

BCI - Baratron Gauge
CCB - Convection or bypass

EPICS mods.

- ① Fix IV4 interlocks.
- ② TUDA2.BCI Relay trips IV4 closed
- ③ TUDA2.BCI readout
- ④ TUDA2.Bypass can't open if IV4 open.
- ⑤ TUDA2.CCB readout
- ⑥ Condition for IV4 open TUDA2.CCB < 50 mTorr
AND TUDA2.Bypass closed
- ⑦ H₂ supply line remote valve opens
iff ~~B~~ TUDA2.BCI relay ok
- ⑧ No restriction ~~on~~ closing H₂ supply line remote valve

Day 14th April 2011

more test in TUDA.

all overpressure inside TUDA breaks end flange ring seal when bolts are removed.

bias (detector) cables tested OK ✓

any IDC preamp services cables OK ✓

any IDC preamp signal cables OK ✓

To Page No. _____

& Understood by me,

Date

Invented by:

Date

Recorded by:

Thursday 14 April 2011

11.50

CAEN SY403 HV Mainframe

Channel	Cable	Detector	Bias
1	HT1	S2-1	-130V
2	" 2	S2-2	-130V
3	" 3	W	-250V
4	" 4	PD	-30V

±15V Preamp PSU

#1 connected to NSL type W preamp (not installed yet)

#2 2xMSL type S2 + 1x 16ch PD preamp units

exp. load +15V/1.9A -15V/0.6A

Friday 15 April 2011

16.40 Re-organized preamp services (±15V, test) cabling to avoid reflections on test-line due to unterminated test-line on PD preamp unit at end of daisy chain.

±15V preamp PSU

#1 1x 16ch PD preamp + 1x MSL type W ^{preamp} (not installed yet)

#2 2x MSL type S2 preamps

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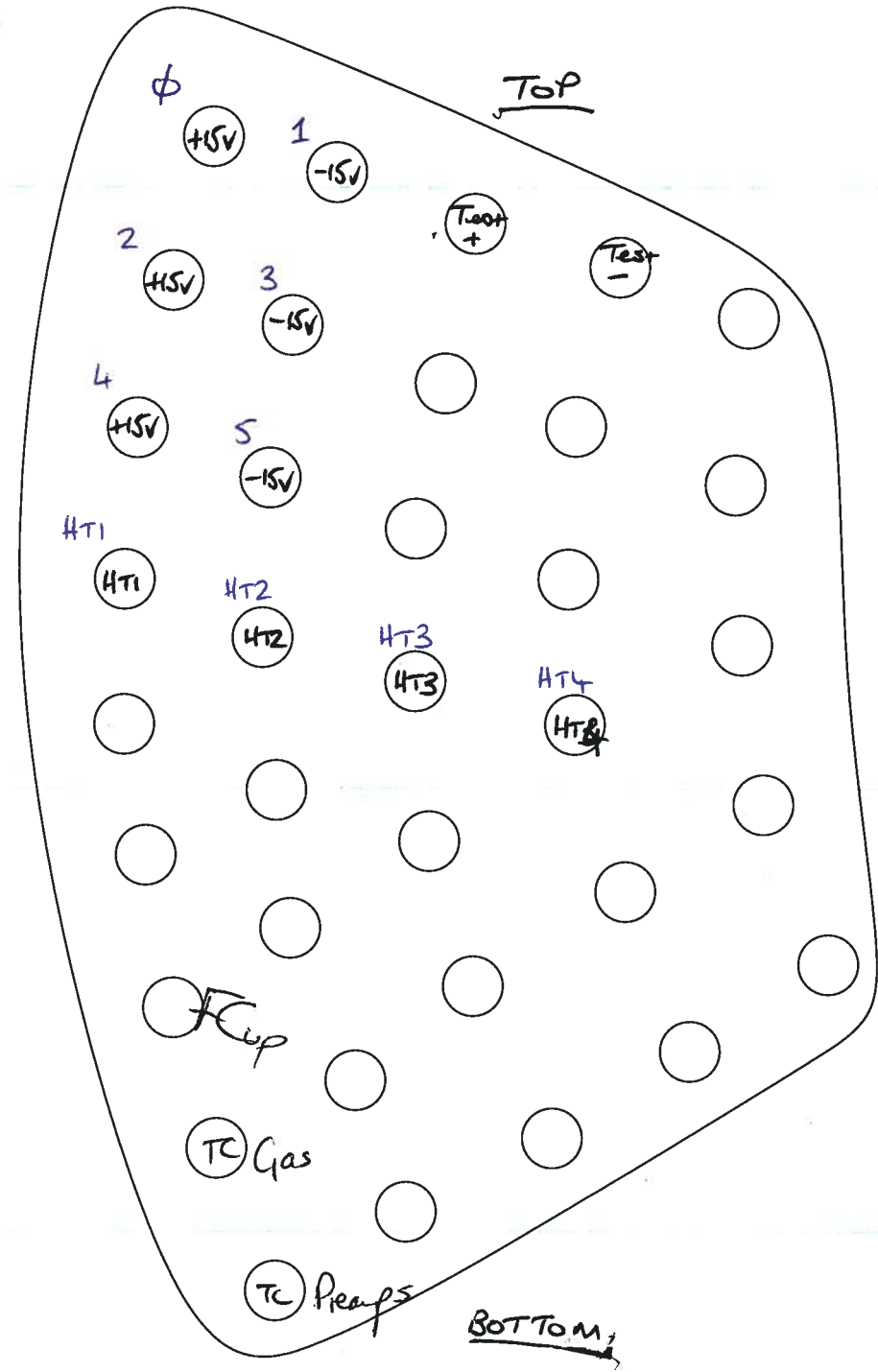
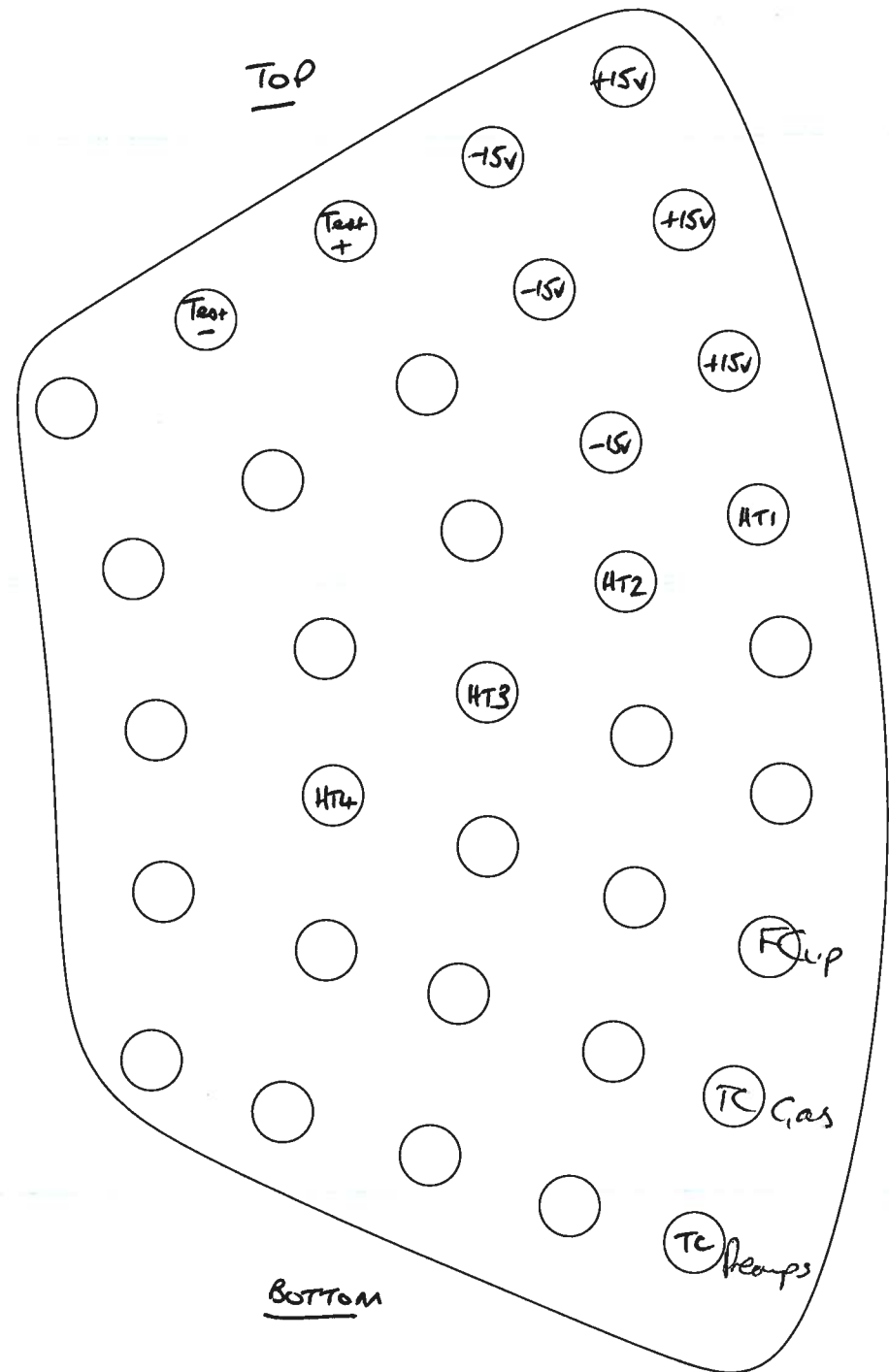
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Date

Invented by:

Date

Recorded by:



Cable #

RIGHT

Bear
●

Outside
TODA chamber

thor: Tom Davinson
 pe:
 category:
 subject: Thursday 14 April

.02 See attachment 1 for overnight EPICS log of TUDA2.CG5
 Downstream flange secured by four bolts
 Current pressure 1.07Torr - rate of increase ~0.2 Torr/5h

.30 TUDA chamber pumped down to ~800mbar
 Downstream flange bolts removed - no change in pressure observed
 N2 bottle connected to TUDA vent valve - to vent and (hopefully)
 exceed atmospheric pressure forcing downstream flange to move open
 Pressure measured using MKS Baratron 1000Torr gauge

Result - pressure increased from 800 to ~1000mbar in ~45s
 TUDA chamber pressure did not noticeably exceed atmospheric
 pressure and there was no obvious movement of downstream flange.
 Gas could be felt escaping from sides of downstream flange.

Conclude - contact with downstream flange O-ring failed at, or near,
 atmospheric pressure - this prevented buildup in excess of atmospheric
 pressure

.50 Installed:

preamp services (+/-15V preamp power, +/- preamp test inputs) - 10-way IDC
 ribbon cables

detector HT - SMC/BNC cabling

preamp signals - 34-way IDC twist-n-flat ribbon cables

preamp thermocouple attached to an S2-1 preamplifier

.00 Time to 250mTorr ~14m
 Time from 250mTorr to 4.75E-5Torr ~45m
 See attachment 2

.04 FTS RS44 set point +5.5 deg C

.21 FTS RS44 temperature +5.6 deg C

.12 TUDA2.PNG5 8.2E-06Torr
 FTS RS44 temperature +5.8 deg C
 Preamp thermocouple +8 deg C

.13 +/-15V preamp power ON

.18 Preamp thermocouple +14 deg C
 TUDA2.PNG5 8.0E-06Torr

.23 Preamp thermocouple +14 deg C
 TUDA2.PNG5 7.9E-06Torr

.28 Preamp thermocouple +15 deg C
 TUDA2.PNG5 7.7E-06Torr

.43 Preamp thermocouple +15 deg C
 TUDA2.PNG5 7.0E-06Torr

EN SY403 HV mainframe

Channel	HT	Detector	Bias (V)	I _L (uA)
1	1	S2-1	-130	-0.03
2	2	S2-2	-130	-0.06

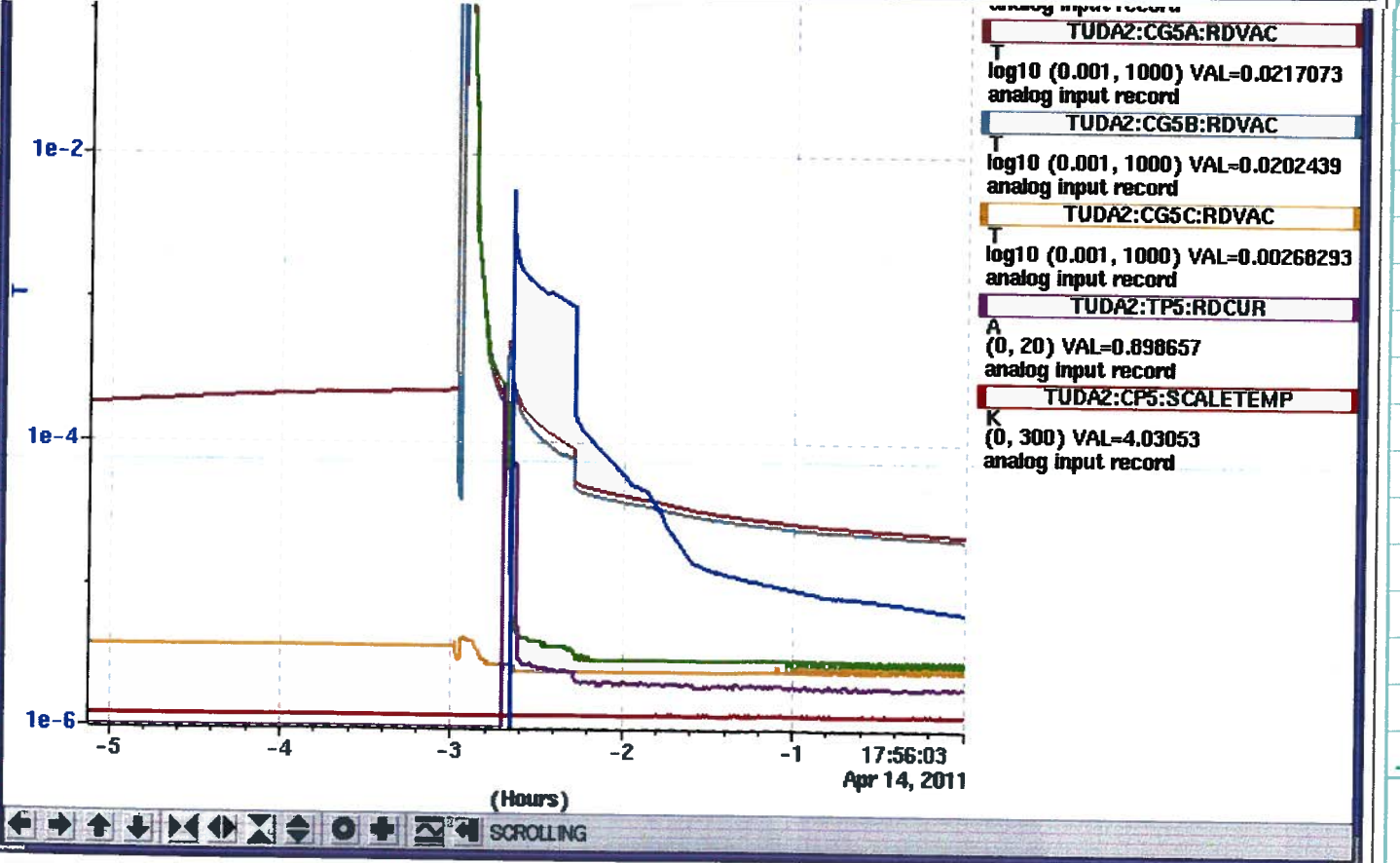
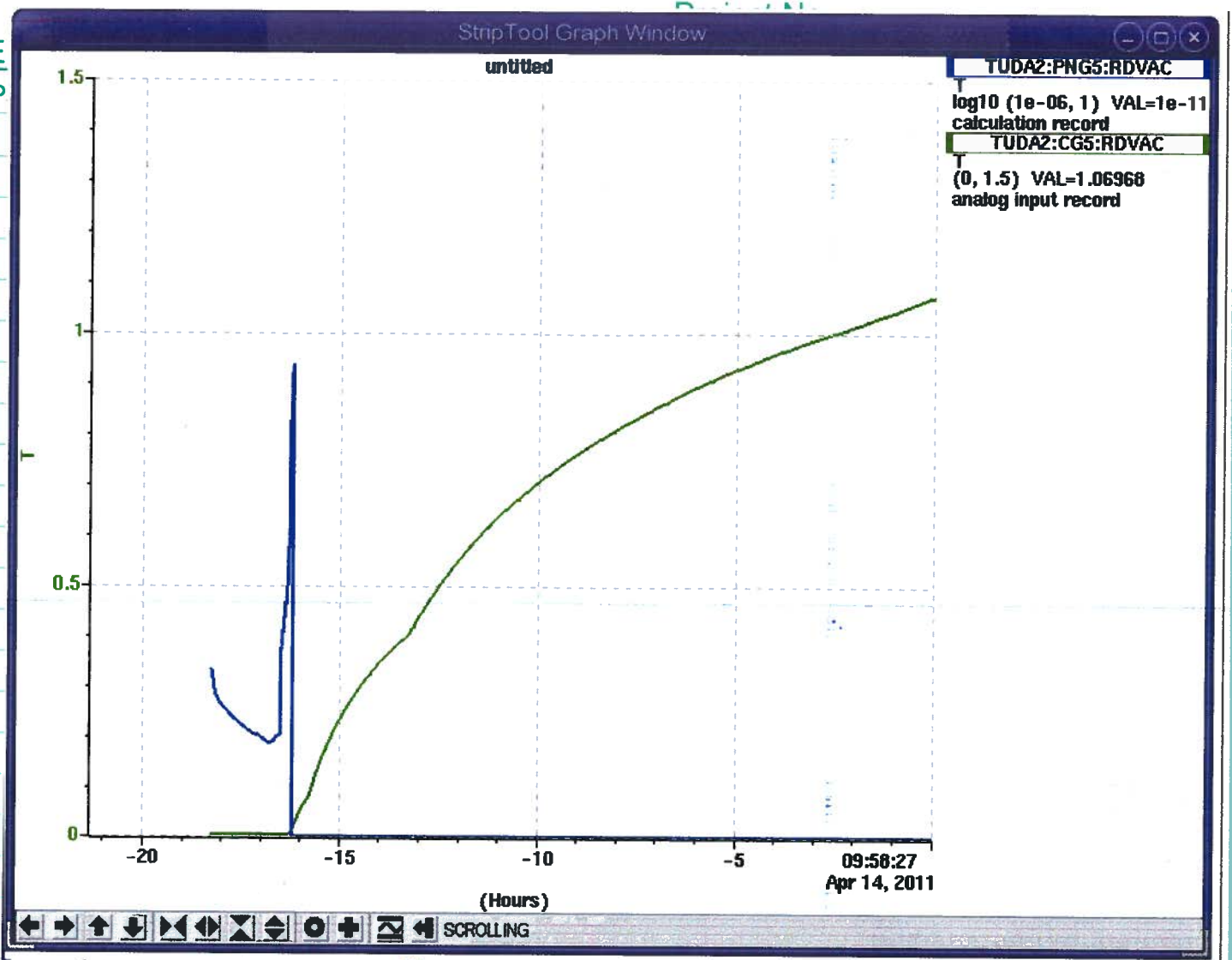
3.29 Preamp thermocouple +12 deg C
 TUDA2.PNG5 5.3-06Torr

3.32 +/-15V preamp power OFF
 FTS RS44 set point +21 deg C

3.39 Cryo gate valve closed
 Turbo off and isolated
 4x bolts securing downstream flange removed

Repeat yesterday's leak-in test (bolts removed)

TITLE
 From P



Witness

Project No. _____

Book No. _____

TITLE _____

Page ID: 11 Entry time: Fri Apr 15 11:00:17 2011

Name: Tom Davinson

Category:

Date: Friday 15 April

5 See attachment 1 for overnight EPICS log of TUDA2.CG5
Downstream flange *not* secured by four bolts
Current pressure 0.97Torr - rate of increase ~0.2 Torr/5h

This history is very similar to the previous test (with the flange secured by four bolts)
- see <https://elog.triumf.ca/Tuda/S1287/10>

Conclude - leak-in rate not affected by (i) lack of bolts securing downstream flange, (ii) addition of cabling within TUDA chamber - provided that the TUDA chamber has previously been pumped to 'good' vacuum (< 1E-05Torr, say).

6 Modified preamp services cabling to avoid unterminated test - input to PD preamp which causes reflections to previous test - inputs to the S2 preamps.

5V PSUs
#1 +15V/0.25A -15V/0.1A (1x 16ch PD preamp + 1x MSL type W preamp - not installed)
#2 +15V/1.5A -15V/0.55A (2x MSL type S2 + 1x 16ch PD preamp units)

1 Time to 250mTorr ~14m
Time from 250mTorr to 4.75E-05Torr ~40m
See attachment 2

0 FTS RS44 set point +5.5 deg C

8 TUDA2.PNG5 7.8E-06Torr

FTS RS44 set point +21 deg C
Cryo pump gate valve closed
Turbo pump off
Four bolts securing downstream flange removed

Vent to c. 300mbar with *He*

N.B. TUDA2.CG5 reads 770 Torr with 300mBar of He in TUDA chamber

MKS Baratron (capacitance manometer - gas independent reading) attached to manual vent port of the Varian V550 turbo pump
Pressure reading at 'good' vacuum 0.0 Torr - no offset

Bourdon (mBar)	MKS Baratron (Torr)	S2 preamp Thermocouple (deg C)
8 300	221.7	
8 300	222.0	+19
8 300	222.1	+20
8 300	222.3	+20
8 300	222.4	+21
8 300	222.6	+21

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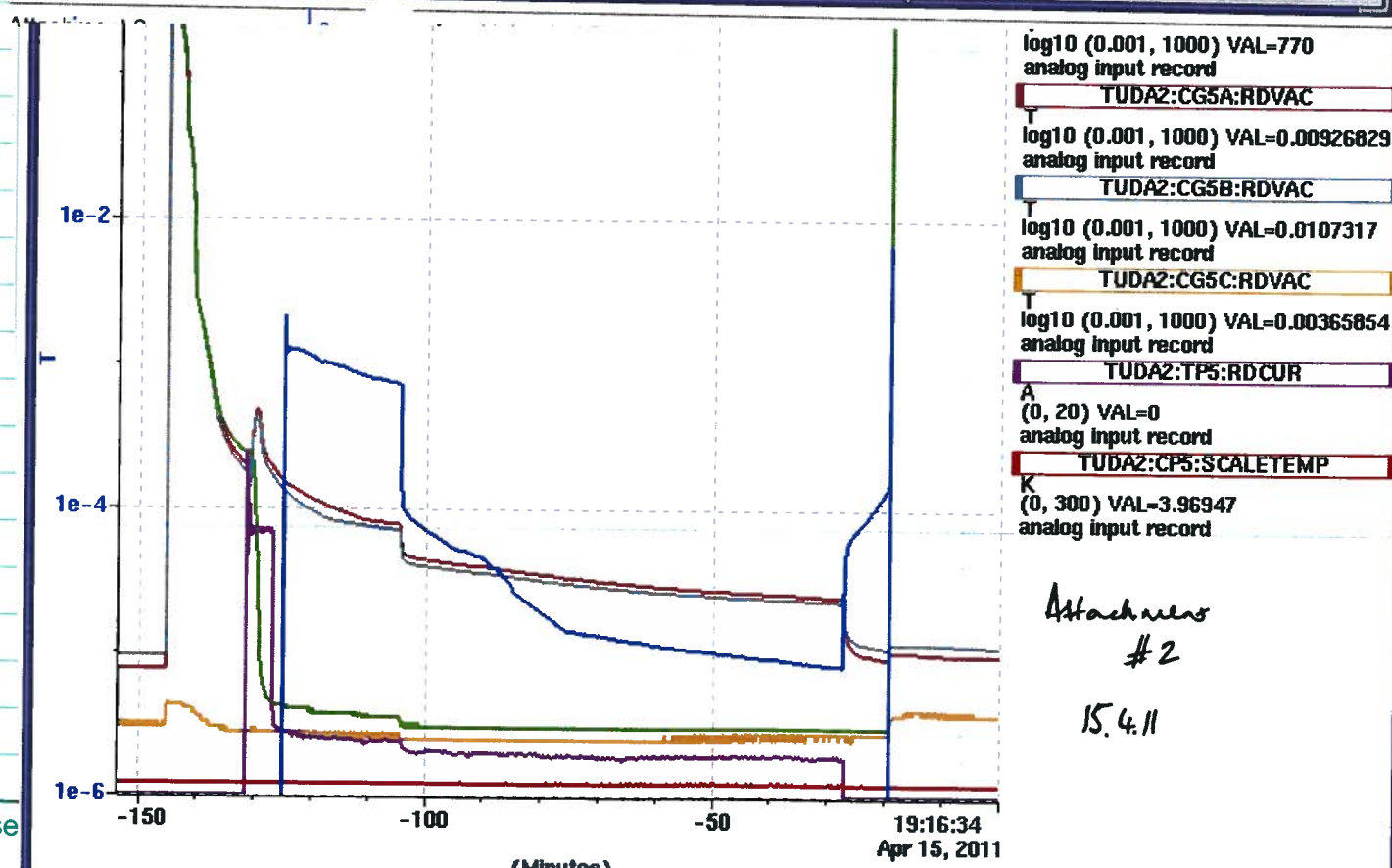
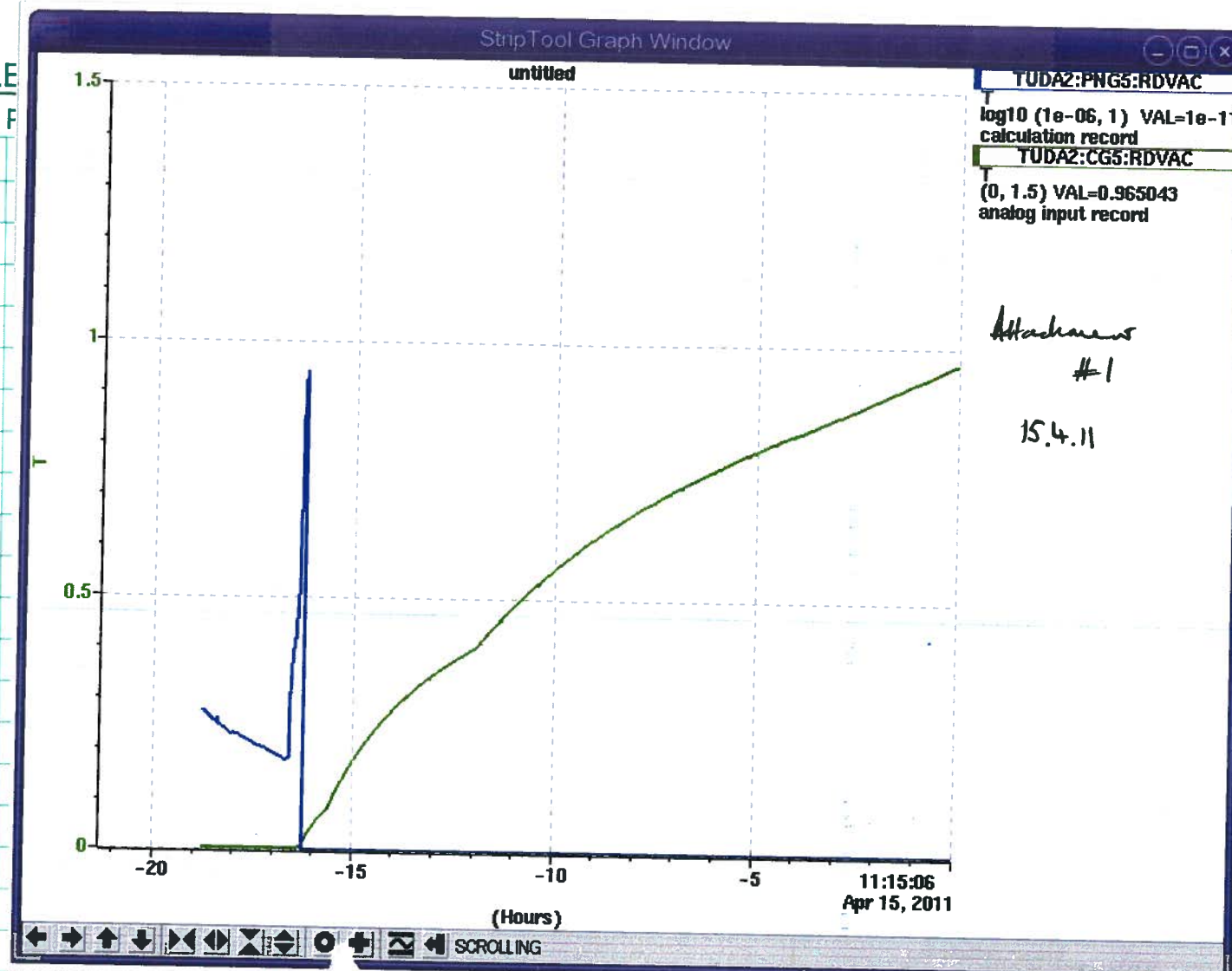
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TITLE From F



Witnessed by _____

Author: Tom Davinson
 Type:
 Category:
 Subject: Saturday 16 April

Continuation of yesterday's test with c. 300mBar of He in the TUDA chamber.

Bourdon (mBar)	MKS Baratron (Torr)	S2 preamp Thermocouple (deg C)
9.31 300	222.9	+22
10.30 300	223.1	+22
11.29 300	223.2	+22
12.29 300	223.3	+22
13.26 300	223.3	+22
14.27 300	223.5	+22
15.27 300	223.6	+22
16.28 300	223.7	+22
17.28 300	223.8	+23
18.28 300	223.9	+23
19.27 300	223.9	+23
20.27 300	223.9	+22

AL109 Shaping Amplifier Modules

Detector	Channels	RAL109 Resistor DIP	Nominal FSR (MeV)	Nominal Gain (keV/ch)	Minimum LLD (keV)
2-1 p+n	0-47	3.3k	71.4	18.6	1300
2-1 n+n	48-63	3.3k	71.4	18.6	1300
2-2 p+n	64-111	1k	33.3	8.7	600
2-2 n+n	112-127	1k	33.3	8.7	600
p+n	128-143	1k	33.3	8.7	600
n+n	144-159	1k	33.3	8.7	600
Os	160-175	10k	183	47.7	3400

downstream low gain.
upstream high gain

11 RAL109 LLDs set to ~10mV (minimum)

AEN V560 Scalers

Channel

Triggers
 Triggers accepted
 1kHz clock
 Ortec 439
 Pulser

S2-1 OR ch 0-15
 S2-1 OR ch 16-31
 S2-1 OR ch 32-47
 S2-1 OR ch 48-63
 S2-2 OR ch 64-79
 S2-2 OR ch 80-95
 S2-2 OR ch 96-111
 S2-2 OR ch 112-127
 W OR ch 128-143
 W OR ch 144-159
 PD OR ch 160-175

24
 25
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TITLE _____

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Author: Tom Davinson
 Type:
 Category:
 Subject: Sunday 17 April

Continuation of yesterday's test with c. 300mBar of He in the TUDA chamber.

Bourdon (mBar)	MKS Baratron (Torr)	S2 preamp Thermocouple (deg C)
09.45 300	222.8	+21
10.44 300	222.9	+21
11.48 300	223.1	+22

11.49 FTS RS44 set point +22.0 deg C
 +/-15V preamp power ON

12.01 300	223.4	+26 FTS RS44 @ set point
12.31 300	223.7	+26
13.00 300	223.9	+26

13.01 FTS RS44 set point +15.0 deg C

13.11 300	223.4	+21 FTS RS44 @ set point
13.41 300	223.0	+22
14.11 300	222.9	+22
15.14 300	222.9	+22
16.11 300	222.9	+22
17.11 300	223.1	+22
18.16 300	223.1	+22
19.10 300	223.2	+22
20.19 300	223.1	+21

20.20 +/-15V preamp power OFF
 FTS RS44 set point +20 deg C

20.25 Bolts securing downstream flange re-installed
 - finger tight only

20.45 Vent TUDA chamber to air, i.e. chamber contains He & air

See attachment 1. Conclude that the preamps can be operated with the FTS RS44 recirculating chiller set point +15 deg C with 300mBar of He. The S2-1 preamplifier thermocouple indicates that the preamplifiers are operating at about ambient temperature with little apparent effect on gas pressure.

N.B. For vacuum operation, the FTS RS44 set point should be +5.5 deg C

Pulser tests

BNC PB-4 settings:
 Amplitude 90,000 x5 attenuator IN
 frequency 266Hz
 delay MIN
 tail pulse
 t_r 50ns tau_d 1000us
 INT ref
 polarity + (for p+n junction strips, - for n+n ohmic strips)

11 ADC & TDC channels OK

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ICs

Detector	FWHM (ch)	(keV)	
-1 p+n #23	1.6	30	
-1 n+n #8	1.6	30	
-2 p+n #23	1.7	15	
-2 n+n #8	1.8	16	
p+n #8	2.2	19	} using signals
n+n #8	4.3	37	} from S2-2 preamps
#0	1.7	81	

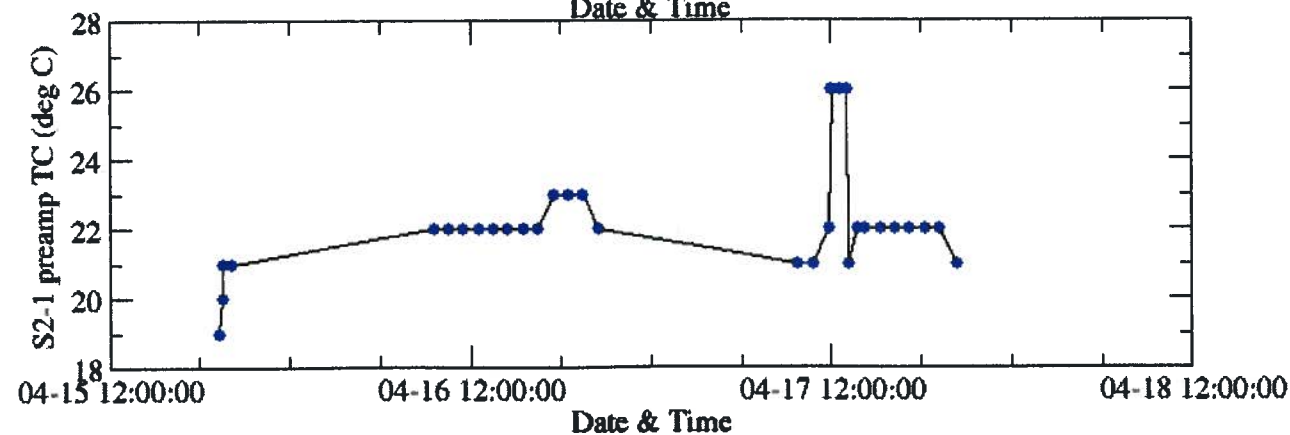
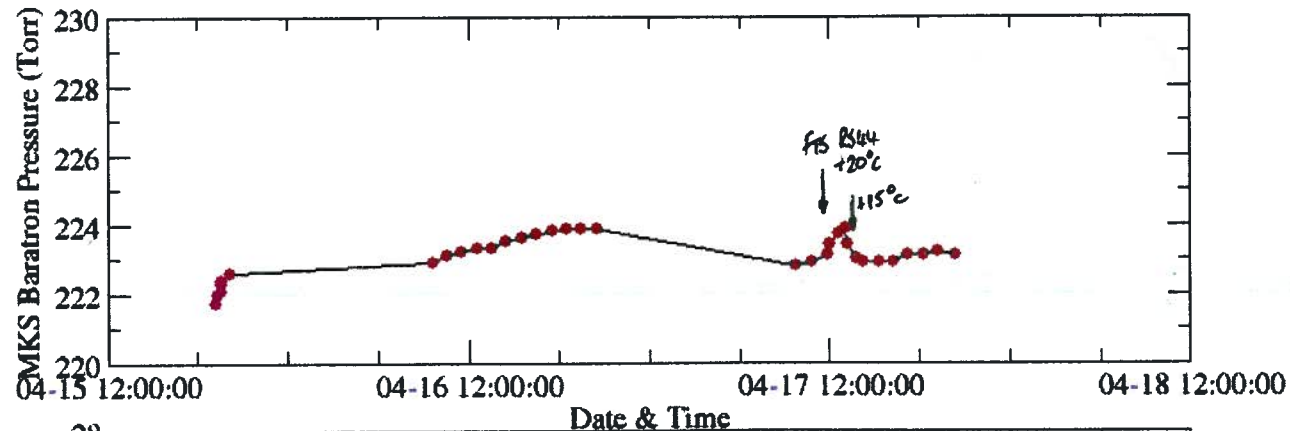
ICs

Detector	Centroid (ch)	FWHM (ch)
-1 p+n #23	245	1.4
-1 n+n #8	254	1.9
-2 p+n #23	253	1.7
-2 n+n #8	260	1.8
p+n #8	254	1.8
n+n #8	266	1.2
#0	233	1.6

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TUDA Chamber Pressure Test

~300mBar He (ambient temperature)

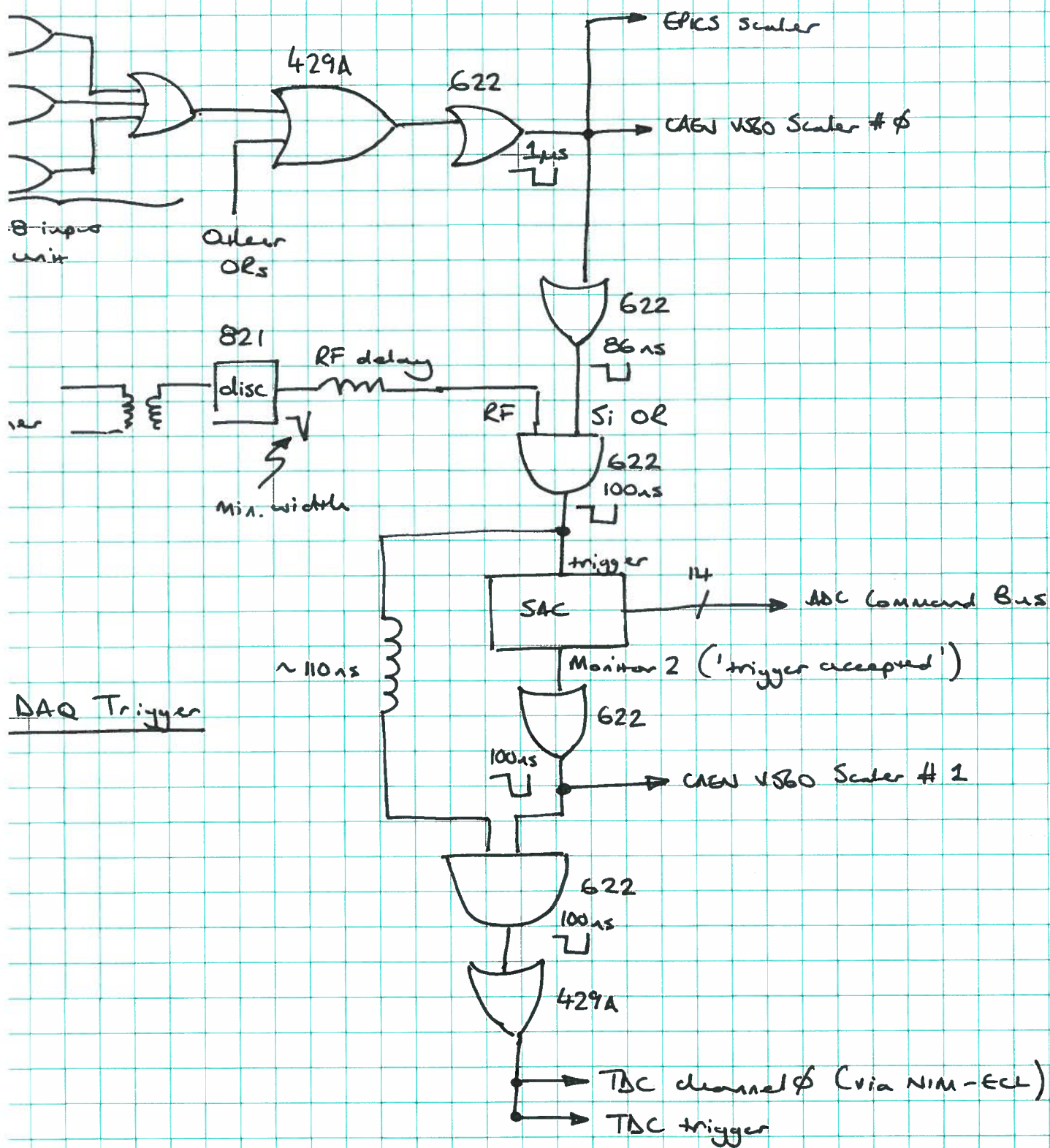


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10:15 Opened chamber to check what was in there.
JB took photos.

10:35 Comenced pump down to check integrity of installed coolant loop.

ELOG #9 (S1287) states ~12mins to get to 250mT

10:59 Ch. Pressure on CE5 ~ 0.2 Torr

Closed_x KVS, opened BV5 & started turbo.

11:00 PNG5 installed on CE5 @ 0.08 Torr

12:15 PNG5 = 3×10^{-5} T

12:18 FTS RS44 Setpoint +5.5°C - small spike in PNG5 from 2.7×10^{-5} T. Quickly recovered.
→ 3.0×10^{-5} T.

ELOG #9 ⇒ 1.5 hrs with cooler @ +5.5°C to get to 4.5×10^{-6} T

12:22 PNG5 = 2.1×10^{-5} T

12:48 PNG5 = 1.16×10^{-5} T

13:20 9.40×10^{-6} T

13:55 8.0×10^{-6} T

Cooler SP put to +22°C then vented when up to temp.

14:30 Moved Tgt Ladder from posⁿ #3 (most downstream) to #1 (most upstream)

e No. 15

00 Having finally located W preamp assembly, installed it.
Cabled up.

Completed coolant loop.

Tested for gross leaks in air - no leaks detectable.

33 Started to pump down.

48 $P_{NG5} = 250 \text{ mT}$

10 $P_{NG5} = 2.5 \times 10^{-4} \text{ T}$ Cooler ON

Cooler setpoint = $+5.5^\circ \text{C}$

No effect on vacuum @ $2.2 \times 10^{-4} \text{ T}$ level.

Cooler OFF

50 $P_{NG5} = 5.8 \times 10^{-5} \text{ T}$

day 6th May 2011

8:40 $P_{NG5} = 6.31 \times 10^{-6} \text{ T}$

Cooler on SP = $+5.5^\circ \text{C}$

Small rise in pressure to $\sim 6.4 \times 10^{-6} \text{ T}$, recovered to $6.3 \times 10^{-6} \text{ T}$
in approx. 2 mins.

10 $T_{\text{Cooler}} = \sim +3.8^\circ \text{C}$ (SP = $+5.5^\circ \text{C}$) $P_{NG5} = 5.4 \times 10^{-6} \text{ T}$

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09:10 Conclude that coolant loop is leak tight.

Make $T_{sp} = 20^\circ \text{C}$ in prep for venting.

09:25 Turbo off. Cryo isolated.

09:40 Commence vent to N_2 .

14:58 By pass line has been installed, from
T404 VV5A to collimator assembly, with
new Convection gauge.

Installed throttle valve also so T404 and upstream
section can be pumped out at approx. same
rate.

See elog for diagram.

(Simon's pulser tests earlier indicate all channels on)
(W preamp are ok.)

Saturday 7th May 2011

10:00 Install top flange for gas inlet.

11:00 Installed thermocouple for gas temp. reading.
(see page 5)

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Date

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8 Measured delta mount rings & secured.
 Measuring from downstream side of mount ring to edge of rail fixing (i.e. 12mm upstream of flange inner surface):

	mm
	228
-1	449
-2	659
meter / PD	851.9

This puts S2r & 1st collimator at required position (see fig. on e-log).

CCD camera mounted onto downstream side of anti-scatter shield (collimator / PD mounting).

New mounting required ~~for~~ for Faraday cup as would be too far downstream is mounted on spider behind W.

Will secure to new plate mounted on upstream side of W mount with long stand offs. (will put photo on e-log once holes drilled - Monday?)

T(s)	Pressure in 2L volume (mTorr)	Chamber	340 mbar Pressure in 2L volume (mTorr)
0	14	0	10
10	16	10	12
20	20	22	14
30	20	39	16
40	20	59	18
1:15	30	1:15	20
2:00	40	2:18	30
2:55	50	3:25	40

Chamber and 2L pumped out. Isolate ~~Measure~~ both from pump and measure Pressure in 2L volume.

2L volume pumped out, Chamber filled with 340 mbar He. Isolate 2L volume from pump and measure pressure will with time.

Both with Window 2

on previous page to measure leak rate of
through Ni window #2.
measurable leak. (plot this for e log).

eat this with a blank flange and other
windows tomorrow.

May

Blank flange leak test chamber with He 340 mbar	P (mTorr)	chamber (mbar)	
	11		Chamber pressure has
	12		crept upto 390 mbar (?)
	14		Closed manually vent valve
	16	390	at 400 mbar
	18		
	20	400	
	30		

12:06 Blank flange test with vacuum
13:45 either side

P (G) P (mTorr)

0	7
10	8
20	8.5
30	~8.5
40	9
1:17	10
2:38	12
3:43	14
7:01	16
	18

Close all valves &
measure pressure rise in
'2L volume'
TADA chamber starting
pressure: 196 mTorr

Test of window #3

chamber pressure 173 m Torr

pressure

1) P (m Torr)

Test of window #4.

chamber pressure 256 m Torr

3) Re-test window #3

chamber @ 268 m Torr

Day 10th May

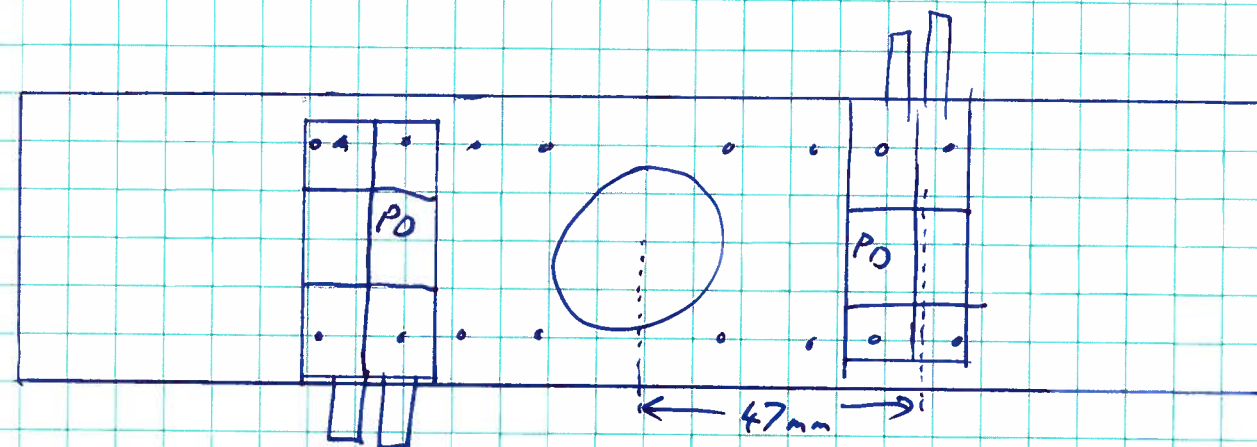
moved PD preamp support ring so as close as possible from to restraint flange window. (50mm)

measured to be 965 mm from downstream edge of ring to upstream edge of rail support.

(101 mm from upstream edge of next ring).

from this position, upstream facing PD must be placed < 47 mm from beam axis.

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Wed. 11th May

11:24 ~~position of~~ W support ring 240 mm

from downstream flange

stand off is 13.5 mm

$$\text{hence } W = 750 - (240 + 13.5) = 496.5$$

hence W is 496.5 mm from target

W strip size 3.1 mm

$$\text{angular size} = \arctan\left(\frac{3.1}{496.5}\right) = 0.358^\circ$$

thick CH_2 target is ~ 2 mm

$$\Rightarrow \arctan\left(\frac{3.1}{494.5}\right) = 0.359^\circ$$

\therefore effect of target thickness is much less than angular resolution.

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Detector Positions

nom target position:

52-2 70 mm

52-1 280 mm

W 496.5 mm

52 Dimensions

- diameter: 20 mm

Inner diameter: 22 mm

Outer diameter: 70 mm

ings: 48

total strips: 16

kness: 500 mm

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W DimensionsActive area: 50 x 50 mm²

strips: 16 x 16

Strip pitch: 3.1 mm

Thickness: 1 mm

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Date

Re-entrant flange alignment

35 Alignment of chamber checked.
Back of chamber found to be ≈ 1 mm out (not sure which direction).

Alignment of re-entrant flange (window end) was ≈ 5 mm low and 2 mm left.

Removed bellows (upstream) etc., checked alignment of upstream end of chamber - good alignment.

Removed collimator assembly & re-entrant flange, dismantled and re-assembled, with re-entrant flange bolts only being tight.

By tightening re-entrant flange bolts inside the chamber was able to get reasonable alignment.

≈ 0.5 mm to the right.

≈ 0.25 mm low.

Used chamber and pumped to roughing vacuum, seems to be good. (at 150 mTorr)

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Date _____

First order check of re-entrant flange vacuum integrity.

19:10 TUDA @ ≈ 100 mb air. Blank on re-entrant flange

2 l section being independent, pumped and pump level ≈ 30 mT

	T (s)	P (mT)	T (s)	P (mT)	
TUDA @ ≈ 0.150 mb	0	≈ 27	0	≈ 27	Introduced 350 mb He into TUDA. TUDA @ 350 mb He N.B. Time readings $\approx \pm 5-10$ s.
	30	30	30	30	
	91	40	46	46	
	160	50	172	50	
	223	60	240	60	

CONCLUSION: To first order the re-entrant flange is leak tight to He in the TUDA chamber

19:35 Pumped He out of chamber. Closed He bottle. Secondary scroll pump off (i.e. into 2 l section).

CGS started reading true again once He removed.

RVS closed at $P_{CGS} \approx 1.5 \tau$. Hard valve (RVS) closed.

Thursday 12th May 2011

06:30 Pressure in TUDA CGS = 2.67 τ

Vert to install Ni window for leak testing w. He

06:55 $P_{CGS} = 760.2 \tau$

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Witnessed & Understood by me, _____

Date _____

Invented by: _____

Date _____

No. _____
10 TUDA opened up, window #1b installed.
5 Commenced roughing out both chamber + re-entrant flange
Inlet valve gradually opened so pumping on window not excessive.
7:45 reading on PNC5 read $\sim 1.0 \times 10^{-4}$ T and then jumped to
 $\sim 1 \times 10^{-2}$ T. Shortly afterwards it "Tuned out".
attempts to RST failed. Turbo off. Cryo isolated. Breakfast!
30 Returned and replicated problem by turning turbo on, CG5 down
below 10 mT and attempted to activate PNC5.
Failed as above. Call to EPICS - they have not changed anything

CONCLUSION: possible hardware problem on PNC5. (Piece of Ni? Dust etc?)

1) Isolate re-entrant section to test Ni #1b.
Filled TUDA with 840 mb He. Closed off He bottle.
Set Scroll pump #2 pumping on re-entrant section.
Levels off at 40 mT. Close off scroll pump.

T	P
0	40
12	50
26	60
36	70
47	80
56	900
106	100
1:27	120
1:48	140

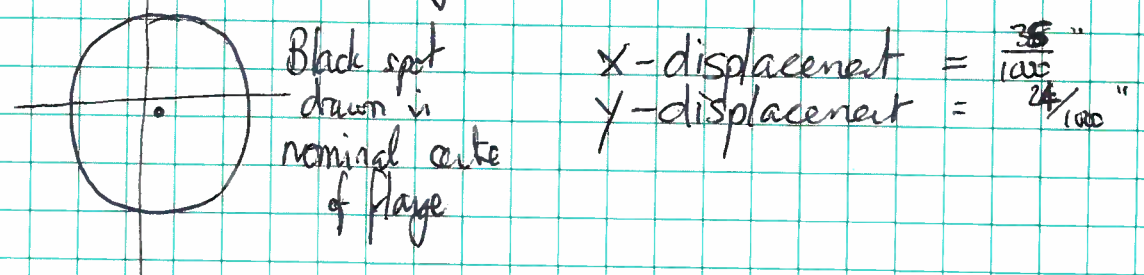
CONCLUSION: Ni #1b leaks.

From Page No. _____
10:45. Pump out He from TUDA and open re-entrant flange to chamber.
Rest of the morning:
1) Light tested 2.0 um Ni foil. - found to be riddled with pin holes.
CR + JB checked whole roll and found areas w/ less holes.
JB to make 6 windows this AM using RW epoxy for testing tomorrow.
2) Many issues with vacuum + EPICS controls.
PM took PNC5 for testing on the He leak detector and reported it is operating.

13:00 Chamber + Target Ladder Survey.
Requested Ops open IV6 (in HERACLES) and V4 for the survey

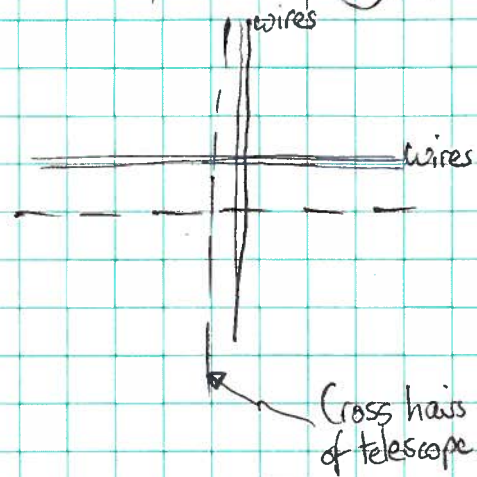
1) Checked telescope on the target ball up of Quads, next to the bending magnet.
At ϕ/ϕ , telescope sights onto dead centre of target ball.
Telescope on beamline.

2) Install Blank Flange into Re-entrant Section.



D/S End of TUDA.

TUDA pushed into chamber. End flange secured by 4x10mm hex bolts as per closing for pumping



x-displacement = $25/1000$ "

y-displacement = $10/1000$ "

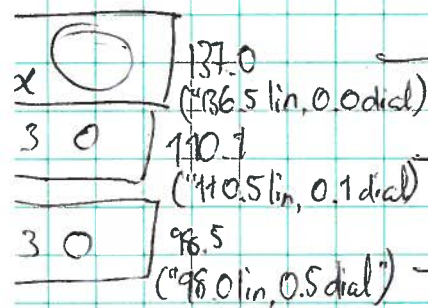
c.f. P177 of logbook #12

$5/1000$ " L

$5/1000$ " D "

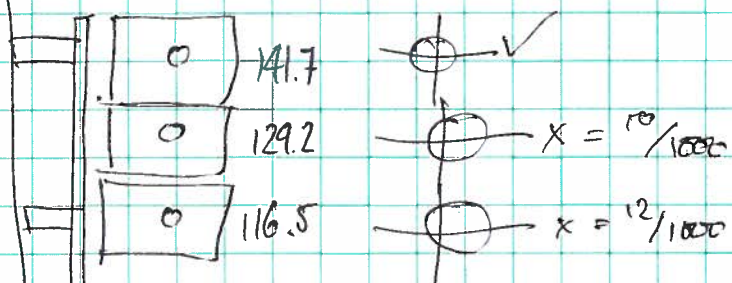
Target Ladders (Draft 1)

#1

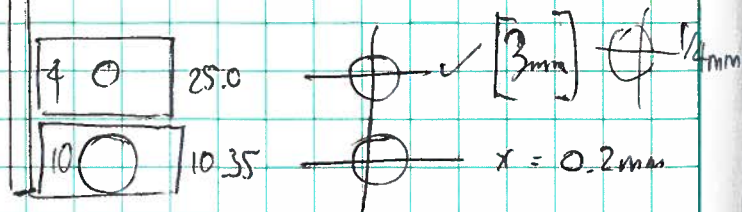
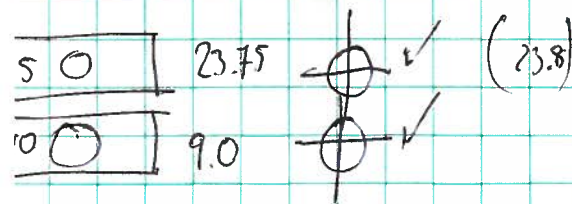


Telescope

#2



Telescope



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Interlock checks

Several problems were identified with the EPICS pages.

- No access for TUDA to row section
- H₂ fill not recognised by IV4
- Can't see interlock details for RV4 and CM4

Jane looking into them

TUDA pumped down - RV4 closed. Leak/outgassing rate in bypass section very high. Long discussions about what to do.

Will pump on it for long time and change H₂ fill procedures to dab IV4 open to bring CM4 pressure down. [Also known as: the H₂ fill will be done in stages]

Peter set up current source on TUDA FC but EPICS shows it not live. Some investigation shows that CANBUS box not present. Controls fixing (returning box)

EPICS now working. Tested interlocks

- with RV4 open, IV4 will not open.
- with IV4 open, RV4 cannot be opened.
- opening H₂ fill trips IV4 shut.
- pressure on CM5 > 280 T trips IV4 shut also trips preamp power.

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Harbringer of doom.

ISACII accelerator is NOT coming online due to overheating motor on cooler.

Options discussed. May run DRAGON instead.

00 TUDA and Re-entrant section connected (RV4 open).

Roughed down after interlock tests.

Turbo tuned on.

Noted that RV4 closes automatically when CGS ~ 10 mT.

(Tripping when CMS reads zero?)

Reopened RV4 to allow re-entrant section to continue outgassing overnight.

Cry opened.

Saturday 14th May 2011.

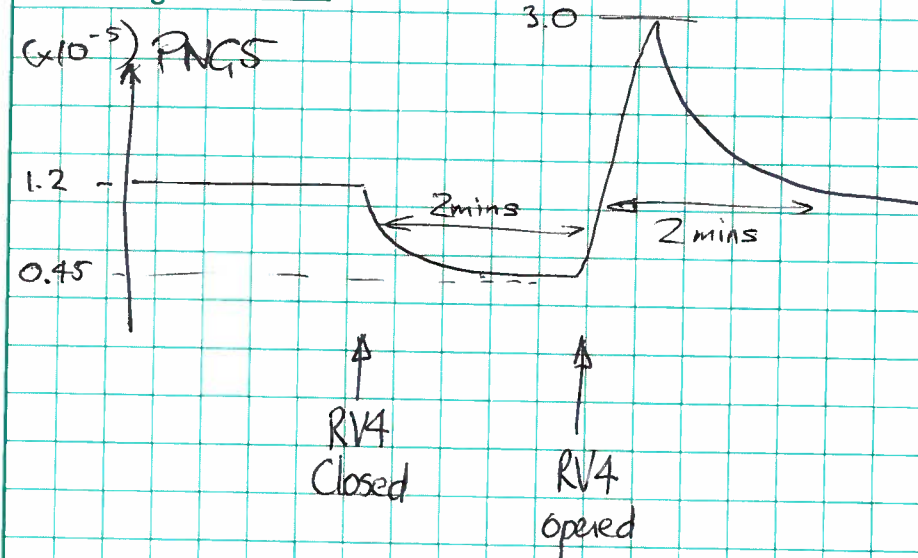
30 Pressure in TUDA + Re-entrant P_{NGS} = 1.27×10^{-5} T

P_{NGS} $\sim 4.75 \times 10^{-5}$ T @ $\sim 21:50$ last night

\Rightarrow ~ 2.75 hrs to reach IV4 pressure w. re-entrant flange in place

43 Closed RV4. Pressure in TUDA dropped to P_{NGS} $\sim 4.8 \times 10^{-6}$ T

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10:45 Reopened RV4.

11:44 Test Outgassing Rate in Re-entrant Flange.

Close RV4

P_{NGS} $\sim 6 \times 10^{-6}$ T and falling

Pressure in Re-entrant: P_{CG4} reads 0.004 T

11:51 P_{NGS} = 3.9×10^{-6} T

P_{CG4} = 0.007 T

7

11:58 P_{NGS} = 3.65×10^{-6} T

P_{CG4} = 0.012 T

14

12:02 P_{NGS} = 3.55×10^{-6} T

P_{CG4} = 0.015 T

18

12:11 P_{NGS} = 3.44×10^{-6} T

P_{CG4} = 0.022 T

27

12:14 P_{NGS} = 3.42×10^{-6} T

P_{CG4} = 0.024 T

30

12:16 P_{NGS} = 3.42×10^{-6} T

P_{CG4} = 0.026 T

32

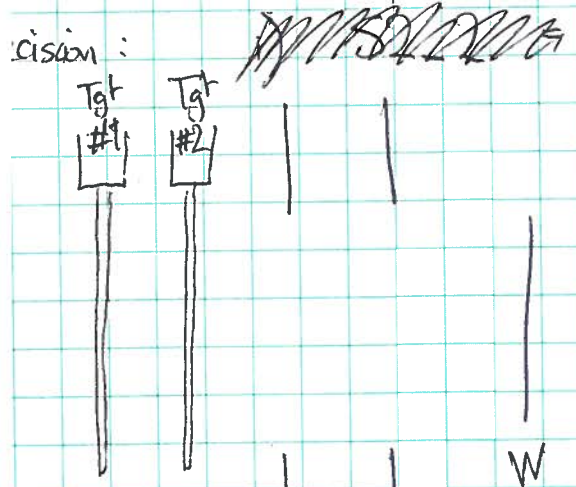
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- 16 Turbo off. Opened RV4. Closed GV5 (Cryo)
- 20 Closed hand valves. Checked VV5/8 attached to He gas bottle. Opened VV8/VV5. Cracked hand valve and let tr of He into chamber to slow turbo down, then closed it.
- 28 Started opening VV5/8 hand valve
- 38 Valving complete. He gas bottle closed off. Side flange unbolted.

55. Installation of Detectors.

of discussion of detectors to be installed.



- 1) S2-1
Yok Detector S2: 2623-16
507mm.
Yok Asset #: 39203
- 2) S2-2
Edinburgh detector 2182-5
471mm.
- 3) W
Yok Detector 2635-19
1037mm.

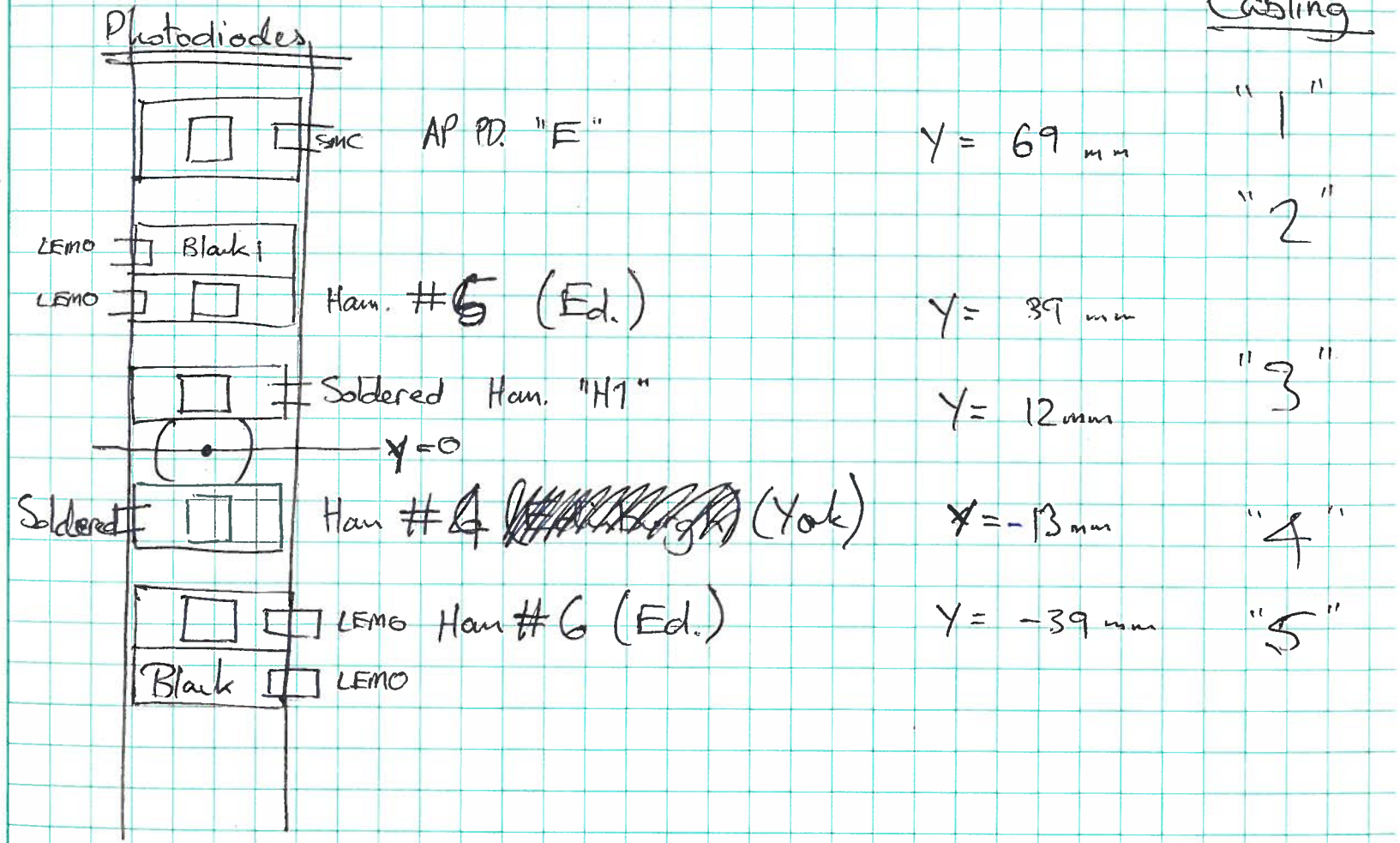
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TITLE Installing Detectors

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- 13:15 Removed side flange.
- Removed target ladder #2 and both LMD → Ladder adapters. LMDs set to $\phi.\phi.$ i.e. fully retracted.
- Removed South Al. Blast plate.
- Unbolted back flange and pulled back.
- Removed CCTV from plate v/s of Tgt #1 to allow installation of photodiodes

Cabling

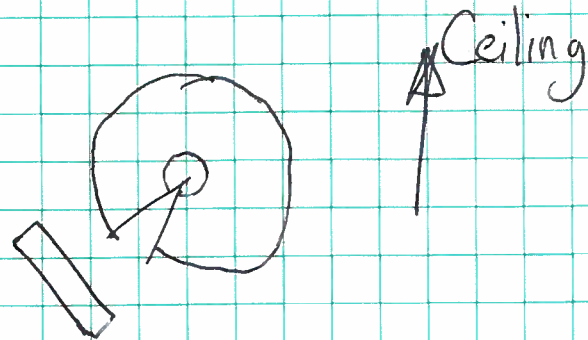


W Ribbon Cable installed with key on cable on BACK side of the detector.

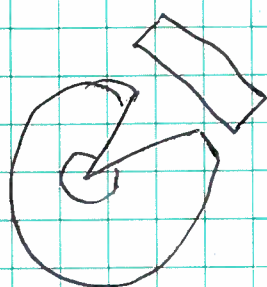
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Orientation of WS2 Detectors. (Beam INTO page)

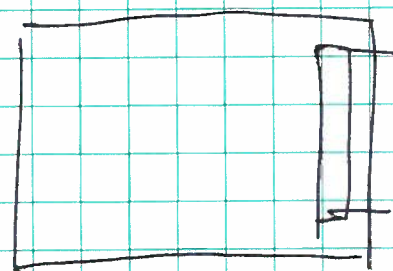
S2-1



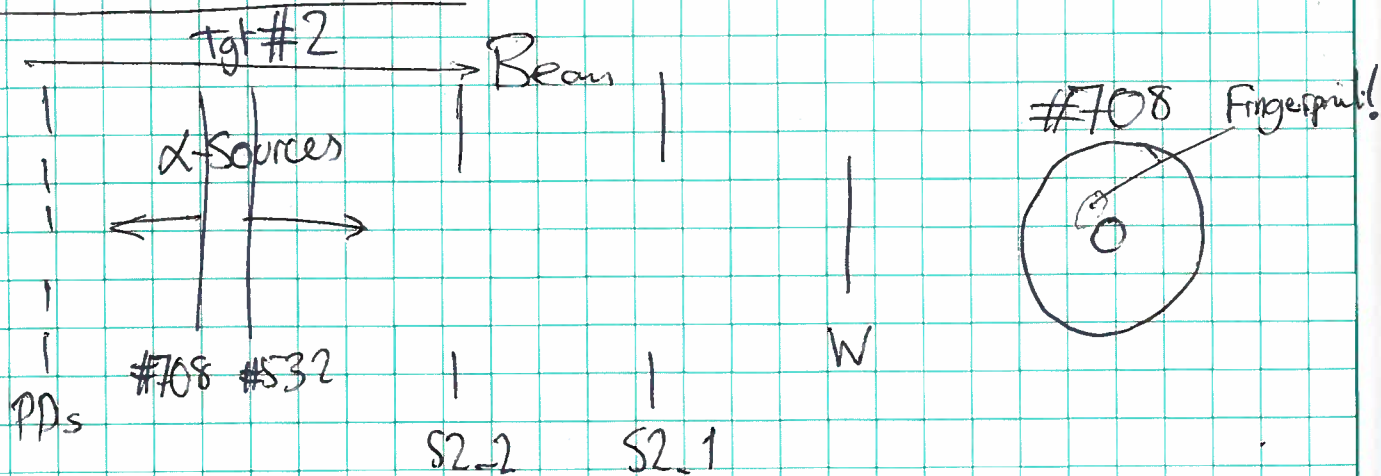
S2-2



W



α-Sources Installed



15:10 All detectors and sources installed.
Closed chamber.
Returned source containers to TUDA shack.
Radiation sign put on side of chamber.

15:15 Pumped out with roughing pump.

15:30 Turbo On.

15:36 Cryo On.

Sunday 15th May 2011

10:00 R/V4 closed yesterday as CG4 went below 10mT.

P_{CG4} now 1.832 T

$P_{NG5} = 2.9 \times 10^{-6}$ T

Pump out re-entrant section using leak checker.

Closed off leak detector + hand valve.

Opened R/V4 a couple of times to get re-entrant flange outgassing into chamber in bursts then left it open.

10:15 $P_{NG5} = 5.24 \times 10^{-4}$ T

$P_{CG4} = 0.005$ T

10:22 $P_{NG5} = 3.05 \times 10^{-4}$ T

$P_{CG4} = 0.004$ T

No. _____

45 Time to get down to cooler pressure is too long so closed RV4.

After ~2 mins, $P_{NGS} = 4.25 \times 10^{-6} \text{ T}$

$P_{CG4} = 0.010 \text{ T}$ and using. Set leak detector pump on the re-entrant section.

2) Cooler turned ON. $T_{SP} = +5.5^\circ\text{C}$.

Tiny fluctuation in P_{NGS} from $3.8 \times 10^{-6} \text{ T} \rightarrow 3.95 \times 10^{-6} \text{ T}$

back on previous downward trend after ~1 minute.

$P_{NGS} = 2.19 \times 10^{-6} \text{ T}$

Cooler. $T_{SP} = +5.5^\circ\text{C}$. Temp. reading fluctuating from

$T = 4.0 \rightarrow 5.5^\circ\text{C}$

Temperature of the Preamps = 10°C

----- "Gas" = 23°C

3) Preamp power turned ON. Top: +15V = 0.62A -15V: 0.22A
Bottom: 1.42A 0.59A

CAEN 54403 powered on (i.e. inserted key + turned it).

Current voltage setpoints:

S2-1	130V
S2-2	130V
W	250V
PDs	30V

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12:06 V-I curve for W.

@ 0 Volt noise is ~10 mV peak-to-peak

$V_{(Volt)}$ $I_{(A)}$

0 1.44 0.03

5 5.16 0.07

10 10.24 0.08

15 15.2 0.12

20 20.2 0.14

25 25.2 0.14

30 30.2 0.17

40 40.2 0.19

50 50.2 0.20

60 60.24 0.24

70 70.2 0.24

80 80.24 0.22

90 90.2 0.25

100.2 0.24

110.28 0.24

120.28 0.25

(noise ~ 5 mV p-to-p)

V	I
130.32	0.25
140.28	0.25
150.28	0.25
160.20	0.25
180.32	0.27
200.32	0.27
220	0.27
230.4	0.27
240.4	0.27
250.4	0.27

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W V-I curve (continued)

I

0.4	0.27
0.44	0.29
0.4	0.29
0.44	0.3
0.44	0.28

Max allowable is 300

have \checkmark set point back to 5 V_{01P} and switched
1 biases to Off.

2 - 14:30 Fun and games working out S2 cabling.

Ch ϕ on cable goes into J1 connector of S2 preamp board.

10 Starting pumping again.

0 Switched on cooler & set to 5.5 °C

Pressure 6.25×10^{-5} Torr

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16:16 Pressure: 1.31×10^{-5} TorrCooler temp: ~ 4.8 °C (Set point 5.5 °C)

Preamp temp: 15 °C

Biases: S2-1 120 V (0.74 mA)

S2-2 110 V (1.85 mA)

W 150 V (0.34 mA)

PD 10 V (0.63 mA)

16:50 Alpha Calibration Data to Disk.

● Run #1

Start = 16:50:58

Stop = 17:33:45

1692 Blocks

(Trigger rate ~ 500 Hz)

17:39

Biases off
pre-amp off
cooler set to 20 °C

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No. _____
 2) Beam delivery late this week now possible. Possibly.

50 Cooler on. $T_{sp} = +5.5^\circ C$

0) Preamps on
 HV Bias on.

S2-1	V = -120V	I = 0.69 μA
S2-2	V = -110V	I = 1.63 μA
W	V = -150V	I = 0.39 μA
PDs	V = -10V	I = 0.6 μA

$T_{preamps} = 15^\circ C$ $T_{gas} = 23^\circ C$

Removed Leak Checker + pipe from Secondary inlet into Re-entrant Section

Online spectra from yesterday saved to: (α -spectra)

~ /S1287/spectra/specs - 2011May - 11:49:22

All spectra cleared (mensas and soltas)

#2 (to disk) [Alpha Data - Sources on Tgt Ladder]

→ see p. 36.

11:55:43
 13:49:04

Trigger rate ~ 135 Hz

Leakages:		V	I
S2-1		120	0.52
S2-2		110	1.45
W		150	0.24
PDs		10	0.58

$T_{gas} = 20^\circ C$

$T_{preamps} = 15^\circ C$

$P_{ING5} = 1.64 \times 10^{-6} T$

$P_{CG4} = 0.153 T$

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ADC → Channel Conversion.

ADC #1: 0 → 31 S2-1 Front Strips

#2: 0 → 15 S2-1 Front
 16 → 31 S2-1 Back Sectors

#3 } As above S2-2
 #4 }

ADC #5: 0 → 15 W Front
 16 → 31 W Back

PDs. 0 → 4 & ADC #6.

S2 Ordering in Mensas spectra as per S2order subroutine, so far above:

ADC #1 Channel 0 = Strip 47
 24 = Strip 0

Run stopped 13:49. Waiting to move sources D/S to get better stats in W and S2-1.

~~14:13~~

14:05 (ish) P_{gas} & preamps off, cooler to 20°C.

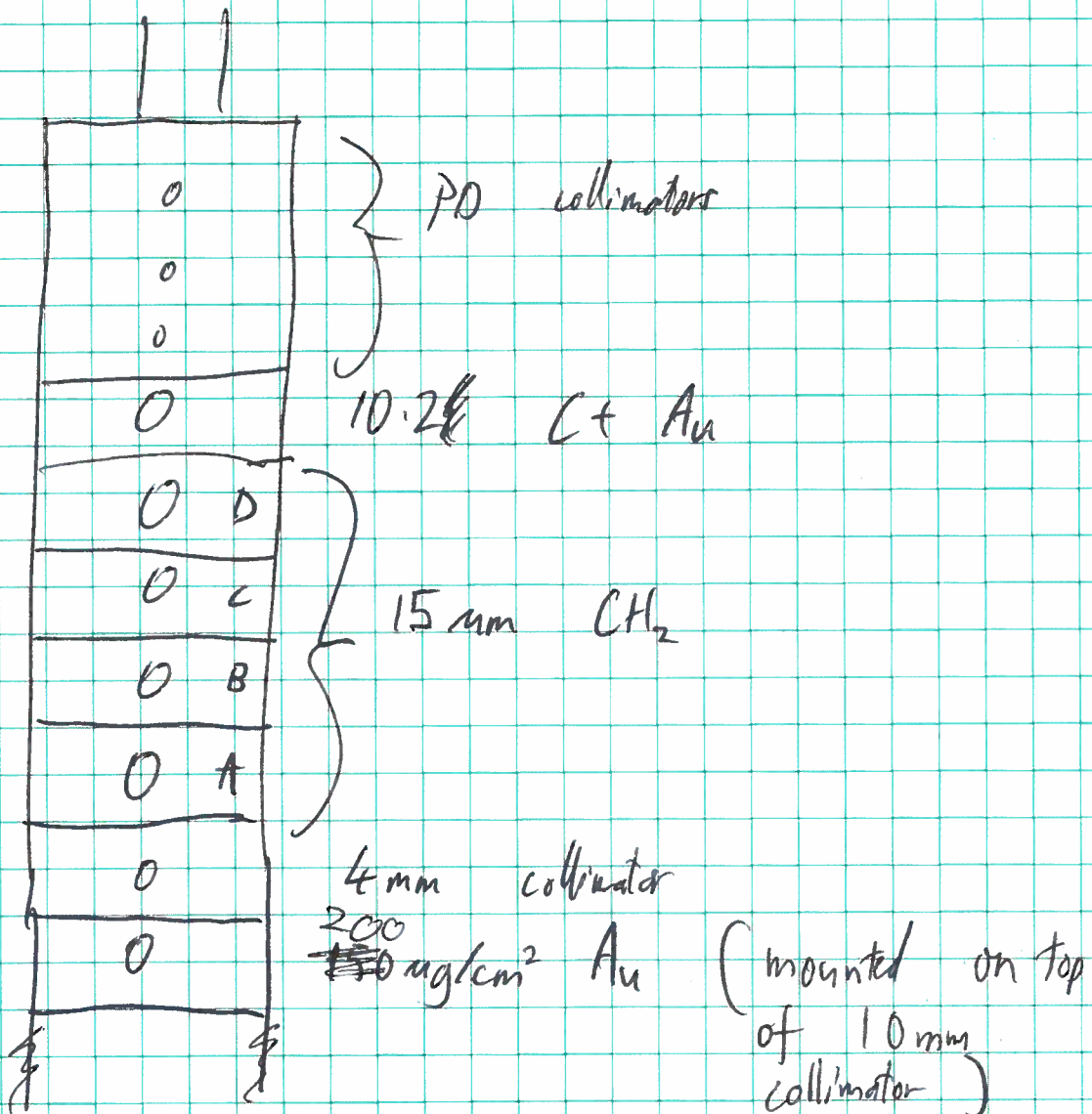
14:13 (ryo & turbo off. Pressure < 10⁻⁹ Torr

14:21 P = 4 x 10⁻³ Torr

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#2 Foils mounted on target ladder for thickness measurements

TOP



and to move PD mount / 4mm collimator mounting stream to fit target ladder #1 in with PD platen on own stream side.

member to move back!

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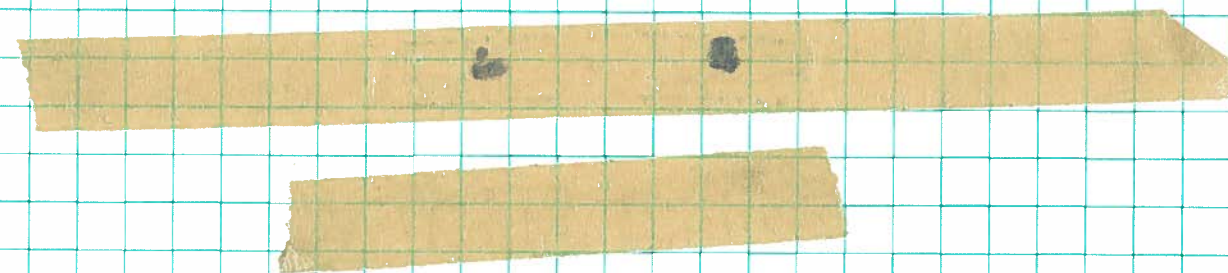
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18:35 Closed chamber and began pumping for calibration & foil thickness measurements.

19:05 Turbo & cryo On.

20:00 Cooler on - set to 5.5°C

20:20 Target ladder #1 @ 2mm
Target ladder #2 @ 99mm

	V (W)	I (mA)
S2-1	120.44	0.72
S2-2	110.32	1.87
W	150.44	0.34
PD	10.04	0.16

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5 Run started #3

Started 20:25:09

~~stopped 26~~

Stopped 20:26:26 - forgot to zero spectra

zeroed sort stats of MemSar

start new run (#4)

Started 20:29:03 Illuminated PD1 through CH₂ foil A.

stopped. 20:59:53

Ladder #1 @ 2mm, #2 @ 19mm

11 save and clear PD spectra.
"alpha-foil ch2-A-pd1"

3 zeroed PD spectra (not others)

moved Ladder #1 to 17mm

Illuminating PD1 through CH₂ B

Start Run #5 20:04:29

Stopped 21:22:17

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21:07 Noticed during Run 4 there was nothing in PD2 (expect some illumination through 4mm collimator).

From photos, looks like one of the wires soldered to PD2 is broken.

Will put photo on e-log.

21:24 Moved target ladder #1 to 32mm

Illuminating PD1 through CH₂ C.

Saved SortStat PD spectra in

of alpha-foil ch2-B-pd1'

(Cleared PD spectra

Start Run #6 20:30:57

Stopped 21:47:44

21:50 Saved & cleared

moved T/L #1 to 47mm - CH₂ D onto PD1

Started Run #7 21:50:04

Stopped 22:08:09. 615 blocks

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