DAQ problem; solved by Lee (see p 31

Experiment LogBook for Experiment PR236 Logged in as "Philip adsley" FLOG

List | New | Edit | Delete | Reply | Duplicate | Find | Config | Logout | Help

Message ID: **11** Entry time: **Sat Mar 21 10:24:49 2015**

Run number:	1032
Author:	Philip adsley
Type:	Severe Error
System:	DAQ
Subject:	problems with k600vme1

When issuing this command:

[online@k600vme1 ~]$ ./k600fevme -h xiafe.tlabs.ac.za -e k600pr236

this is the output

[online@k600vme1 ~]$ ./k600fevme -h xiafe.tlabs.ac.za -e k600pr236
Frontend name : k600fevme
Event buffer size : 30000000
User max event size : 10000
cm_disconnect_experiment not called at end of program
[online@k600vme1 ~]$ driver not present? Cannot open VME device '/dev/vme_ctl', errno 6 (No such device or address)

I will initiate callout procedure now.

As we are waiting for the beam it is not that urgent: the DAQ should just be ready preferably by lunchtime today

RN

Lee's response →

Pulser tests:

Run 1032
1033
1034
1035

rom: ee Pool <funnyvoice@tlabs.ac.za>
Reply-To: funnyvoice@tlabs.ac.za
To: neveling@tlabs.ac.za
Cc: padsley@gmail.com
Subject: Re: ee callout
Date: Sat, 21 Mar 2015 11:05:49 +0200 (SAST)

i

Ok.

K600vme1 seems to be up. I say 'seems to be' cause you should run pulser through it to make sure things are ok.
############################

then:

as per my elog entry: please type reboot as online user to reboot.

[online@k600vme1 ~]$ reboot

Broadcast message from root (pts/0) (Sat Mar 21 13:00:26 2015):

The system is going down for reboot NOW!
[online@k600vme1 ~]$ Connection to k600vme1 closed by remote host.
Connection to k600vme1 closed.

####################

I will need to monitor stuff for awhile.

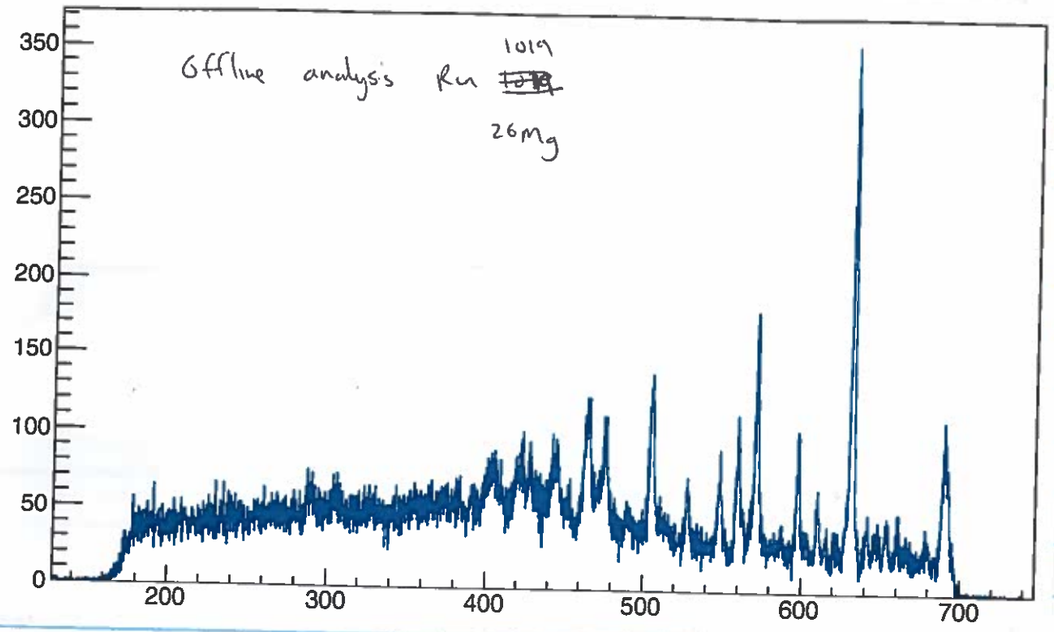
The issue is well know, and is due to /diskless nfs mount from xiafe.
It does not like power dips/outages which makes the kernel drivers react strangely, and produce stale files via the nfs. multiple reboots does not fix this issue.

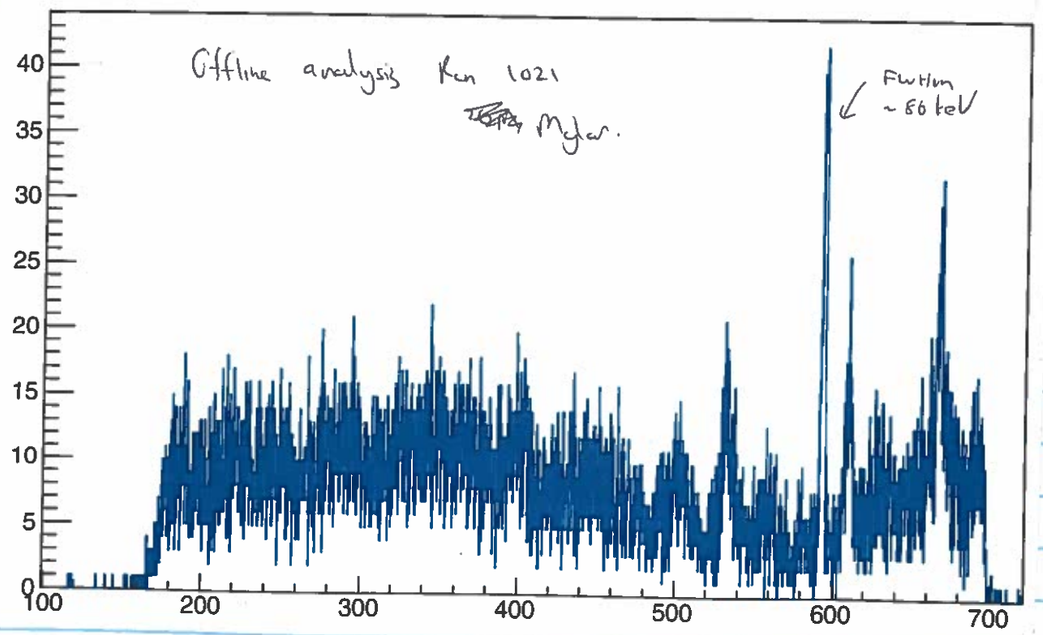
There is a solution on the cards. completely removing the /diskless mount.

Soon. Soon.

I'm at some local town thing here. which we are suppose to attend. I might not be super close to a terminal.

Regards
Lee



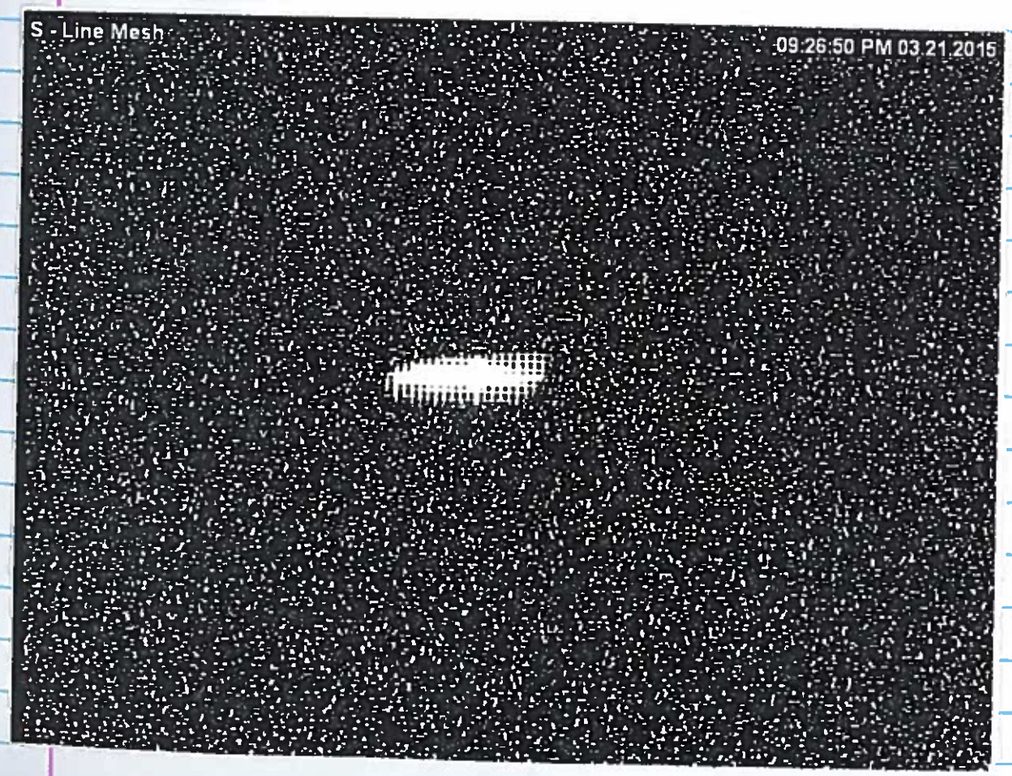


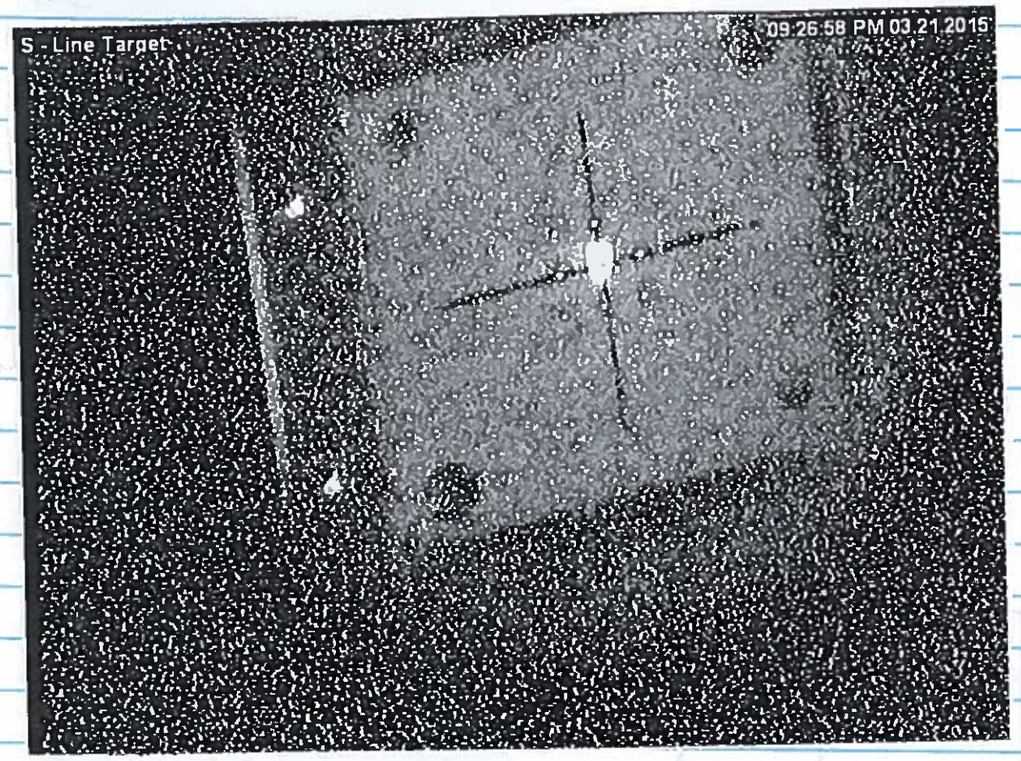
Offline analysis does not reproduce low energy resolutions even for faint beam runs.

Offline I get ~ 60keV for fb. runs.

* For faint beam problem solved → see comment p 41

Sat 21 March → Beam is "back" at 21:41, we are taking a preliminary look. Control room says beam profile is similar to last night (pictures attached)





Energie_NMR.txt

```
** EnMet Ver5.7 Oct 2013 **

** BEREKENDE ENERGIE **** CALCULATED ENERGY **        2015/03/21

Versnelde deeltjie        Accelerated particle :
  Element                                    = He
  Atoomgetal           = Atomic Number       = 2
  Massagetal           = Mass Number         = 4
  Rel. Atoommassa      = Rel. Atomic Mass    = 4.0026
  Natuurlike voorkoms  = Natural Abundance   = 100 %
  Ladingsgetal Q       = Charge State Q      = 2

              1 Tesla = 42.5759 MHz    [Linear Relation]

-------------------------------------------------------------

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

-------------------------------------------------------------

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

  B3P Beam Energy = 196.13 MeV from NMR = 1.02156 Tesla

-------------------------------------------------------------
```

10-15 pm

We were prevented from putting beam into the spectrometer by an interlock. FDS fixed this by changing the switch on the collimator carousel control box from zero to non-zero degree mode.

! This means that we are running in an unsafe mode.

The magnet set fields + read-back values are all within acceptable limits.
↳ Do not understand ~~what~~ why this interlock is occurring. Inst

Ops worked on it for an hour and the hole was bad. They tried all of the usual things. We're going to try with Q21P + Q6S to see if we can optimize.

Faint beam.

D1 → 437.24 A

Q: -481.065
H: -3001
D2: 287.054
K: 3.001

PA → I forgot to write down the old fields.

We use D1 → 412.8 A.

VDis on
1: -2.95 kV (3.21 kV in Data room)
2: -2.94 kV (3.01 kV)

Q21P is currently: 28.550 A
Q6S " " : 33.997 A.

ToF: [4740, 4780]
Pad 1: [1000, 2000]

σ: 0.72 mm Run 1037?

Q21P → 28.65

Frontend crashed.

Run 1039.

σ: 0.65 - 0.7 mm.

Seems to depend on whether the high pos shoulder is included.

Q21P to 28.75 A.

Run 1040.

σ: 0.63 mm.

Q21P to 28.95 A.

Run 1041.

σ: 0.72 mm.

Q21P back to 28.75 A.

Run 1042

Now Q6S from 33.999 A → 34.2 A σ = 0.66 mm

Run 1043: Q6S → 33.8 A σ = 0.77 mm

Run 1044: Q6S → 34.1 A σ = 0.7 mm

So, once we set Q21P, Q6S makes no difference. Go back to original settings and reverse the order of things

Run 1045: Q21P → 28.55 A σ = 0.74 mm
Q6S → 34 A

Run 1046: Q6S → 33.8 A σ = 0.83 mm

Run 1047 : Q6S → 34.2 A σ = 0.7 mm

Run 1048 : Q6S → 34.4 A σ = 0.64 mm

Run 1049 : Q6S → 34.6 A σ = 0.60 mm

Run 1050 : Q6S → 34.8 A σ = 0.54 mm

Run 1051 : Q6S → 35.0 A σ = 0.48 mm

Run 1052 : Q6S → 35.2 A σ = 0.44 mm

Run 1053 : Q6S → 35.4 A σ = 0.41 mm

Run 1054 : Q6S → 35.6 A σ = 0.41 mm

Run 1055 : Q6S → 35.8 A σ = 0.44 mm

Run 1056 : Q6S → 35.5 A σ = 0.40 mm

Now let's try tweak Q21P

Run 1057 : Q21P = 28.45 A σ = 0.39 mm
Q6S = 35.5 A ~ 0.4 mm

Run 1058 : Q21P → 28.35 A σ = 0.39 mm
~ 0.4 mm

Run 1059 : Q21P → 28.25 A σ = 0.38 mm
⇒ 31 keV
or rather 29 keV @ 33 keV/mm

Run 1060 : Q21P → 28.15 A σ = 0.4 mm

Run 1061 : Q21P → 28.25 A σ = 0.39 mm
↳ offline analysis yields 0.4 mm.
= 31 keV @ 33 keV/mm
Run 1061

We're going to take this. Now to check the beam spot again...

Phil turns VDCs off.

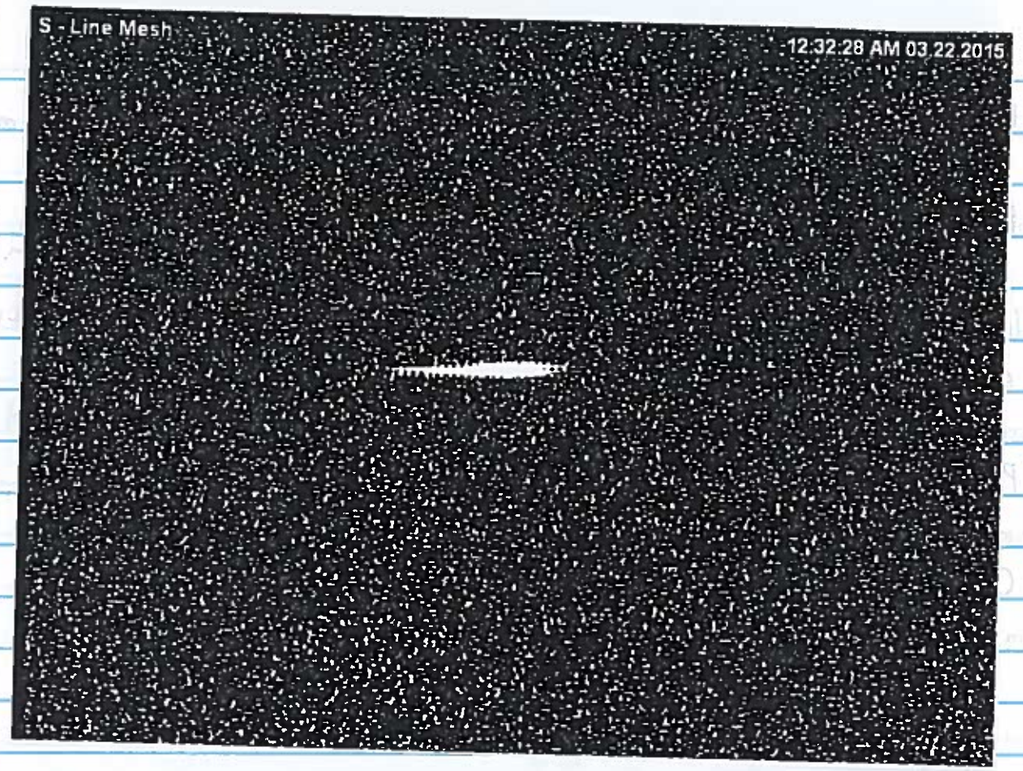
Change field settings using the superknob :

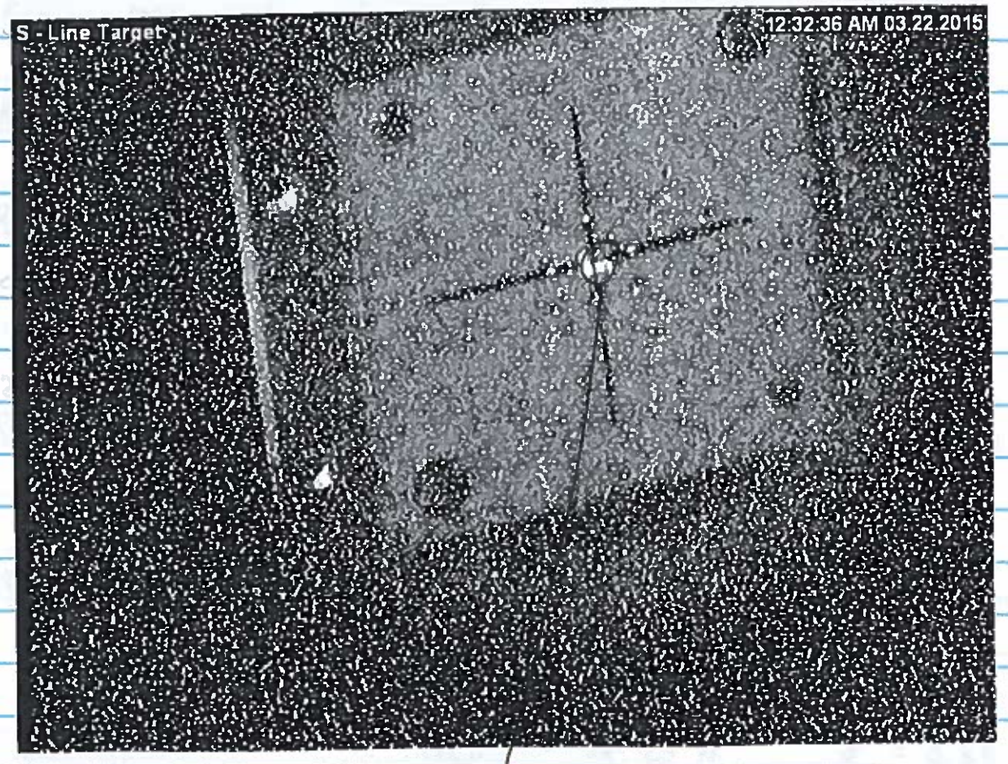
Q : -454.175
D1 : 412.800
H : -2.833
D2 : 271.008
K : 2.833

Look at Hotaruka + ~~Beam~~ target viewer.
↓
Weird oscillating blob on the beamstop.

Ops think it could be clipping slits.
↓
Playing with slits.

Can't fix it → Go to lab time.





This bit

Fbdy bit.

That attenuator fault is back. See note on the bottom of page 37.
Hdo tune: Runs 1062+1063.
ODB gates → TOF: [4825, 4875]

Pad 1: [1500, 2000]

Rate: ~100 Hz @ .5 nA.

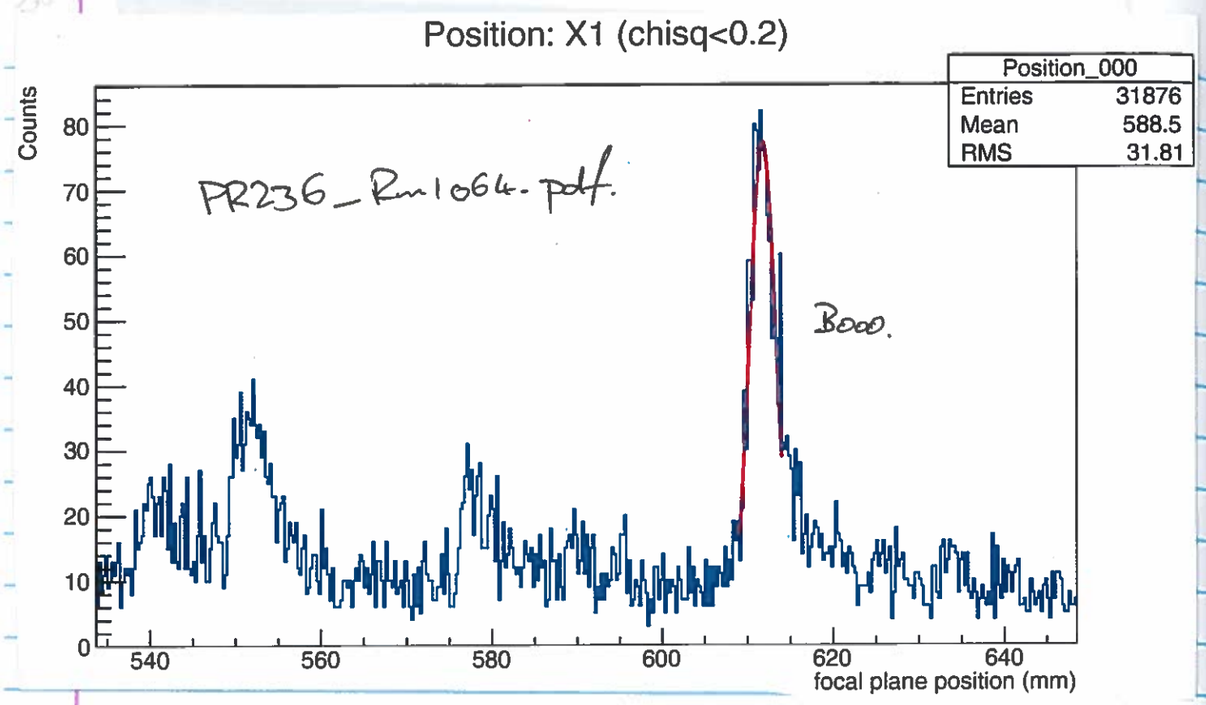
VDC 1 : -2.95 kV (in vault)
VDC 2 : -2.94 kV (in vault)

Run comment: ^{26}Mg data
Run #: 1064
Start: 01h14
Stop: 01h35
Target: ^{26}Mg
Target angle: -118
Current: 0.5 nA
CI Range: 6
Collimator: #3
Trigger rate: 156 Hz
Data rate: 51 kB/s
Trigger evts:
Scaler evts:
K600 angle: ~~4 deg~~ 0°
K600 field:
Q: -454.175 A
D1: 412.800 A
H: -2.833 A
D2: 271.008 A
K: 2.833 A
VDC efficiency
X1 93.78
U1 94.75
X2 87.63
U2 94.05

ODB gates : TOF : [4730, 4875]
Pad 1 : [1250, 2200]

01.40 For run 1064, the resolution of the main ^{26}Mg peak is ~120 keV. Not sure why this has got ~~that~~ much worse with the target in.

See picture overleaf.



We need to go back to faint beam :"

Change D1 with superknob :

D1 → 437.24 A

→ Q : -481.065

H : -3.001

D2 : 287.054

K : 3.001

The J-line buncher fell off around this point. Run 1065 is junk.

Run 1066 : σ = 0.4 mm ? rough offline : position = 368.9 mm, σ ≈ 0.42 mm

Going to put in ^{26}Mg to see what we have with target

Run 1067 : σ = 0.52 mm rough offline : position = 367.5 mm, σ = 0.49 mm

1066 - 1067 : Δx = 1.4 mm ≡ 46 keV @ 33 keV/mm

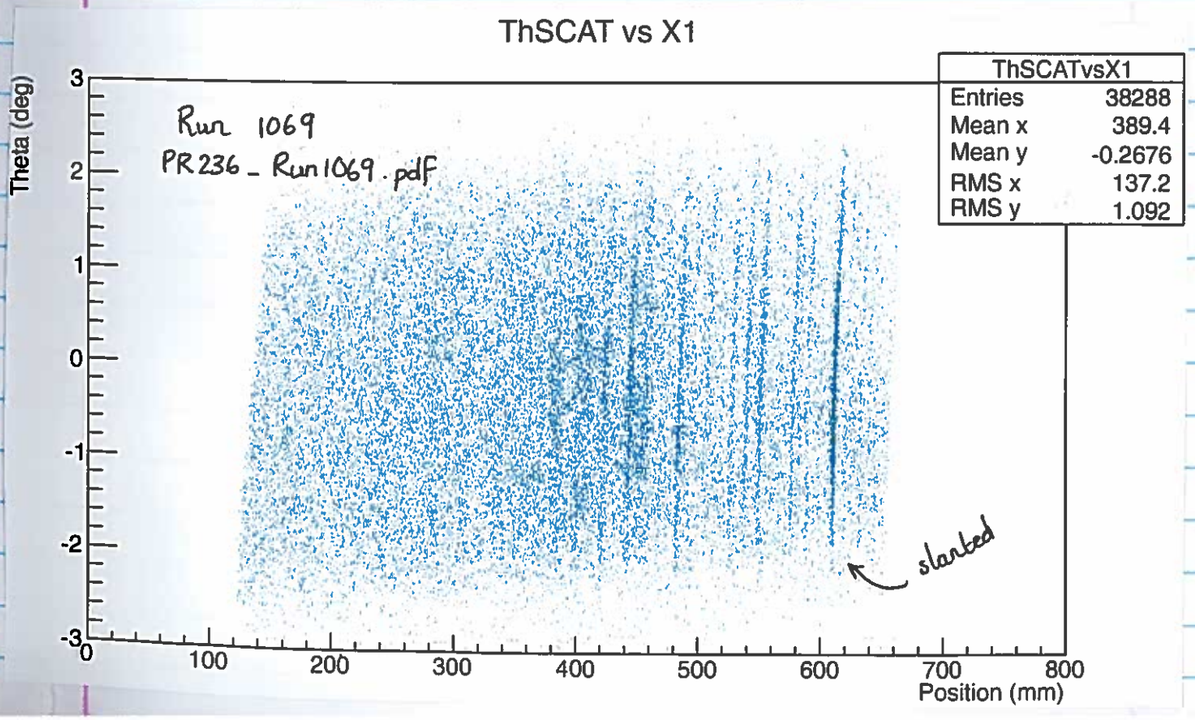
ELoss ~ 200 MeV α in 433 mg/cm^2 ~ 55 keV

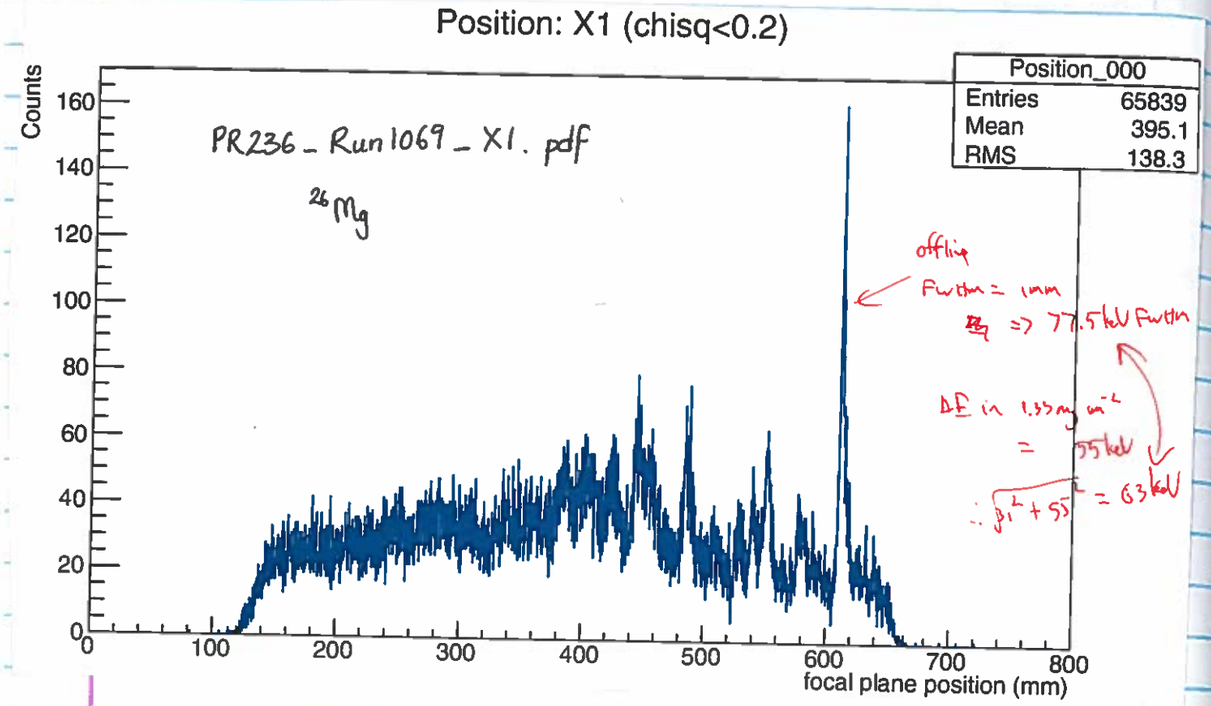
Ops said that the J-line may have failed progressively which may have caused the problem. Maybe. They couldn't guarantee anything.

Run 1068 → Fast beam. ^{26}Mg. σ = 0.52 mm
After buncher reboot.

Q : -454.175 A
D1 : 412.8 A
H : -2.833 A
D2 : 271.008 A
K : +2.833 A

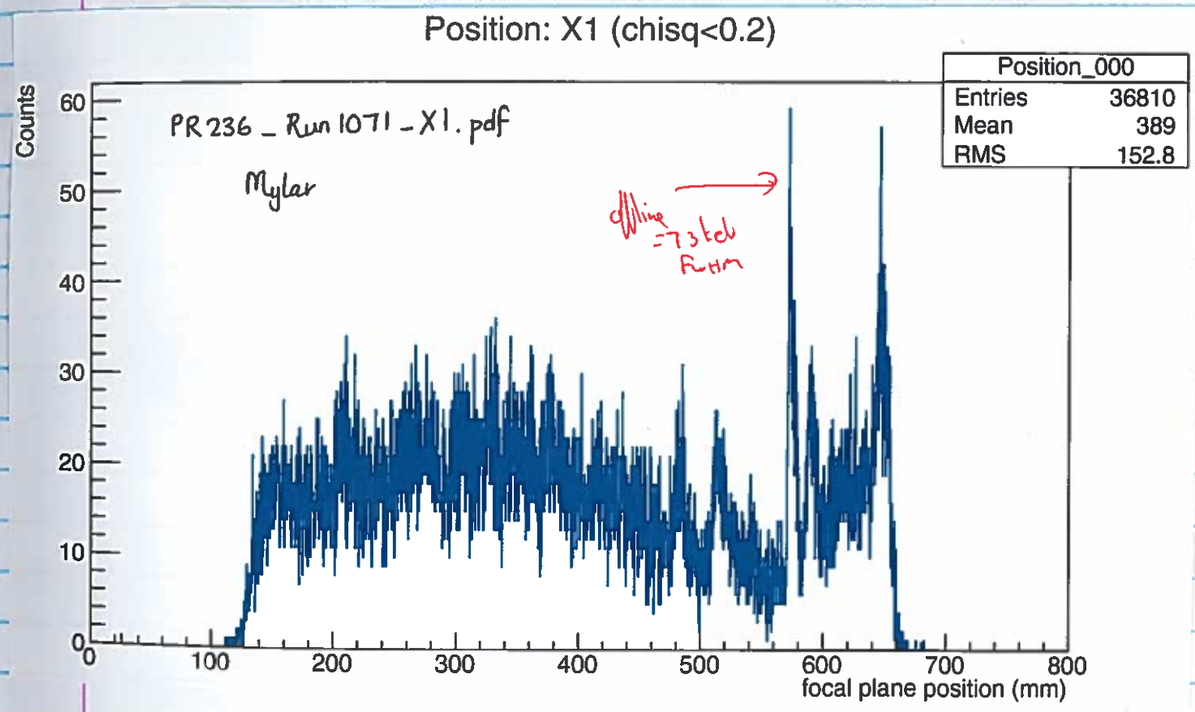
Run comment: 26 Mg Resolution check
Run #: 1069
Start: 02h02
Stop: 02h24
Target: 26 Mg
Target angle: -118
Current: 0.4 nA
CI Range: 6
Collimator: 3
Trigger rate: 149 Hz
Data rate: 45 kB/s
Trigger evts:
Scaler evts:
K600 angle: ~~4 deg~~ 0°
K600 field:
Q: S A
D1: A A
H: M A
D2: E A
K: A
VDC efficiency
X1 93.71
U1 94.75
X2 87.84
U2 94.50

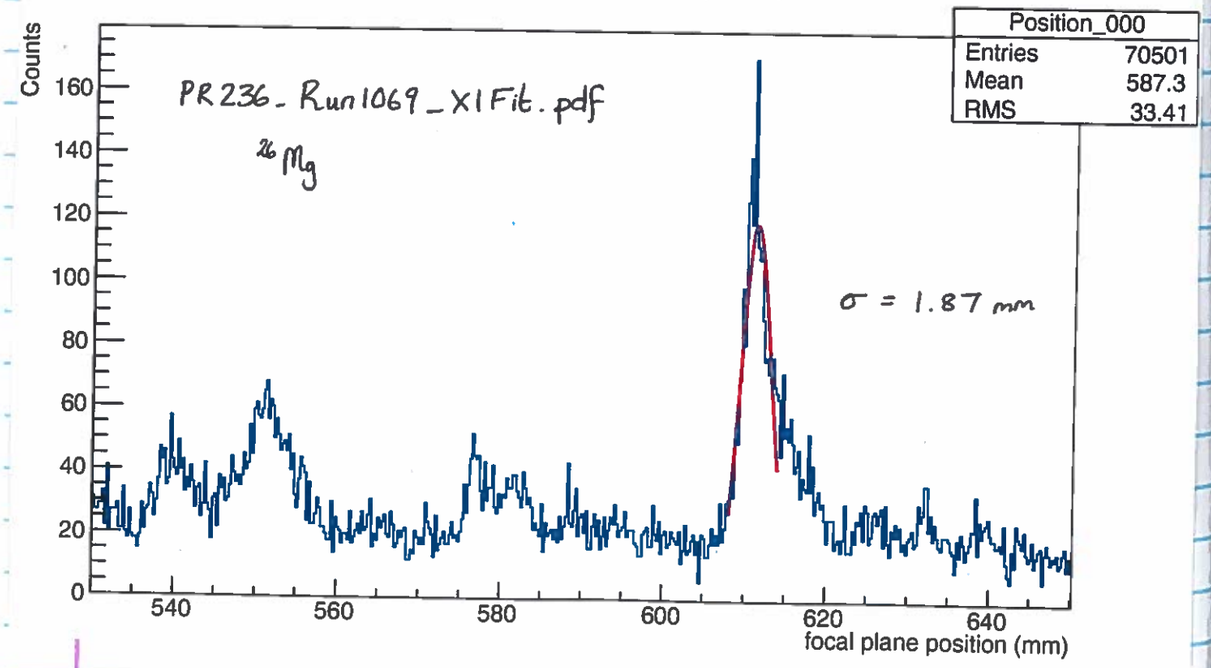




Run comment: Empty
Run #: 1070
Start: 02h26
Stop: 02h37
Target: Empty
Target angle: -118
Current: 0.6 nA
CI Range: 6
Collimator: 3
Trigger rate: 108 Hz
Data rate: 37 kB/s
Trigger evts:
Scaler evts:
K600 angle: ~~4 deg~~ 0°
K600 field:
Q: -454.175 A
D1: 412.8 A
H: -2.833 A
D2: 271.008 A
K: 2.833 A
VDC efficiency
X1 95.805
U1 94.02
X2 89.93
U2 94.75

Run comment: Mylar
Run #: 1071
Start: 02h39
Stop: 03h11
Target: Mylar
Target angle: -118
Current: 0.5 nA
CI Range: 6
Collimator: 3
Trigger rate: 168 Hz
Data rate: 60 kB/s
Trigger evts:
Scaler evts:
K600 angle: ~~4 deg~~ 0°
K600 field:
Q: SA
D1: A
H: ME A
D2: A
K: A
VDC efficiency
X1 94.12
U1 94.63
X2 86.56
U2 94.79





There is a clear slant in ThSCAT vs X1 which will affect the resolution we see online. If one takes a slice instead of the full spectrum, the peak is much thinner.

Run comment: ^{58}Ni Data
Run #: 1072
Start: 03h13
Stop: 04h08
Target: ^{58}Ni
Target angle: -118
Current: 0.6 nA
CI Range: 6
Collimator: 3
Trigger rate: 177 Hz
Data rate: 62 kB/s
Trigger evts:
Scaler evts:
K600 angle: ~~4 deg~~ 0°
K600 field:
Q: SA
D1: A
H: ME A
D2: A
K: A
VDC efficiency
X1 93.65
U1 94.37
X2 86.94
U2 94.98

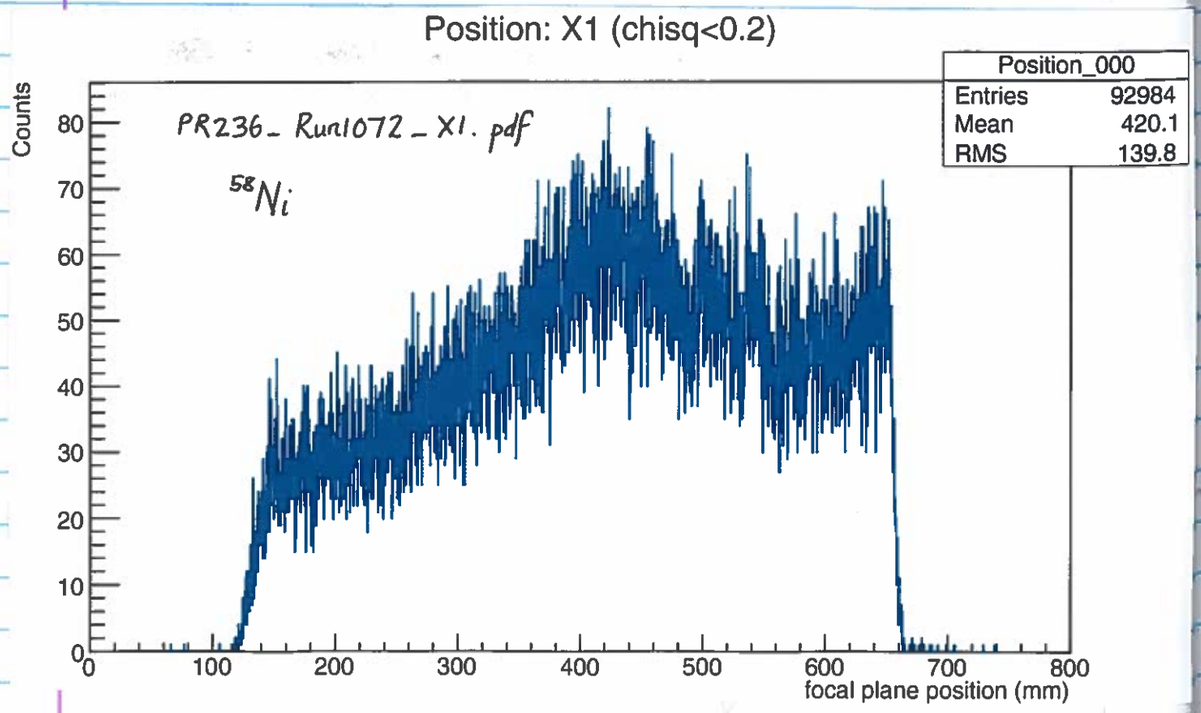
Beam current dipping to 0.2 nA. Asked operators to

increase the current. They opened a slit just before the SSC. Current now 0.7 nA

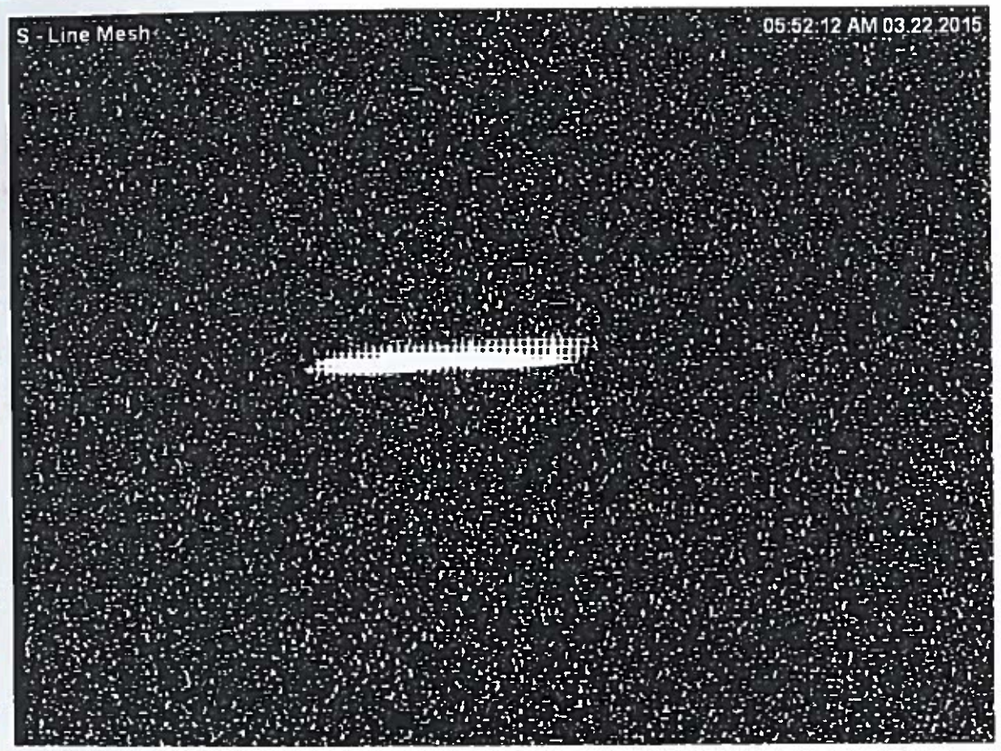
~ 30 minutes into Run 1072, there was an SSC voltage error which the operators fixed. Beam current low again but they opened some slits. Current now 0.7 nA again.

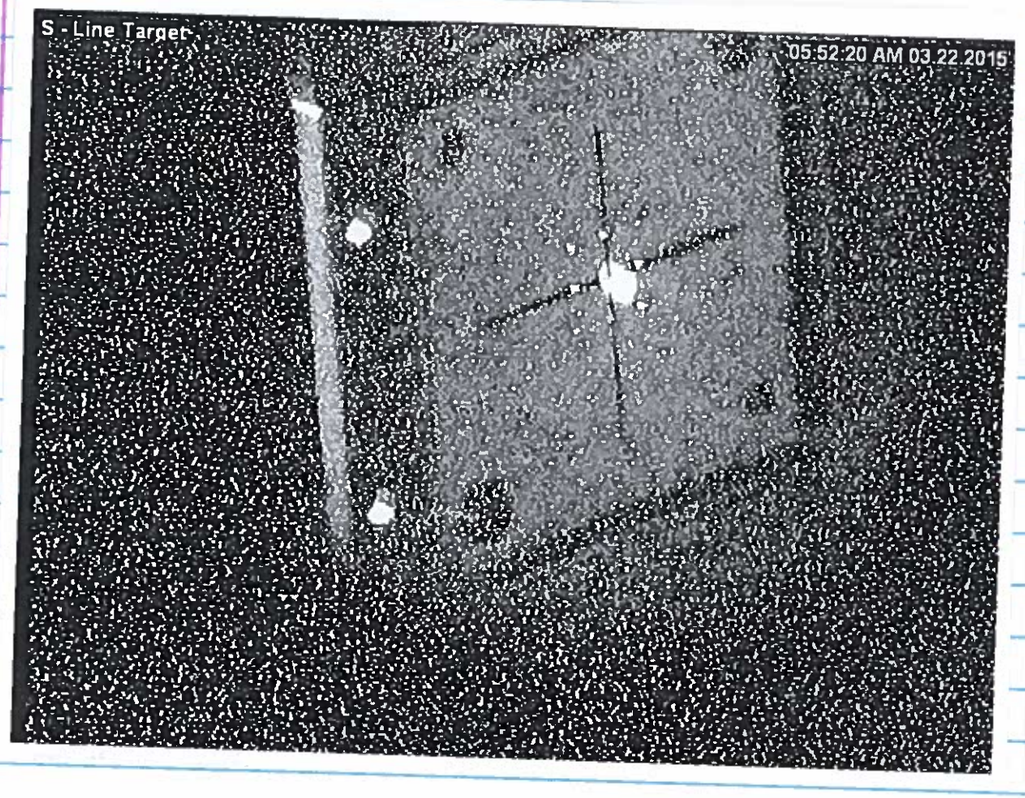
04h01 Problems with the beam current again :(Operators say that there is a problem with the source and so they are trying to open up slits to compensate.... He'll let us know if there's anything more he can do or if this is the maximum we can get (0.1 - 0.2 nA). Leave run 1072 going to accumulate what little counts we do have.

04h09 Beam gone. Ion source problems - Rainer is being called. Run 1072 stopped.



06h05 Beam back but the operators aren't sure that we still have the same running conditions. Checking the beam on viewer and Hotanaka. Then will do faint beam to confirm resolution.





Change superknob :

D1 : 437.24
⇒ Q : -481.065
H : -3.001
D2 : 287.054
K : 3.001

Run 1073 : Faint beam with Empty
↳ how count rate ?
Check everything our side
(collimator 3 ; beam stop out ; VDCs on ; paddles on)

Run 1074 σ = 0.53 mm
Q6S = 35.5

Run 1075 Q6S → 35.3 σ = 0.65 mm

Run 1076 Q6S → 35.7 σ = 0.48 mm

Run 1077 Q6S → 35.9 σ = 0.57 mm

Run 1078 Q6S → 35.8 σ = 0.51 mm

Run 1079 Q6S back to 35.7 σ = 0.47 mm
Q21P = 28.25

Run 1080 Q21P → 28.15 σ = 0.46 mm

Run 1081 Q21P → 28.05 σ = 0.45 mm

Run 1082 Q21P → 27.95 σ = 0.448 mm

Run 1083 Q21P → 27.85 σ = 0.47 mm

Run 1084 Q21P back to 27.95 σ = 0.44 mm
⇒ 34 keV

Let's just try Q18P.

Run 1085 Q18P from 24.25 → 24.35 σ = 0.436 mm

Run 1086 Q18P → 24.45 σ = 0.46 mm

Run 1087 Q18P → 24.40 σ = 0.45 mm

Run 1088 Q18P → 24.35 σ = 0.45 mm

Run 1089 ~~Q2+~~ Q18P → 24.25 σ = 0.47 mm

So Q18P seems ineffective but just to be thorough:

Run 1090 ~~Q2+~~ Q18P → 24.15 σ = 0.48 mm

Back to Q18P = 24.35 ⇒ σ = 0.46 mm
⇒ 36 keV

We can't seem to get this any better :' but we'll take it for now.

Change superknob back:

D1 → 412.800 A
⇒ Q = -454.175
H = -2.833
D2 = 271.008
K = +2.833

Note that when changing back, we didn't have the interlock problem as described on page 37
↳ Turns out interlock wasn't enabled.

07h16 Ben is now checking halo...
08h00 End with 150 Hz @ 0.6 nA

Run comment: ^{26}Mg K600 angle: ~~4 deg~~ 0° K600 field:
Run #: 1093
Start: 07h55 Current: 0.4 nA Trigger rate: 162 Hz Q: -454.175 A VDC efficiency
Stop: 08h84 CI Range: 6 Data rate: 62 kB/s D1: 412.8 A X1 98.68
Target: ^{26}Mg Collimator: 3 Trigger evts: H: -2.833 A U1 99.63
Target angle: -118 Scaler evts: D2: 271.008 A X2 87.63
K: 2.833 A U2 94.81

Decide to check empty first

Run comment: Empty K600 angle: 0° deg K600 field:
Run #: 1094
Start: 08h06 Current: 0.4-1.0 nA Trigger rate: 290 Hz Q: S A VDC efficiency
Stop: 08h18 CI Range: 6 Data rate: 108 kB/s D1: A A X1 94.23
Target: Empty Collimator: 3 Trigger evts: H: M A U1 95.19
Target angle: -118 Scaler evts: D2: E A X2 85.60
K: A U2 94.69

Run comment: ^{90}Zr data K600 angle: ~~4 deg~~ 0° K600 field:
Run #: 1095
Start: 08h20 Current: 1.2 nA Trigger rate: 252 Hz Q: A VDC efficiency
Stop: 09h56 CI Range: 6 Data rate: 76 kB/s D1: SA A X1 94
Target: ^{90}Zr Collimator: 3 Trigger evts: 1069 H: M A U1 94
Target angle: -118 Scaler evts: 5582 D2: E A X2 86
K: A U2 94.5

Run 1096 → JUNK.

Run comment: ^{58}Ni data K600 angle: ~~2 deg~~ 0° K600 field:
Run #: 1097
Start: 09:58 Current: 0.7 nA Trigger rate: 137 Hz Q: S A VDC efficiency
Stop: 11:01 CI Range: 6 Data rate: 51 kB/s D1: A A X1 94
Target: ^{58}Ni Collimator: 3 Trigger evts: 512935 H: M A U1 94
Target angle: -118 Scaler evts: 3630 D2: ~ A X2 87
K: A U2 94.5

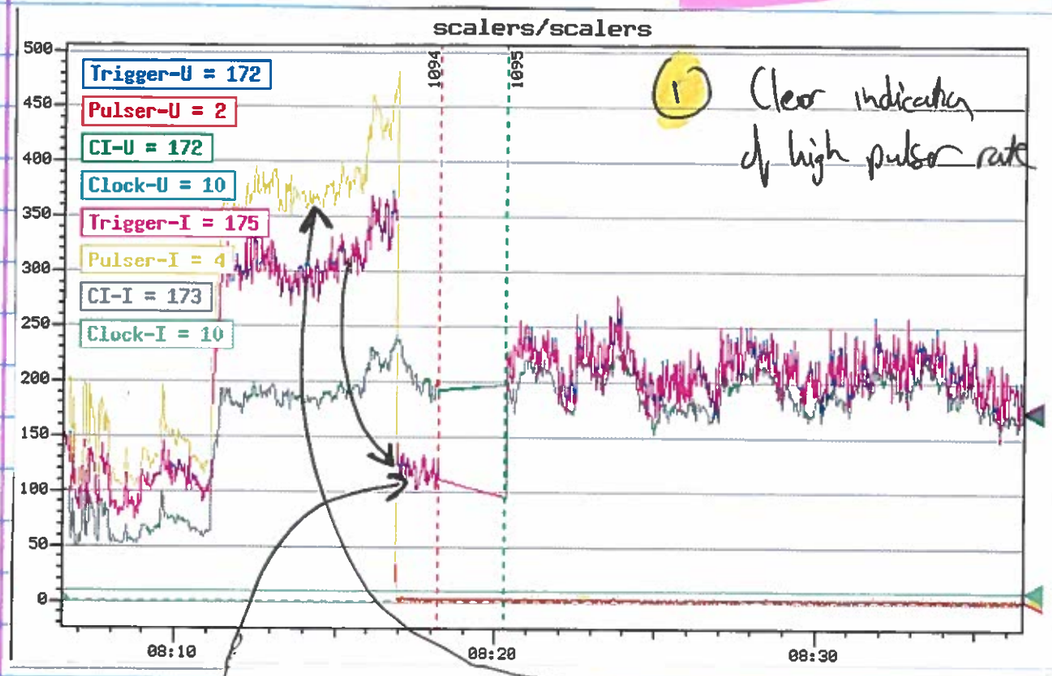
11:00 → Change to empty target to check the halo

Run comment: EMPTY K600 angle: 0° deg K600 field:
Run #: 1098
Start: 11:04 Current: 0.5 nA Trigger rate: 144 Hz Q: S A VDC efficiency
Stop: 11:11 CI Range: 6 Data rate: 39 kB/s D1: A A X1 90
Target: EMPTY Collimator: 3 Trigger evts: 41680 H: M A U1 94
Target angle: -118 Scaler evts: 357 D2: A X2 87
K: E A U2 94.95

~~Back~~ after tuning the rate is 60 Hz at 1.1 nA

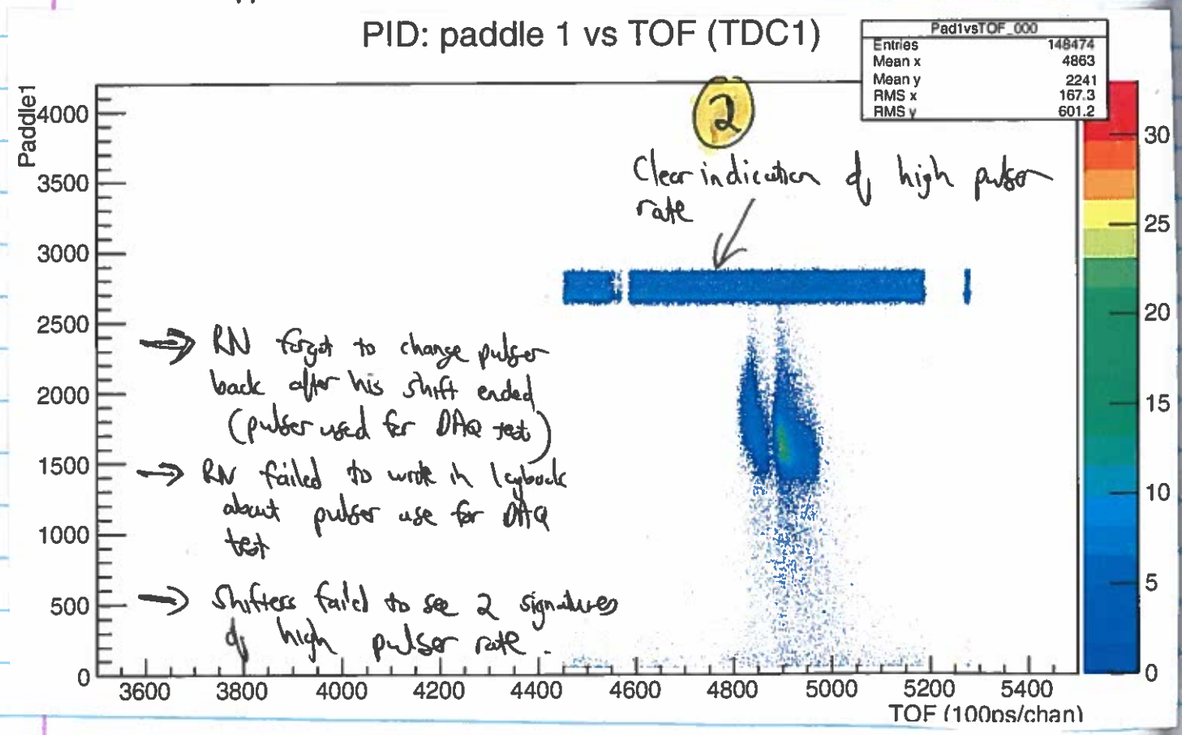
11:11 Put the VIEWERS IN → ~~go~~ to page 56

Comment on halo problem



(1) Clear indication of high pulser rate

The problem was the high rate of the pulser. When the prescale of the pulser was changed from 1 to 10 this happened



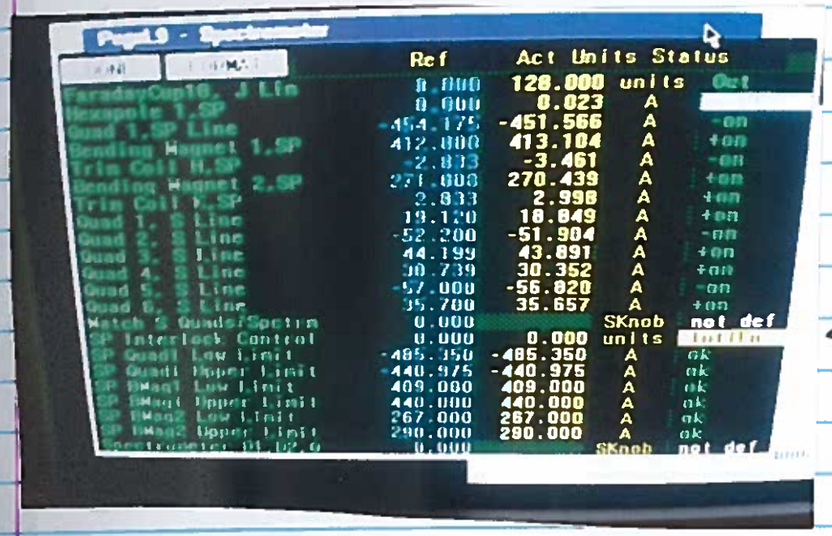
(2) Clear indication of high pulser rate

→ RN forgot to change pulser back after his shift ended (pulser used for DAQ test)

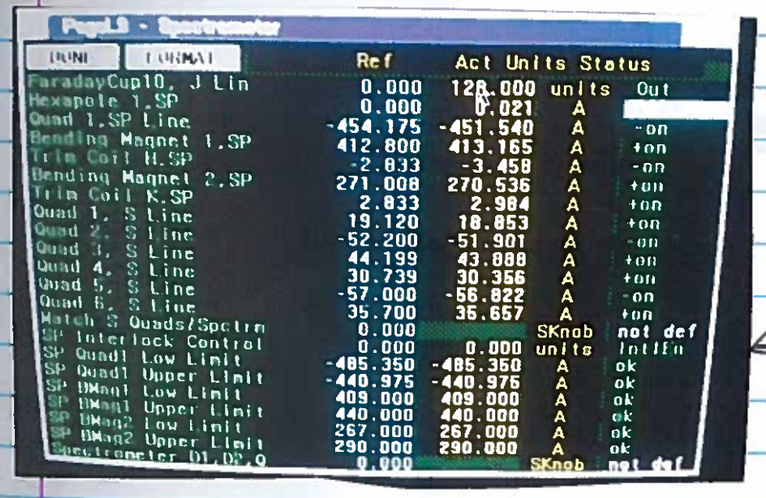
→ RN failed to write in logbook about pulser use for DAQ test

→ Shiftcrew failed to see 2 signatures of high pulser rate.

Comment on interlock problem



(A)

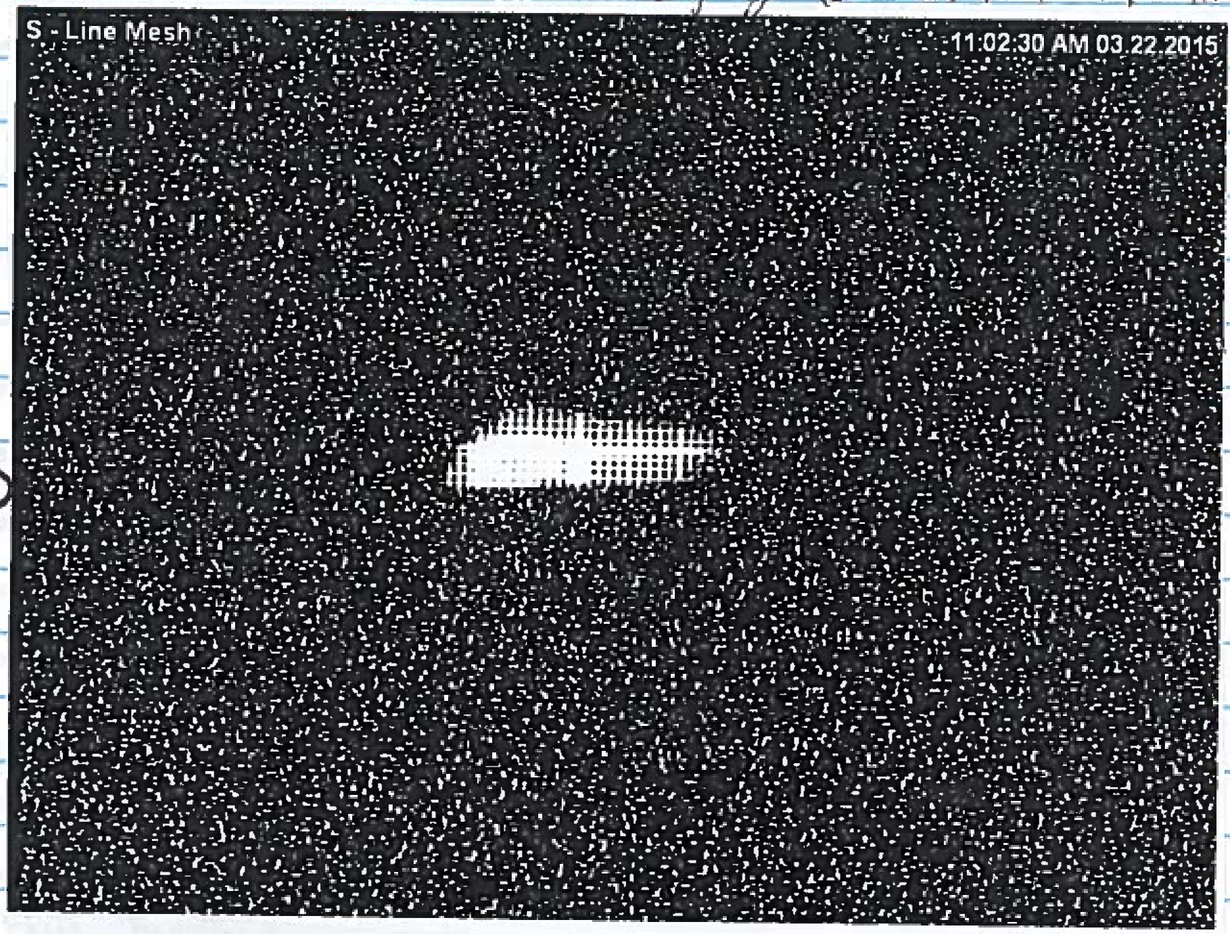


(B)

After the power dip the interlock control was no longer enabled (see (A)) With this enabled (see (B)) the key at the collimator carousel could be turned back to the zero degree mode.

11:11 : VIEWER IN , Was slightly low on Potentiometer, fixed it

was here →



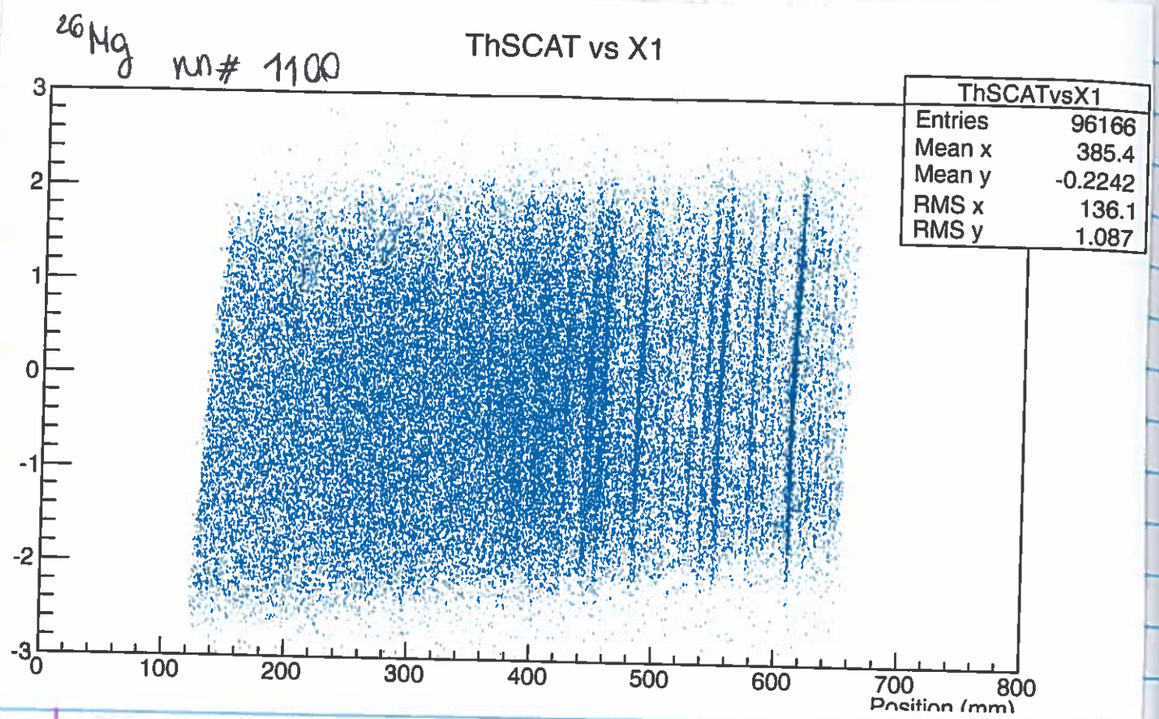
not ideal but to change we need to do target scan to check resolution.

after viewer, checking ~~the~~ again with empty target

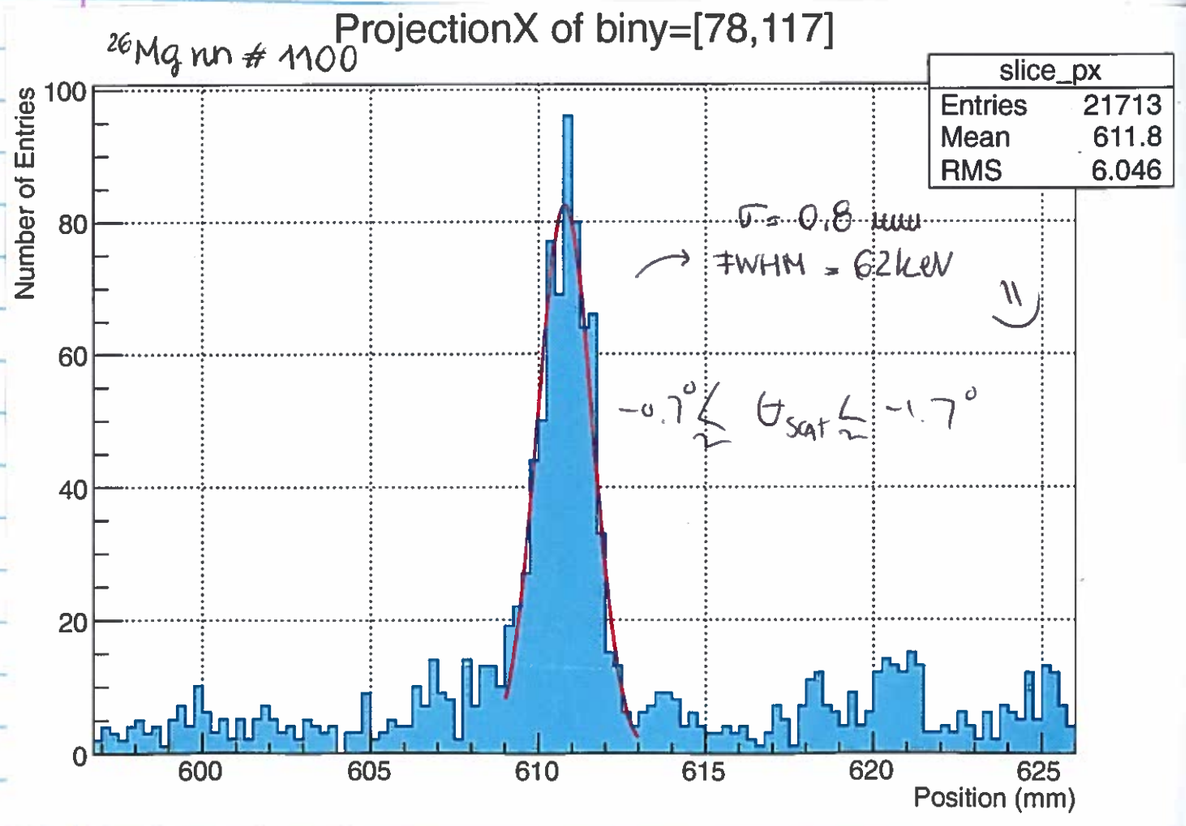
Run comment: EMPTY				K600 angle: 0 deg	K600 field:		
Run #: 1099					Q: S A	VDC efficiency	
Start: 11:20	Current: 0.9 nA	Trigger rate: 44 Hz			D1: S A	X1	
Stop: 11:26	CI Range: 6	Data rate: 21 kB/s			H: A A	U1	
Target: EMPTY	Collimator: 3	Trigger evts: 18053			D2: M A	X2	
Target angle: -118		Scaler evts: 321			K: E A	U2	

Run comment: ^{26}Mg			K600 angle: 0 deg	K600 field:
Run #: 1100			Q: S A	VDC efficiency
Start: 11:28	Current: 0.9 nA	Trigger rate: 150 Hz	D1: S A	X1 94
Stop:	CI Range: 6	Data rate: 78 kB/s	H: A A	U1 94
Target: ^{26}Mg	Collimator: #3	Trigger evts: 193815	D2: ME A	X2 88
Target angle:		Scaler evts: 1224	K: - A	U2 95

^{26}Mg run# 1100

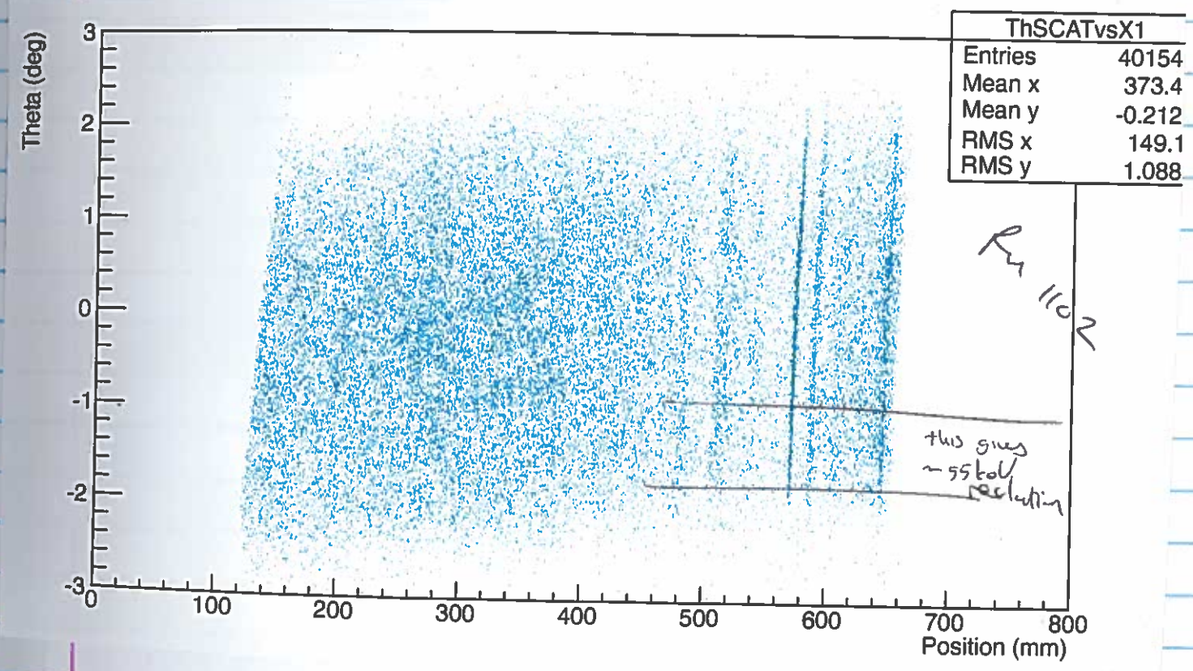


↓ projection down 0, -1



Run comment: 90Zr
Run #: 1101
Start: 11:54
Stop: 12:54
Target: 90Zr #1
Target angle: -118°
Current: 0.7 nA
CI Range: 6
Collimator: 3
Trigger rate: 113 Hz
Data rate: 40 kB/s
Trigger evts: 289373
Scaler evts: 3476
K600 angle: 9 deg
K600 field:
Q: A
D1: A
H: A
D2: A
K: A
VDC efficiency
X1 94
U1 94
X2 87
U2 95

Run comment: Mylar
Run #: 1102
Start: 12:56
Stop:
Target: Mylar #6
Target angle: -118°
Current: 0.6 nA
CI Range: 6
Collimator: 3
Trigger rate: 43 Hz
Data rate: 18 kB/s
Trigger evts: 16934
Scaler evts: 2314
K600 angle: 0 deg
K600 field:
Q: A
D1: A
H: A
D2: A
K: A
VDC efficiency
X1 94
U1 94
X2 89
U2 94



Sunday 22 March

Run comment: 58Ni
Run #: 1103
Start: 13:41
Stop: 14:40
Target: #5 58Ni
Target angle: -118
Current: 1.4 nA
CI Range: 6 nA
Collimator: 3 (4-1)
Trigger rate: 350 Hz
Data rate: 143 kB/s
Trigger evts: 1.186M
Scaler evts: 3442
K600 angle: 4 deg
K600 field:
Q: -454.175 A
D1: 412.842 A
H: -2.833 A
D2: 271.008 A
K: -7.833 A
VDC efficiency
X1 96
U1 94.2
X2 86
U2 94.5

unchanged
Just listed for completeness

Run comment: ^{26}Mg | K600 angle: 4 deg | K600 field: | VDC efficiency
Run #: 1104
Start: 16:41 | Current: 1.4 nA | Trigger rate: 1.80 Hz | Q: S A | X1 93.7
Stop: 17:07 | CI Range: 6 | Data rate: 208 kB/s | D1: A A | U1 94.0
Target: ^{26}Mg | Collimator: #3 | Trigger evts: 693268 | H: A A | X2 85
Target angle: −118 | Scaler evts: 1483 | D2: ME A | U2 94.5
K: A

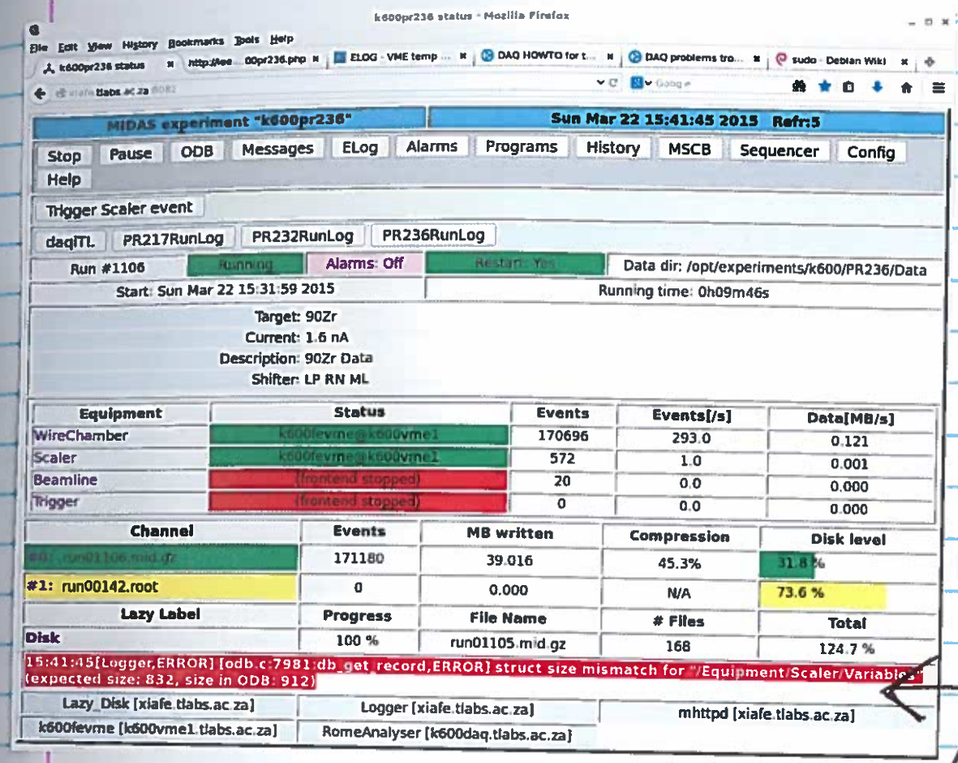
Run comment: Empty | K600 angle: 0 deg | K600 field: | VDC efficiency
Run #: 11065
Start: 15:10 | Current: 1.5 nA | Trigger rate: 84 Hz | Q: S A | X1
Stop: | CI Range: 6 | Data rate: kB/s | D1: A A | U1
Target: Empty | Collimator: #3 | Trigger evts: | H: A A | X2
Target angle: −118 | Scaler evts: | D2: up A | U2
K: A

Run comment: ^{90}Zr data | K600 angle: 0 deg | K600 field: | VDC efficiency
Run #: 11076
Start: 15:31 | Current: 1.6 nA | Trigger rate: 261 Hz | Q: S A | X1 93.8
Stop: 16:32 | CI Range: 6 | Data rate: 108 kB/s | D1: A A | U1 94.35
Target: ^{90}Zr #4 | Collimator: 3 | Trigger evts: 1.069M | H: M A | X2 85.84
Target angle: −118° | Scaler evts: 3518 | D2: E A | U2 94.57
K: A

Run comment: ^{58}Ni Data | K600 angle: 4 deg | K600 field: | VDC efficiency
Run #: 1107
Start: 16h37 | Current: 1.6 nA | Trigger rate: 155 Hz | Q: S A | X1 93.9
Stop: 17h37 | CI Range: 6 | Data rate: 58 kB/s | D1: A A | U1 94.3
Target: ^{58}Ni | Collimator: 3 | Trigger evts: 714429 | H: M A | X2 87.1
Target angle: −118° | Scaler evts: 3504 | D2: E A | U2 94.7
K: F A

Run comment: ^{26}Mg | K600 angle: 4 deg | K600 field: | VDC efficiency
Run #: 1108
Start: 17h41 | Current: 1.9 nA | Trigger rate: 360 Hz | Q: S A | X1
Stop: 18h13 | CI Range: 6 | Data rate: 167 kB/s | D1: A A | U1
Target: ^{26}Mg | Collimator: #3 | Trigger evts: 581516 | H: M A | X2
Target angle: −118.0 | Scaler evts: 1878 | D2: E A | U2
K: F A

Run comment: MT | K600 angle: 0 deg | K600 field: | VDC efficiency
Run #: 1109
Start: 18h16 | Current: 1.2 nA | Trigger rate: 64 Hz | Q: S A | X1
Stop: 18h26 | CI Range: 6 | Data rate: 26 kB/s | D1: A A | U1
Target: MT | Collimator: #3 | Trigger evts: 32568 | H: M A | X2
Target angle: −118.0 | Scaler evts: 571 | D2: E A | U2
K: A



Do not be overly alarmed by this error message. It concerns the ODB, and should not effect data acquisition. RN.

Run comment: ^{90}Zr | K600 angle: 0 deg | K600 field: | VDC efficiency
Run #: 1110
Start: 18h29 | Current: 1.2 nA | Trigger rate: 206 Hz | Q: S A | X1 93.9
Stop: 19h29 | CI Range: 6 | Data rate: 88 kB/s | D1: A A | U1 94.4
Target: ^{90}Zr | Collimator: #3 | Trigger evts: 784567 | H: M A | X2 86.4
Target angle: −118.0 | Scaler evts: 3503 | D2: E A | U2 94.6
K: F A

Run comment: ^{58}Ni: data | K600 angle: 0 deg | K600 field: | VDC efficiency
Run #: 19h31 1111
Start: 19h31 | Current: 1.6 nA | Trigger rate: 152 Hz | Q: S A | X1 93.9
Stop: 20h31 | CI Range: 6 | Data rate: 66 kB/s | D1: A A | U1 94.4
Target: ^{58}Ni | Collimator: #3 | Trigger evts: 484679 | H: A A | X2 87.4
Target angle: −118.0 | Scaler evts: 3489 | D2: M A | U2 94.7
K: F A