  
 draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.894 2: 1.281 3: 1.279 4: 1.310 5: 1.503  
 Si rates (kHz) 1: 27 2: 23 3: 24 4: 60 5: 27

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: M A H: E A D2: A A K: A  
 VDC efficiency X1 \_\_\_\_\_ U1 \_\_\_\_\_ X2 \_\_\_\_\_  
 D2 NMR

PL Blg

Run comment: PL Blg  
 Run #: 3085  
 Start: 02:15 Current: 6.1 nA Trigger rate: 277 Hz  
 Stop: 02:30 CI Range: 20 nA Trigger evts: 77  
 Target: Mylar #5 Scaler evts:  
 draw\_me\_frontback() OK? Ok draw\_me\_TDC2D() OK? Ok  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.29 2: 1.27 3: 1.33 4: 1.30 5: 1.50  
 Si rates (kHz) 1: 5.6 2: 6.9 3: 7.4 4: 11.3 5: 7.4

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: A A H: M A D2: E A K: A  
 VDC efficiency X1 92.65 U1 87.19 X2 92.05  
 D2 NMR

Halo check Rate 228 @ 5.7 mA 40  
 3086 186 @ 4.8 mA 38.3

↳ Note that it is written in the log as a Mylar run but it was not. I think I clicked on start accidentally before changing all the fields or something like that.

$^{24}\text{Mg}$  data

Run comment:  $^{24}\text{Mg}$  data  
 Run #: 3087  
 Start: 02:37 Current: 5.5 nA Trigger rate: 239 Hz  
 Stop: 03:39 CI Range: 20 Trigger evts: 831612  
 Target:  $^{24}\text{Mg} \#3$  Scaler evts:  
 draw\_me\_frontback() OK? Ok draw\_me\_TDC2D() OK? Ok  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.89 2: 1.28 3: 1.34 4: 1.31 5: 1.50  
 Si rates (kHz) 1: 18.8 2: 18.8 3: 20.0 4: 49.3 5: 25.0

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: A A H: M A D2: E A K: A  
 VDC efficiency X1 92.47 U1 95.85 X2 95.21  
 D2 NMR

$^{24}\text{Mg}$  data

Run comment:  $^{24}\text{Mg}$  data  
 Run #: 3088  
 Start: 03:40 Current: 5.6 nA Trigger rate: 28 Hz  
 Stop: 04:46 CI Range: 20 Trigger evts: 762450  
 Target:  $^{24}\text{Mg}$  Scaler evts: 3535  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.9 2: 1.29 3: 1.34 4: 1.31 5: 1.51  
 Si rates (kHz) 1: 20.0 2: 20.4 3: 21.6 4: 48.0 5: 20.6

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: A A H: M A D2: E A K: A  
 VDC efficiency X1 93.79 U1 96.35 X2 95.17  
 D2 NMR

Background

Run comment: Background  
 Run #: 3089  
 Start: 04:41 Current: 5.8 nA Trigger rate: 269 Hz  
 Stop: 04:57 CI Range: 20 nA Trigger evts: 213187  
 Target: Mylar #5 Scaler evts: 885  
 draw\_me\_frontback() OK? Ok draw\_me\_TDC2D() OK? Ok  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No  
 Si leakages (uA) 1: 1.89 2: 1.28 3: 1.33 4: 1.31 5: 1.51  
 Si rates (kHz) 1: 6.5 2: 6.0 3: 7.0 4: 11.4 5: 6.9

K600 angle: 0 deg  
 Mental Health Level:  
 Q: S A D1: A A H: M A D2: E A K: A  
 VDC efficiency X1 92.27 U1 86.88 X2 91.17  
 D2 NMR

## Halo check

Run 3090

4:59

241 Hz @ 5.7 mA → 42 Hz/mA  
211 Hz @ 5.4 mA → 39. Hz/mA  
228 Hz @ 5.7 mA → 40 Hz/mA

Run comment: 24 Mg data

Run #: 3091 Start: 05:04 Current: 5.1 nA Trigger rate: 212 Hz

Stop: 06:07 CI Range: 20 nA Trigger evts: 94274

Scaler evts: Target: 24 Mg draw\_me\_frontback() OK? ✓

draw\_me\_TDC2D() OK? ✓ Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.89 2: 1.78 3: 1.35 4: 1.32 5: 1.51

Si rates (kHz) 1: 21 2: 21 3: 21 4: 50 5: 23

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 92.1 U1 93.6 X2 93.5  
D2 NMR

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 92.1 U1 93.6 X2 93.5  
D2 NMR

Run comment: <sup>24</sup>Mg data

Run #: 3095

Start: 07:31 Current: 4.7 nA Trigger rate: 192 Hz

Stop: 08:27 CI Range: 20 Trigger evts: 808571

Target: <sup>24</sup>Mg #3 Scaler evts: 3317

draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 16.2 2: 15.5 3: 16.4 4: 37 5: 17.5

Si rates (kHz) 1: 1.90 2: 1.29 3: 1.35 4: 1.32 5: 1.52

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 92.2 U1 97.4 X2 95.6  
D2 NMR

Run comment: Mg data

Run #: 3096

Start: 08:30 Current: 5.4 nA Trigger rate: 214 Hz

Stop: 09:30 CI Range: 20 nA Trigger evts: 975912

Target: <sup>24</sup>Mg Scaler evts: 3535

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D() OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.931 2: 1.303 3: 1.361 4: 1.332 5: 1.537

Si rates (kHz) 1: 18.1 2: 17.7 3: 18.3 4: 41.6 5: 19.1

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 93.4 U1 87 X2 92.8  
D2 NMR

Run comment: <sup>24</sup>Mg data

Run #: 3092 Start: 06:02 Current: 5.2 nA Trigger rate: 221 Hz

Stop: 07:09 CI Range: 20 Trigger evts: 813341

Scaler evts: Target: <sup>24</sup>Mg draw\_me\_frontback() OK? ✓

draw\_me\_TDC2D() OK? ✓ Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.92 2: 1.79 3: 1.35 4: 1.32 5: 1.53

Si rates (kHz) 1: 20.0 2: 19.9 3: 19.1 4: 45.0 5: 19.6

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 89.61 U1 96.21 X2 97.78  
D2 NMR

Run comment: Mylar background

Run #: 3097

Start: 09:33 Current: 5.5 nA Trigger rate: 220 Hz

Stop: 09:49 CI Range: 20 Trigger evts: 198895

Target: mylar#5 Scaler evts: 923

draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.92 2: 1.29 3: 1.34 4: 1.32 5: 1.53

Si rates (kHz) 1: 5.3 2: 5.1 3: 5.7 4: 9.1 5: 0.8

ThSCAT vs X1

Entries	1352
Mean x	450.7
Mean y	-0.8324
RMS x	221.5
RMS y	0.9987

Run comment: Blg

Run #: 3093 Start: 07:11 Current: 5.7 nA Trigger rate: 246 Hz

Stop: 07:20 CI Range: 20 Trigger evts: 218340

Scaler evts: Target: mylar#5 draw\_me\_frontback() OK? ✓

draw\_me\_TDC2D() OK? ✓ Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

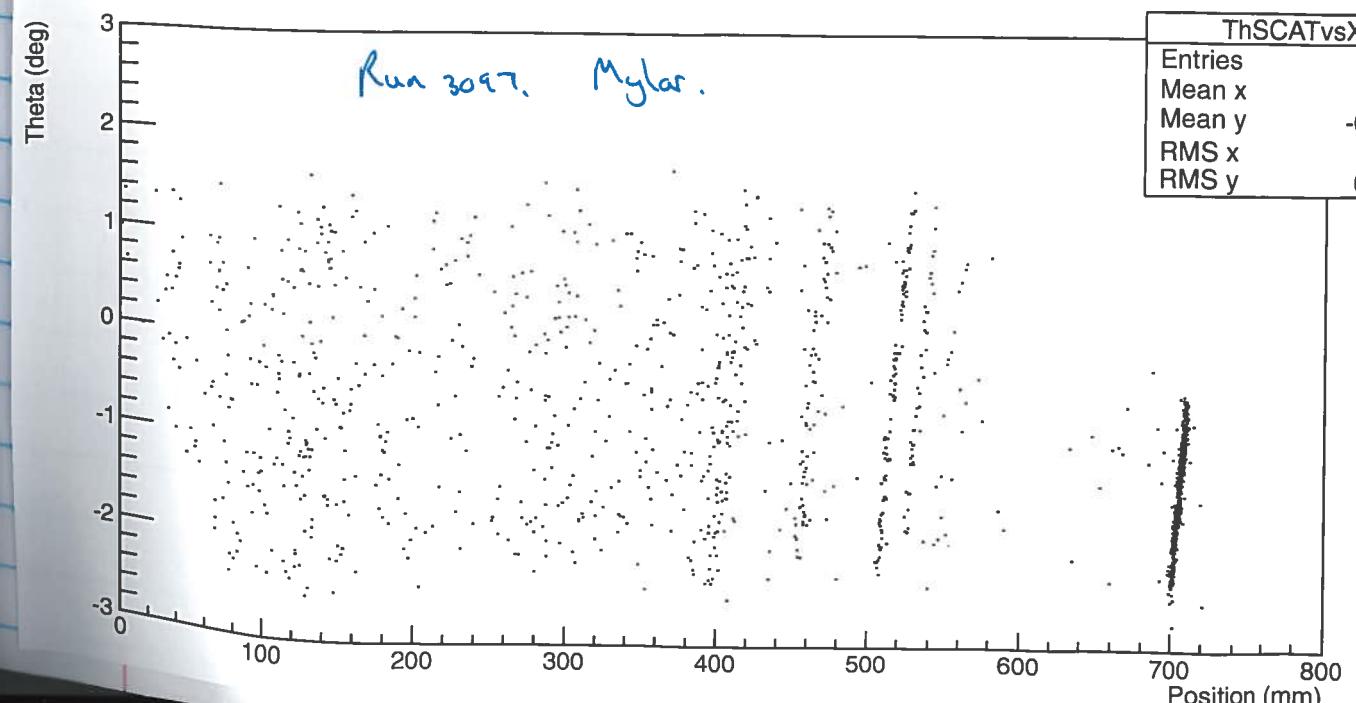
Si leakages (uA) 1: 1.90 2: 1.28 3: 1.34 4: 1.31 5: 1.51

Si rates (kHz) 1: 5.5 2: 5.5 3: 6.1 4: 9.3 5: 6.3

K600 angle: 0 deg  
Mental Health Level:  
Q: S A D1: A A H: M A D2: E A K: A A  
VDC efficiency X1 92.2 U1 88.96 X2 94.6  
D2 NMR

Run 3094 Halo check

192 Hz @ 5.1 mA 37.6 Hz/mA  
200 Hz @ 5.4 mA 37.0 Hz/mA



Stokes  
Sunday

9 am

## Magnets

Q	-441.125
D1	392.910
H	-29.429
D2	391.462
L	6.367
Q6S	7425.0

VDC<sub>1</sub> HV -3.56 kV

VDC<sub>2</sub> -365 kV

All wireplanes at 500 V.

## Paddles

pad <sub>1</sub>	WIP	1460
	LIP	1450
pad <sub>2</sub>	WIP	1400
	LIP	1600

## Thresholds

X <sub>1</sub>	10 V
U <sub>1</sub>	94 V
X <sub>2</sub>	9 V

Run comment: Halo run

Run #: 3098 Start: 9:50 Current: 1 nA Trigger rate: 172 Hz

Stop: 10:01 CI Range: 20 Trigger evts: 167184

Target: empty #6 Scaler evts: 623

draw\_me\_frontback() OK? nothing to see draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.91 2: 1.281 3: 1.345 4: 1.318

Si rates (kHz) 1: 300 2: 250 3: 800 4: 900

K600 angle: 0 deg

Q:	A	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	0
D2:	A	U1	95
K:	E	X2	92

Mental Health Level:

Q:	A	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	0
D2:	A	U1	95
K:	E	X2	92

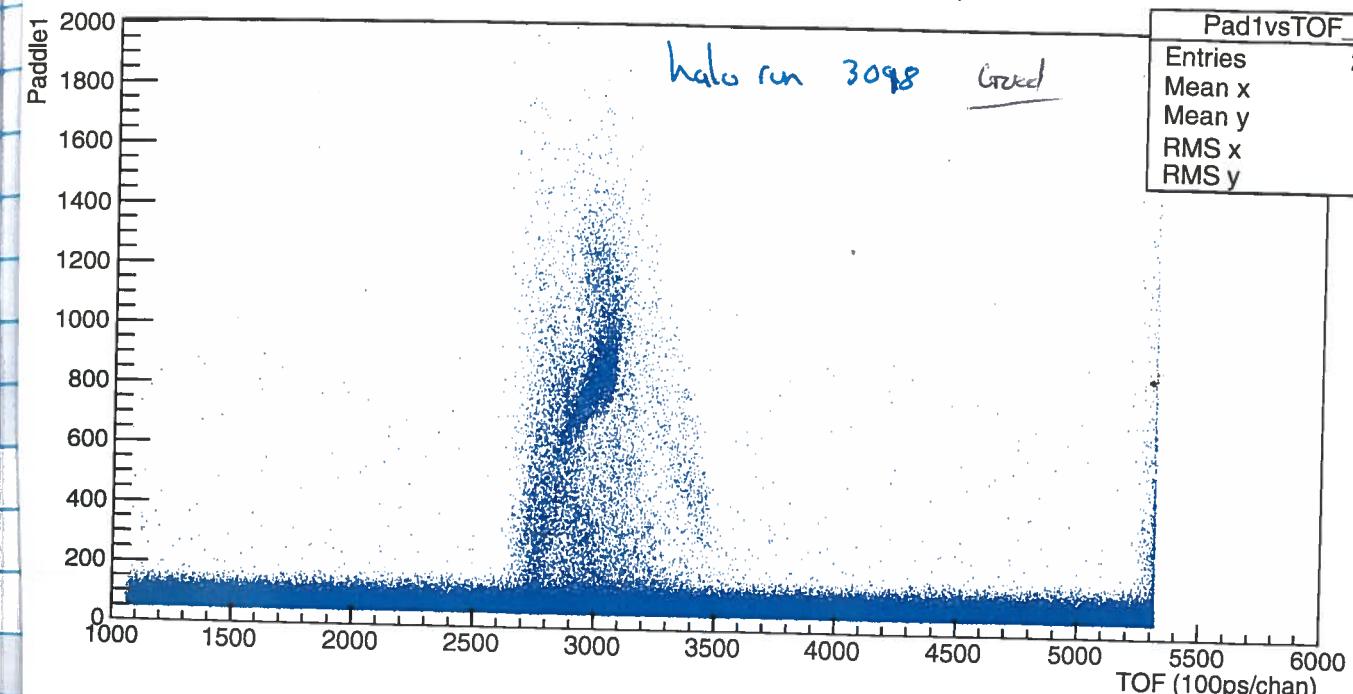
D2 NMR

5: 1.521

5: 500

43

PID: paddle 1 vs TOF (TDC1)



Run comment:

Run #: 3099 Start: 10:02 Current: 6 nA Trigger rate: 247 Hz

Stop: 11:00 CI Range: 20 Trigger evts: 907528

Target: <sup>24</sup>Mg #3 Scaler evts: 3384

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.924 2: 1.309 3: 1.362 4: 1.333

Si rates (kHz) 1: 20 2: 20 3: 21 4: 49

K600 angle: 0 deg

Q:	S	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	93
D2:	A	U1	96
K:	E	X2	96

Mental Health Level:

Q:	S	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	93
D2:	A	U1	96
K:	E	X2	96

Run comment: <sup>24</sup>Mg data

Run #: 3100 Start: 11:01 Current: 5.2 nA Trigger rate: 220 Hz

Stop: 12:01 CI Range: 20 Trigger evts: 926062

Target: <sup>24</sup>Mg #3 Scaler evts: 3547

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.912 2: 1.307 3: 1.365 4: 1.337

Si rates (kHz) 0.79mA 1: 24 2: 24 3: 25 4: 63

K600 angle: 0 deg

Q:	S	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	93
D2:	A	U1	96
K:	E	X2	95

Mental Health Level:

Q:	S	MENTAL HEALTH LEVEL:	( ) ( ) ( )
D1:	A	VDC efficiency	
H:	A	X1	93
D2:	A	U1	96
K:	E	X2	95

Daily Interlock interruption in run 3100

Sunday 12:01

- LEPs filling

Done ✓

Run comment:  $^{12}\text{C}$  check

Run #: 3101

Start: 12:13 Current: 7.2 nA Trigger rate: 311 Hz

Stop: 12:34 CI Range: 20 Trigger evts: 286398

Target:  $^{12}\text{C} \#4$  Scaler evts: 1184

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.940 2: 1.308 3: 1.365 4: 1.337 5: 1.346

Si rates (kHz) 1: 17 2: 17 3: 18 4: 38 5: 19

K600 angle: 0 deg  
Mental Health Level:  
Q: A D1: A H: A K: A  
VDC efficiency X1 93 U1 96.6 X2 95.9  
X1 93 U1 95.5 X2 95.9

Run comment:  $^{24}\text{Mg}$

Run #: 3103

Start: 13:02 Current: 7.3 nA Trigger rate: 296 Hz

Stop: 14:11 CI Range: 20 Trigger evts: 1.652 Mille

Target:  $^{24}\text{Mg}$  Scaler evts: 4674

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.944 2: 1.314 3: 1.372 4: 1.342 5: 1.551

Si rates (kHz) 0.8nA 1: 17.7 2: 18 3: 18.6 4: 1.5 5: 20

K600 angle: 0 deg

Mental Health Level:  
Q: S A D1: A A H: M A K: A A

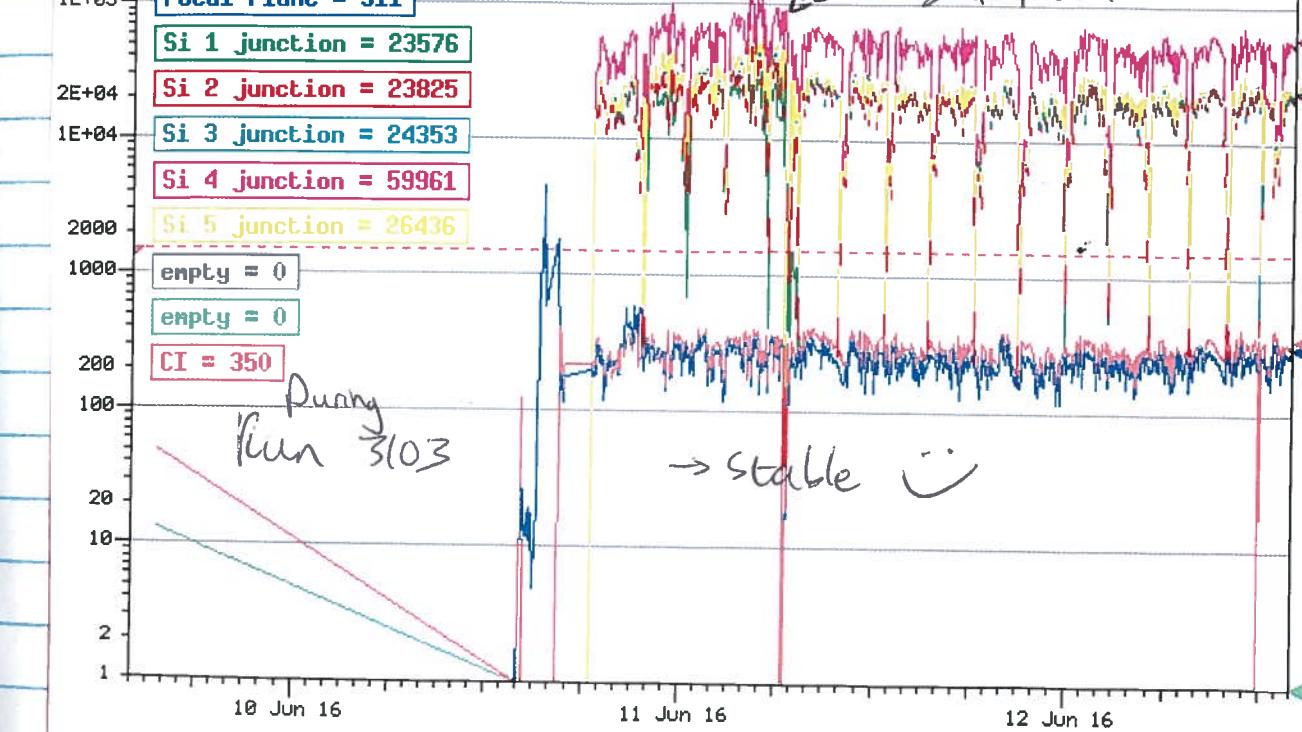
VDC efficiency

X1 93

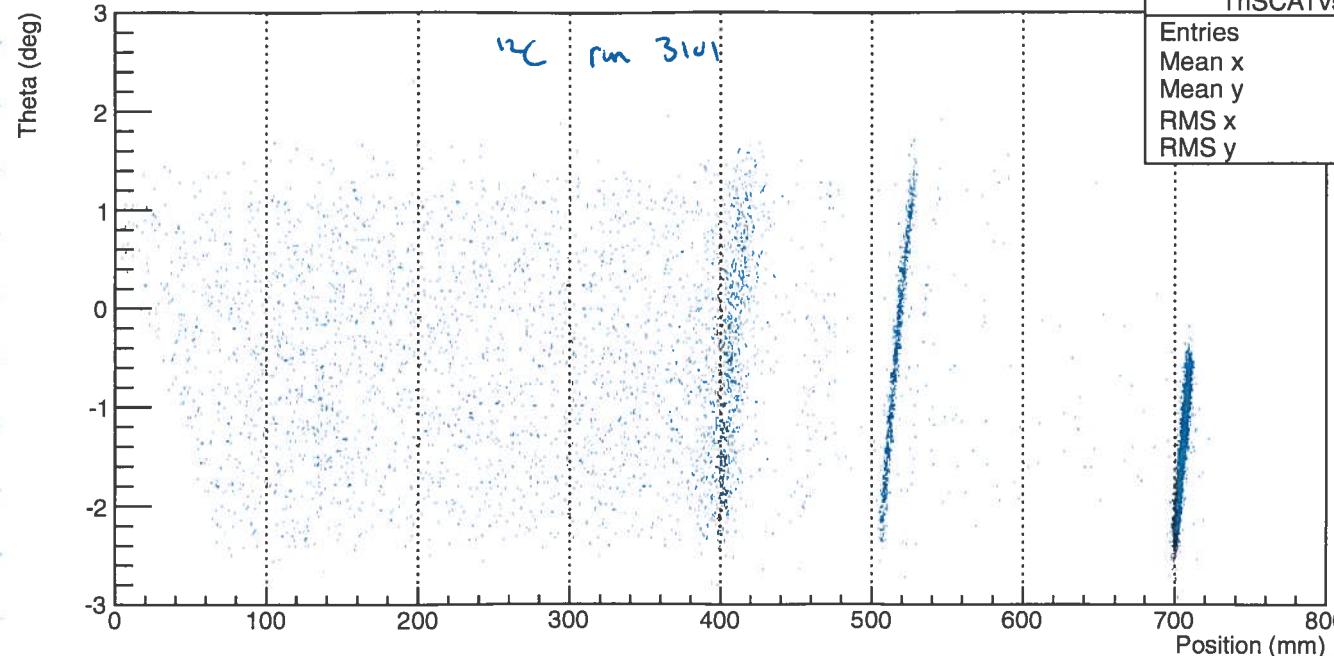
U1 96.6

X2 95.9

### AncDetectors/Ancilliary Detector Rates



ThSCAT vs X1



ThSCATvsX  
Entries  
Mean x  
Mean y  
RMS x  
RMS y

Run comment: Mylar

Run #: 3102

Start: 12:36 Current: 7.7 nA Trigger rate: 316 Hz

Stop: 12:59 CI Range: 20 Trigger evts: 398

Target: Mylar Scaler evts: 1357

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.924 2: 1.298 3: 1.356 4: 1.328 5: 1.534

Si rates (kHz) 1: 8 2: 8 3: 9 4: 14 5: 9

K600 angle: 0 deg  
Mental Health Level:

Q: S A D1: A A H: M A K: E A

VDC efficiency X1 93 U1 89 X2 94

Run comment:  $^{24}\text{Mg}$

Run #: 3104

Start: 14:13 Current: 7 nA Trigger rate: 270 Hz

Stop: 15:14 CI Range: 20 Trigger evts: 1.012 Mille

Target:  $^{24}\text{Mg}$  Scaler evts: 3576

draw\_me\_frontback() OK? Y draw\_me\_TDC2D() OK? Y

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5? Yes No

Si leakages (uA) 1: 1.951 2: 1.305 3: 1.362 4: 1.355 5: 1.553

Si rates (kHz) 0.7nA 1: 72 2: 72 3: 23 4: 64 5: 27

K600 angle: 0 deg

Mental Health Level:  
Q: S A D1: A A H: M A K: E A

VDC efficiency

X1 93

U1 97

X2 96

Run comment: Mylar b.g.

Run #: 3105  
 Start: 15:16 Current: 6.7 nA Trigger rate: 200 Hz  
 Stop: 15:33 CI Range: 20n Trigger evts: 265851  
 Target: #5 mylar Scaler evts: 973  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.931 2: 1.301 3: 1.358 4: 1.331 5: 1.542  
 Si rates (kHz) 1: 7K 2: 7K 3: 7K 4: 12K 5: 8K

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 95
D2: M A	U1 90
K: E A	X2 93
D2 NMR	94.6

Holo W/ mT

Run comment:  
 Run #: 3106  
 Start: 15:34 Current: 6.5 nA Trigger rate: 250 Hz  
 Stop: 15:40 CI Range: 20n Trigger evts: 106182  
 Target: MT Scaler evts: 386  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 62
D2: E A	U1 89
K: E A	X2 88
D2 NMR	94.6

$^{24}\text{Mg}$  data

Run comment:  
 Run #: 3107  
 Start: 15:42 Current: 6.5 nA Trigger rate: 260 Hz  
 Stop: 16:43 CI Range: 20n Trigger evts: 847697  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3525  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.943 2: 1.318 3: 1.374 4: 1.346 5: 1.555  
 Si rates (kHz) 1: 25K 2: 26K 3: 25K 4: 60K 5: 27K

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 93
D2: E A	U1 96
K: E A	X2 97
D2 NMR	94.6

Small beam interruption @ 3 min to check effect of radiation on camera.

Run comment:  $^{24}\text{Mg}$  Data

Run #: 3108  
 Start: 16:44 Current: 6.1 nA Trigger rate: 220 Hz  
 Stop: 17:46 CI Range: 20n Trigger evts: 900494  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3609  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 95
D2: E A	U1 93
K: E A	X2 95
D2 NMR	94.6

24 Mg data

Run comment:  
 Run #: 3109  
 Start: 17:47 Current: 6.8 nA Trigger rate: 220 Hz  
 Stop: 18:52 CI Range: 20n Trigger evts: 901076  
 Target:  $^{24}\text{Mg}$  #3 Scaler evts: 3794  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.964 2: 1.321 3: 1.378 4: 1.351  
 Si rates (kHz) 1: 18K 2: 19K 3: 20K 4: 55K

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 94
D2: E A	U1 97
K: E A	X2 96
D2 NMR	94.6

mT holo

Run comment:  
 Run #: 3110  
 Start: 18:54 Current: 7.2 nA Trigger rate: 320 Hz  
 Stop: 19:55 CI Range: 20n Trigger evts: 26382  
 Target: mT Scaler evts: 74  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 _____
D2: E A	U1 _____
K: A A	X2 _____
D2 NMR	94.6

330Hz @ 8.3 nA

Mylar

Run comment:  
 Run #: 3111  
 Start: 18:56 Current: 6.5 nA Trigger rate: 200 Hz  
 Stop: 19:16 CI Range: 20n Trigger evts: 307422  
 Target: #5 mylar Scaler evts: 1145  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.930 2: 1.302 3: 1.359 4: 1.332  
 Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_ 5: \_\_\_\_\_

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 93
D2: E A	U1 88
K: A A	X2 93
D2 NMR	94.6

$^{24}\text{Mg}$  #3

Run comment:  
 Run #: 3112  
 Start: 19:20 Current: 5.6 nA Trigger rate: 280 Hz  
 Stop: 20:19 CI Range: 20n Trigger evts: 928908  
 Target: #3  $^{24}\text{Mg}$  Scaler evts: 3684  
 draw\_me\_frontback() OK? draw\_me\_TDC2D() OK?  
 Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No  
 Si leakages (uA) 1: 1.960 2: 1.318 3: 1.375 4: 1.349  
 Si rates (kHz) 1: 25K 2: 25K 3: 26K 4: 63K

K600 angle: 0 deg	Mental Health Level:
Q: S A	☺ ☺ ☹
D1: A A	VDC efficiency
H: M A	X1 94
D2: E A	U1 96
K: E A	X2 96
D2 NMR	94.6

Run comment: 24Mg Data

Run #: 3113

Start: 20:20 Current: 6.1 nA Trigger rate: 250 Hz  
Stop: 21:24 Cl Range: 20n Trigger evts: 919252  
Target: 24Mg #3 Scaler evts: 3705

draw\_me\_frontback() OK? \_\_\_\_\_ draw\_me\_TDC2D0 OK? \_\_\_\_\_

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

Si rates (kHz) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: E A

D2 NMR

Mental Health Level:

VDC efficiency

X1 \_\_\_\_\_

U1 \_\_\_\_\_

X2 \_\_\_\_\_

49

S.

! Run stopped:

missing event from dma transfer.

@ 21:19:41

913215 → 913248.

TDC module 0.

VME sys reset.

! Run 3114 → Some DMA error on the chip.

Junk.

ARGH.

Cycle the main power.

No DMA error now.



Run comment: 24Mg Data

Run #: 3115

Start: 21:35 Current: 6.5 nA Trigger rate: 270 Hz  
Stop: 22:37 Cl Range: 20n Trigger evts: 1060M  
Target: 24Mg #3 Scaler evts: 3665

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.971 2: 1.324 3: 1.381 4: 1.355

Si rates (kHz) 1: 24.2 2: 31.0 3: 33.5 4: 83.9

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: E A

D2 NMR

Mental Health Level:

VDC efficiency

X1 93.3

U1 96.8

X2 96.0

5: 1.579

5: 35.9

Run 3116: halo check.

Begin 227 for 5.5 → 41.3 for 1

End 339 for 8.3 → 40.8 for 1

Still good.

Run comment: Bkg

Run #: 3117

Start: 22:44 Current: 5.7 nA Trigger rate: 252 Hz  
Stop: 23:05 Cl Range: 20 nA Trigger evts: 239432  
Target: Mylar Scaler evts: 960

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: \_\_\_\_\_ 2: \_\_\_\_\_ 3: \_\_\_\_\_ 4: \_\_\_\_\_

Si rates (kHz) 1: 5.4 2: 5.5 3: 6.1 4: 9.5

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: E A

D2 NMR

Mental Health Level:

VDC efficiency

X1 92.7

U1 91.9

X2 93.1

5: \_\_\_\_\_

5: \_\_\_\_\_

Run comment: My data

Run #: 3118

Start: 23:08 Current: 6.8 nA Trigger rate: 262 Hz  
Stop: 00:10 Cl Range: 20 nA Trigger evts: 1.070M  
Target: 24Mg Scaler evts: 3624

draw\_me\_frontback() OK? Yes draw\_me\_TDC2D0 OK? Yes

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.956 2: 1.323 3: 1.374 4: 1.353

Si rates (kHz) 1: 24.6 2: 23.9 3: 25.3 4: 60.6

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: E A

D2 NMR

Mental Health Level:

VDC efficiency

X1 92.6

U1 94.3

X2 95.4

5: 1.571

5: 26.6

Run comment: 24Mg DATA

Run #: 3119

Start: 00:11 Current: 6.7 nA Trigger rate: 300 Hz  
Stop: 01:11 Cl Range: 20 Trigger evts: 924444  
Target: 24Mg #3 Scaler evts: 3501

draw\_me\_frontback() OK? ok draw\_me\_TDC2D0 OK? ok

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.985 2: 1.333 3: 1.388 4: 1.363

Si rates (kHz) 1: 24.0 2: 23.9 3: 24.9 4: 63.0

K600 angle: 0 deg

Q: S A

D1: A A

H: M A

D2: E A

K: E A

D2 NMR

Mental Health Level:

VDC efficiency

X1 94

U1 97

X2 95

5: 1.592

5: 27.2

S.

Run comment: 24Mg data  
 Run #: 3120

Start: 01:12 Current: 4.2 nA Trigger rate: 180 Hz  
 Stop: 02:12 CI Range: 20-14 Trigger evts: 861759

Target: #3 Scaler evts: 3524  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.481 2: 1.378 3: 1.384 4: 1.358 5: 1.584  
 Si rates (kHz) 1: 14 2: 14 3: 20 4: 45! 5: 14

K600 angle: 0 deg		Mental Health Level:		
Q:	S	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	A	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	M	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	C	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:		A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1	95	
X1		U1	95	
X2			92	
D2 NMR				

Not sure why Si4 is much higher, looks like it has been like that for awhile...

Run comment: Bkg Run  
 Run #: 3121

Start: 02:14 Current: 7.2 nA Trigger rate: 282 Hz  
 Stop: 02:31 CI Range: 20 Trigger evts: 277193

Target: Nylon #15 Scaler evts:   
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1:  2:  3:  4:  5:   
 Si rates (kHz) 1:  2:  3:  4:  5:

K600 angle: 0 deg		Mental Health Level:		
Q:	S	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	A	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	E	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	C	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:		A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1	91	
X1		U1	89	
X2			93	
D2 NMR				

Run comment: HALO CHECK  
 Run #: 3122

Start: 02:33 Current: 5.5 nA Trigger rate: 228 Hz  
 Stop: 02:38 CI Range: 20 Trigger evts: 72735

Target: EMPTY #6 Scaler evts: 302  
 draw\_me\_frontback() OK?  draw\_me\_TDC2D() OK?

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1:  2:  3:  4:  5:   
 Si rates (kHz) 1:  2:  3:  4:  5:

K600 angle: 0 deg		Mental Health Level:		
Q:		A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	S	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	A	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	M	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:	E	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1		
X1		U1		
X2				
D2 NMR				

Run comment: 24Mg DATA  
 Run #: 3123

Start: 02:40 Current: 6.7 nA Trigger rate: 286 Hz  
 Stop: 03:40 CI Range: 20 Trigger evts: 930656

Target: 24Mg #3 Scaler evts: 3523  
 draw\_me\_frontback() OK? OK draw\_me\_TDC2D() OK? OK

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.966 2: 1.330 3: 1.385 4: 1.361 5: 1.578  
 Si rates (kHz) 1: 23.4 2: 25.0 3: 24.8 4: 61.0 5: 26.7

K600 angle: 0 deg		Mental Health Level:		
Q:		A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	S	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	M	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	C	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:		A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1	90.97	
X1		U1	94.27	
X2			93.96	
D2 NMR				

Run comment: 24Mg DATA  
 Run #: 3124

Start: 03:41 Current: 7.1 nA Trigger rate: 327 Hz  
 Stop: 04:41 CI Range: 20 Trigger evts: 1,009 M

Target: 24Mg #3 Scaler evts: 3524  
 draw\_me\_frontback() OK? OK draw\_me\_TDC2D() OK? OK

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.999 2: 1.302 3: 1.397 4: 1.371 5: 1.601  
 Si rates (kHz) 1: 28.4 2: 33.7 3: 37.7 4: 74.7 5: 32.8

K600 angle: 0 deg		Mental Health Level:		
Q:	S	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	A	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	M	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	E	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:		A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1	91.56	
X1		U1	95.22	
X2			97.85	
D2 NMR				

Run comment: 24Mg DATA  
 Run #: 3125

Start: 04:42 Current: 6.5 nA Trigger rate: 285 Hz  
 Stop: 05:44 CI Range: 20 Trigger evts: 1,068 M

Target: 24Mg #3 Scaler evts: 3639  
 draw\_me\_frontback() OK? OK draw\_me\_TDC2D() OK? OK

Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 2.001 2: 1.338 3: 1.393 4: 1.367 5: 1.600  
 Si rates (kHz) 1: 18.2 2: 18.4 3: 20.0 4: 51.6 5: 23.7

K600 angle: 0 deg		Mental Health Level:		
Q:		A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D1:	S	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H:	A	A	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2:	M	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
K:	E	A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VDC efficiency		X1	95.02	
X1		U1	98.24	
X2			93.56	
D2 NMR				

Run comment: BKG RUN  
 Run #: 8126

Start: 05:45 Current: 6.7 nA Trigger rate: 259 Hz  
 Stop: 06:00 CI Range: 20 Trigger evts: 201004

Target: MYLAR #5 Scaler evts: 845  
 draw\_me\_frontback() OK? ✓ draw\_me\_TDC2D() OK? ✓

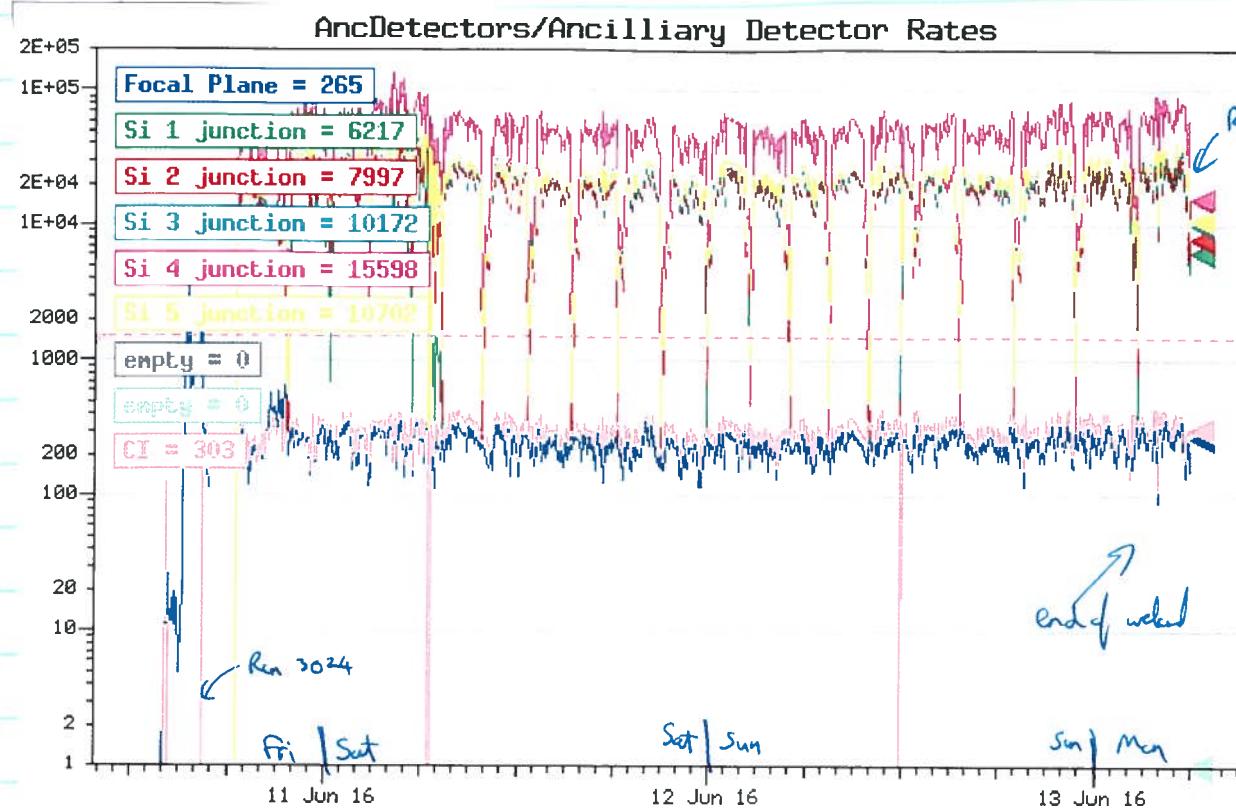
Buffer levels of QDC = ADC1 = ADC2 = ADC3 = ADC4 = ADC5 ? Yes No

Si leakages (uA) 1: 1.995 2: 1.338 3: 1.391 4: 1.368 5: 1.603  
 Si rates (kHz) 1:  2:  3:  4:  5:

K600 angle: 0 deg		Mental Health Level:		


<tbl\_r cells="

Sc



↗  
A good weekend.

For future reference: this shows the error messages  
shown in the terminal window tabs "Messages"  
during DAG problem on p48

```

Sun Jun 12 20:19:31 2016 [mtransition,INFO] Run #3112 stopped
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:28 2016 [k600fevme,INFO] FRONTEND MODE is 0 [default mode]
Sun Jun 12 20:20:29 2016 [mtransition,INFO] Run #3113 started
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting QDC Thresholds
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting ADC 32 Chan Thresholds, Mod[0]
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting ADC 32 Chan Thresholds, Mod[1]
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting ADC 32 Chan Thresholds, Mod[2]
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting ADC 32 Chan Thresholds, Mod[3]
Sun Jun 12 20:20:29 2016 [k600fevme,INFO] Setting ADC 32 Chan Thresholds, Mod[4]
Sun Jun 12 20:20:35 2016 [Lazy_Disk,INFO] Starting lazy_disk_copy '/diskcache/experiments/2016/PR254
/run03112.mid.gz' to '/k600data/online-storage/2016/PR254/run03112.mid.gz'
Sun Jun 12 20:20:39 2016 [Lazy_DiskOffline,INFO] Starting lazy_disk_copy '/diskcache/experiments
/2016/PR254/Data/run03112.mid.gz' to '/experiment-data/PR254/run03112.mid.gz'
Sun Jun 12 20:20:40 2016 [Lazy_Disk,INFO] Copy finished in 4.7 sec, 454.0 MiBytes at 96.8 MiBytes/sec
Sun Jun 12 20:20:40 2016 [Lazy_Disk,INFO] Disk[425] (cp:4.7s) /k600data/online-storage/2016/PR254
/run03112.mid.gz 453.997MB file NEW
Sun Jun 12 20:20:44 2016 [Lazy_DiskOffline,INFO] Copy finished in 4.9 sec, 454.0 MiBytes at 92.1
MiBytes/sec
Sun Jun 12 20:20:44 2016 [Lazy_DiskOffline,INFO] DiskOffline[425] (cp:4.9s) /experiment-data/PR254
/run03112.mid.gz 453.997MB file NEW
Sun Jun 12 21:19:41 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913215], cur [913248]
Sun Jun 12 21:19:41 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913279], cur [913312]
Sun Jun 12 21:19:41 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913343], cur [913376]
Sun Jun 12 21:19:41 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913407], cur [913440]
Sun Jun 12 21:19:41 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913471], cur [913504]
Sun Jun 12 21:19:42 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913535], cur [913568]
Sun Jun 12 21:19:42 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913599], cur [913632]
Sun Jun 12 21:19:42 2016 [k600fevme,ERROR] [k600fevme.c:2242:sortTDCData,ERROR] TDC[0] missing
event dma transfer: prev [913663], cur [913696]

```

↑ normal  
begin of run  
and file  
copying

↑ normal  
end of run

S.

Si Thresh holdsBefore last  $^{228}\text{Th}$  calib

D1P : -46 mV

D2P : -46 mV

D3P : -80 mV

D4P : -38 mV

D5P : -61 mV

D1/2N : -60 mV

D3/4N : -353 mV

DSN : -15 mV.

For last  $^{228}\text{Th}$  calibLeakagesD1 80V 1.601  $\mu\text{A}$ D2 80V 1.142  $\mu\text{A}$ D3 80V 1.226  $\mu\text{A}$ D4 80V 1.166  $\mu\text{A}$ D5 80V 1.333  $\mu\text{A}$ .

The final  $^{228}\text{Th}$  calibration is  
#3127. In PR259.

In /diskcochel/experiments/2016/PR259/Data.

Would like to copy to PR254  
directory later if possible.

S.  
10<sup>th</sup> August 2016  
S: N-side Cabling

D<sub>N</sub> 1 → 1

5 → 5

Breakout cable from the preamp P

↳ BNC connector 1 →  
BNC connector 1 on  
cable to amp.

So, preamp channel n → Amplifier channel n.

D<sub>2N</sub>

1 → 9

5 → 13

2 → 10

6 → 14

3 → 11

7 → 15

4 → 12

8 → 16

D<sub>3N</sub> (in)

15 → + (on the output breakout board)

8 → 0

" "

D<sub>4N</sub> (in)

15 → 15

" "

14 → 14

" "

:

CFD: D<sub>4</sub> different.



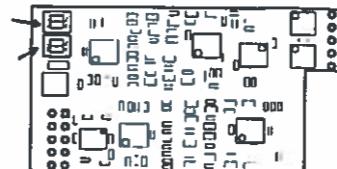
MSCF-16 F

16 fold shaper with CFD

Fraction and delay selection of the 4 channel CFD plug on modules

Fraction (sw 1) Example: CFD-120

On: 20 %  
Off: 40 %



Delay (sw 1, 2)

off off: 20 ns  
on off: 40 ns  
off on: 80 ns  
on on: 120 ns

For other CFD delays see section "Tables"  
See also label inside the movable module side plate.

#### Multiplicity trigger

- Each channel above threshold contributes to multiplicity level, a multiplicity trigger is generated for:  
lower multiplicity threshold <= multiplicity level <= upper multiplicity threshold
- Coincidence interval adjustable via RC from 20 ns up to 200 ns (default 120 ns = Value 128).
- The multiplicity trigger is delayed by the coincidence time to the trigger signal.
- Multiplicities selectable via remote control
- Lower multiplicity threshold: 1 ... 8 and inf
- Multiplicity chaining: multiplicity outputs from several modules can be connected, resulting in a total multiplicity level of all connected modules. Multiplicity trigger windows of the connected modules act independently on the total multiplicity.

#### Power consumption: (max 9 W)

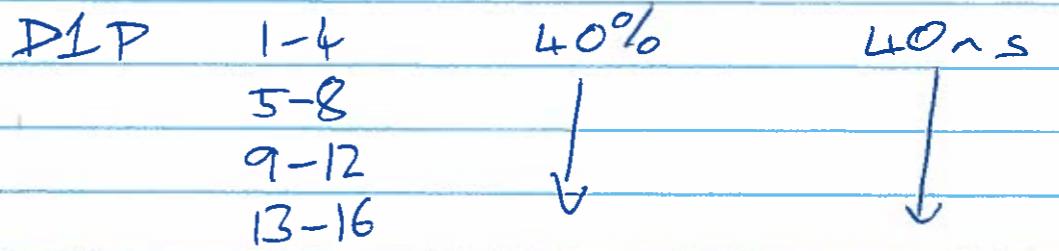
+ 6 V	360 mA
- 6 V	-780 mA
+12 V	270 mA

D<sub>1P</sub>: CFD fraction 40%  
Digay:

S.

Detector	Channels	Delay/ns	Fraction / %
D1P	1-4		40% 20
	5-8		20
	9-12		20
	13-16		20-40
D2P	1-4	120	40 40 20
	5-8	40	20
	9-12	80	20
	13-16	20	40
D3P	1-4	120	40
	5-8	80	20
	9-12		
	13-16		
D4P	1-4		see note.
	5-8		
	9-12		
	13-16		
DSP	1-4		
	5-8		
	9-12		
	13-16		

I took photos but they're really not clear. I'm going to go down to have another look.



D2P : All 60% + 40ns  
 D3P : All 40% + 40ns

D4P : All 20% + 80ns.

DSP : All 40% + 40ns.

D1/2 N: All 20% + 80 ns.

D3/4 N: All 40% + 40 ns

D5 N: All 20% + 80ns.

S.  
Brackets: Bottom  $\rightarrow$  55.9 mm  
Top: 54.4 mm