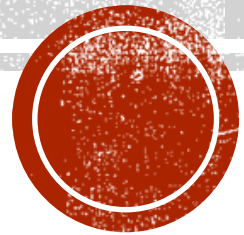
ISOLDE CHAMBER STATUS

21st April 2017

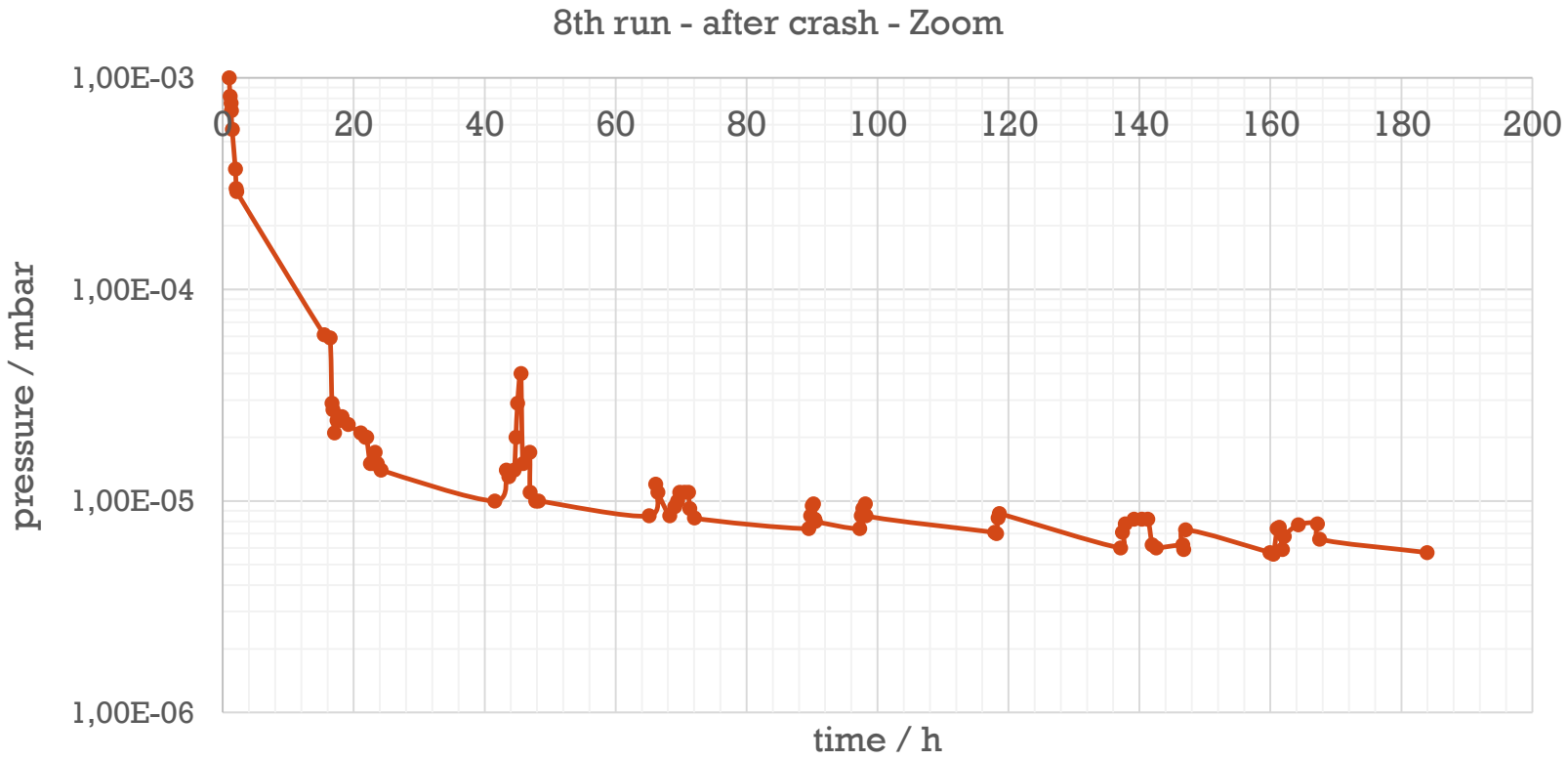
Vacuum and Si-Det testing



STATUS QUO

- Pumping time (<1.0E-05): 40 - 60 h (first run: 100 h)
- Lowest pressure:
  - ~6E-06 mbar (without preamp) /
  - ~1E-05 mbar → ~8E-06 mbar (with preamp on and after 100 h)
- Changing temperature with preamps on/off → not enough cooling power
- Gauge (TC1) was far away from big and small turbo pump
- Si-Det (74µm)

PRESSURE TEST V (AFTER POWER SHUTDOWN)



Establish opening chamber Procedure!!!

- Cooling off long before or heat up to +5 to +10 deg C

Minimum:
p ~ 6.0E-06 mbar
T ~ -8.2° C

→ Problem with Coolant → exchange it!
→ 1E-05 took 40-50 hours → more moisture than usual

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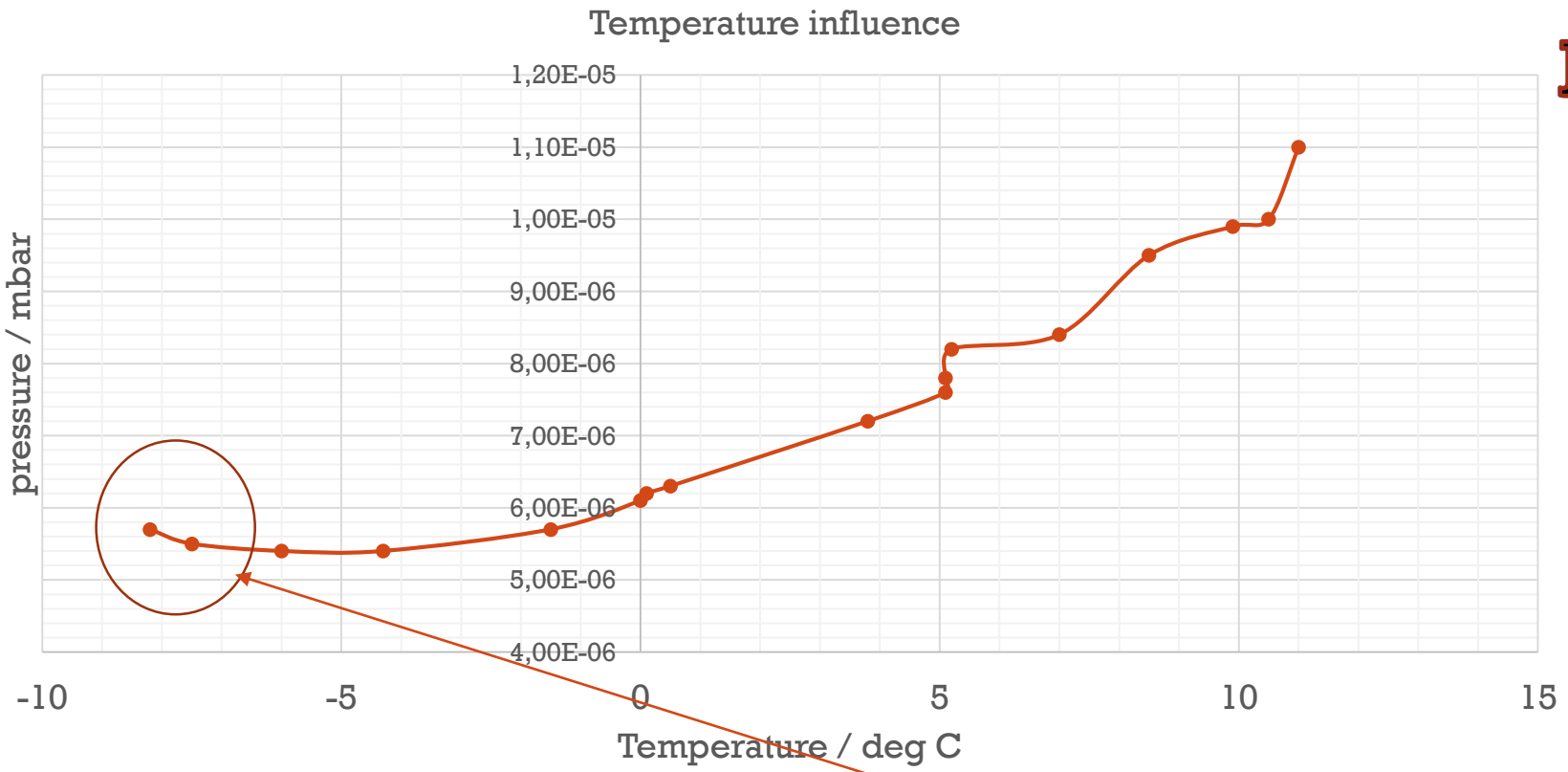
TEMPERATURE TEST



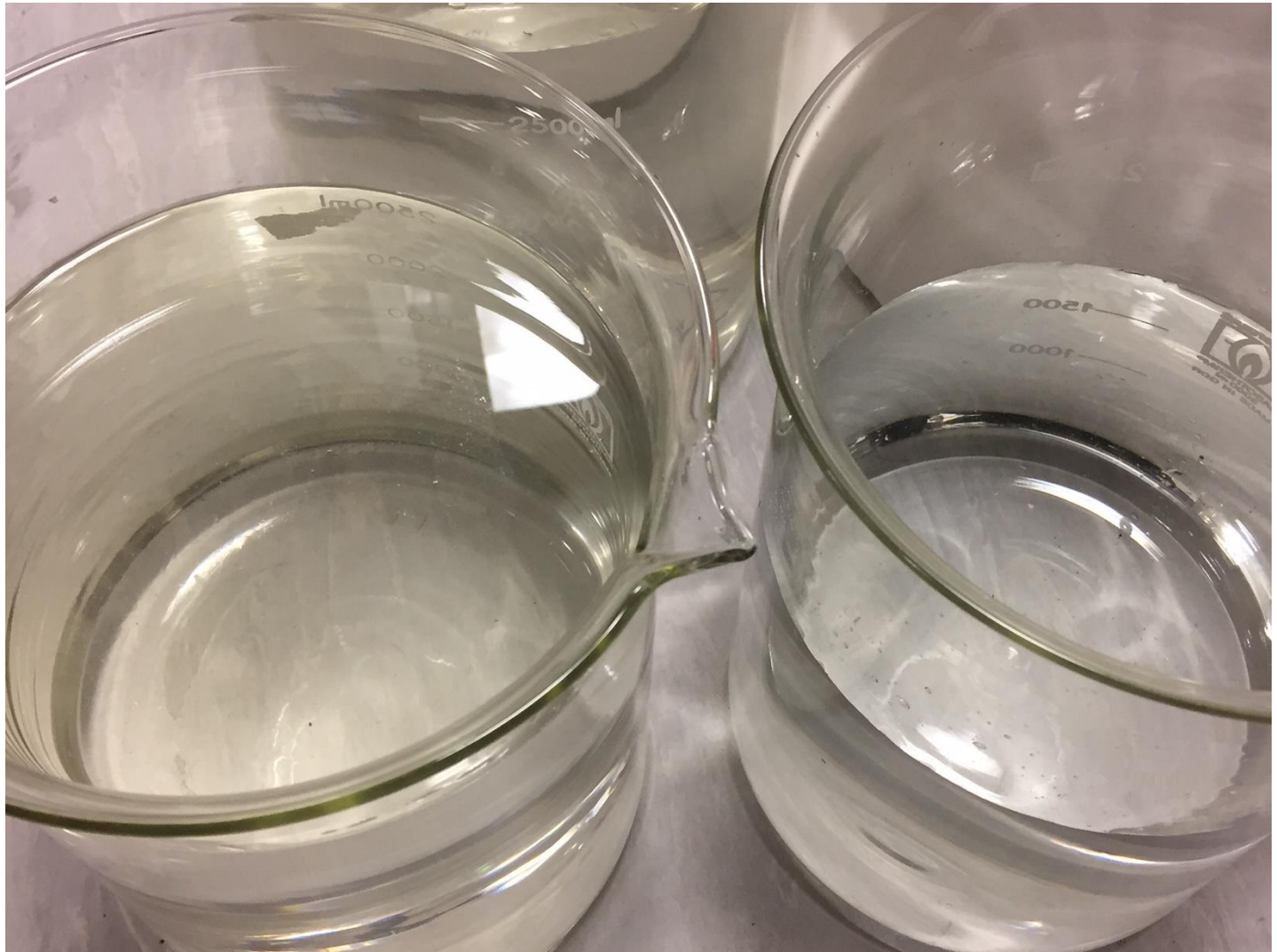
Just changed temperature! (over 1h)

Pumped for 180 h to Minimum:
p ~ 5.7E-06 mbar
T ~ -8.2° C (although set to -10 deg C)
→ Freezing issue in the chiller

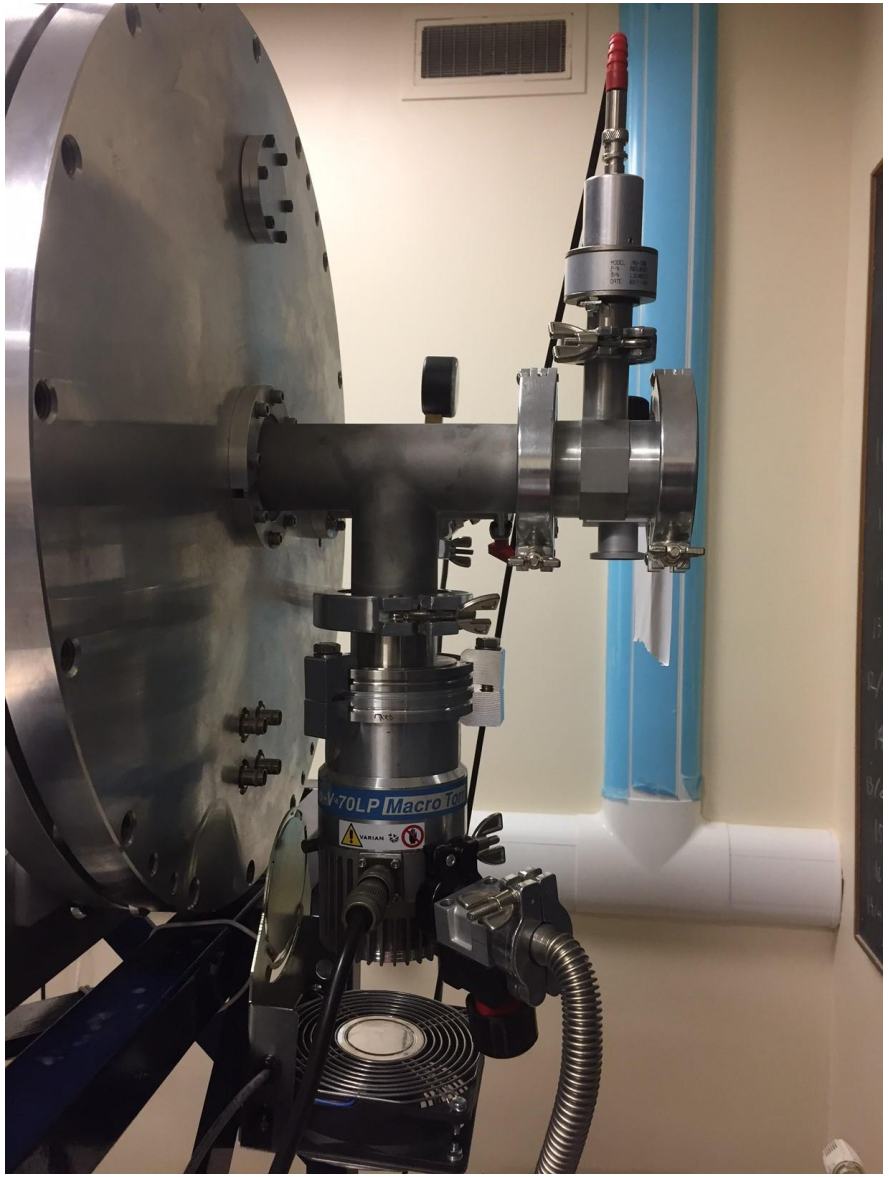
Freezing release

EXCHANGE COOLANT

→ NEW 50% - 50%



IMPROVED PRESSURE TEST IX



Coolant exchanged

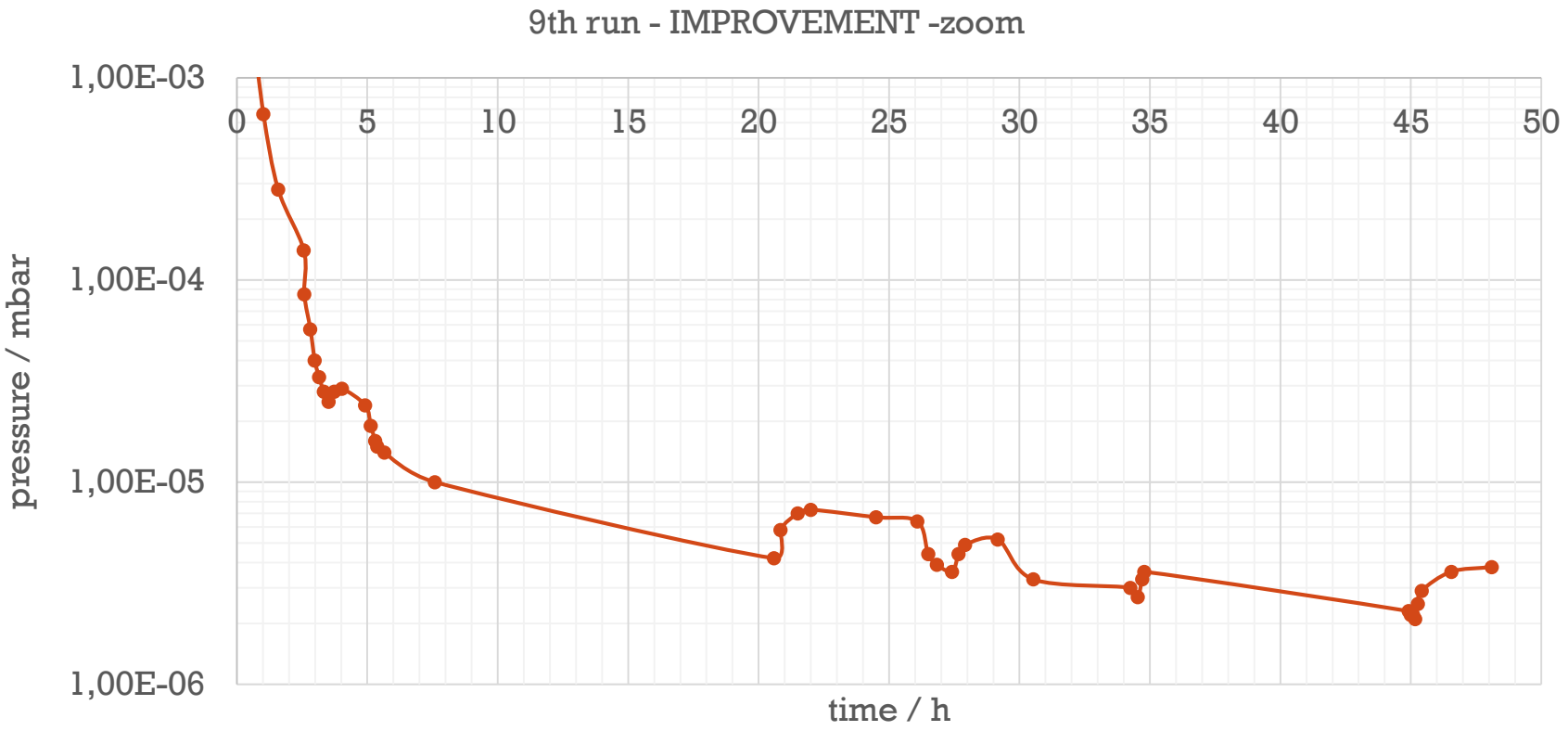
+

Gauge closer to TP2

+

Opening procedure (coolant up 10 deg C)

IMPROVED PRESSURE TEST IX



Coolant exchanged
+
Gauge closer to TP2
+
Opening procedure

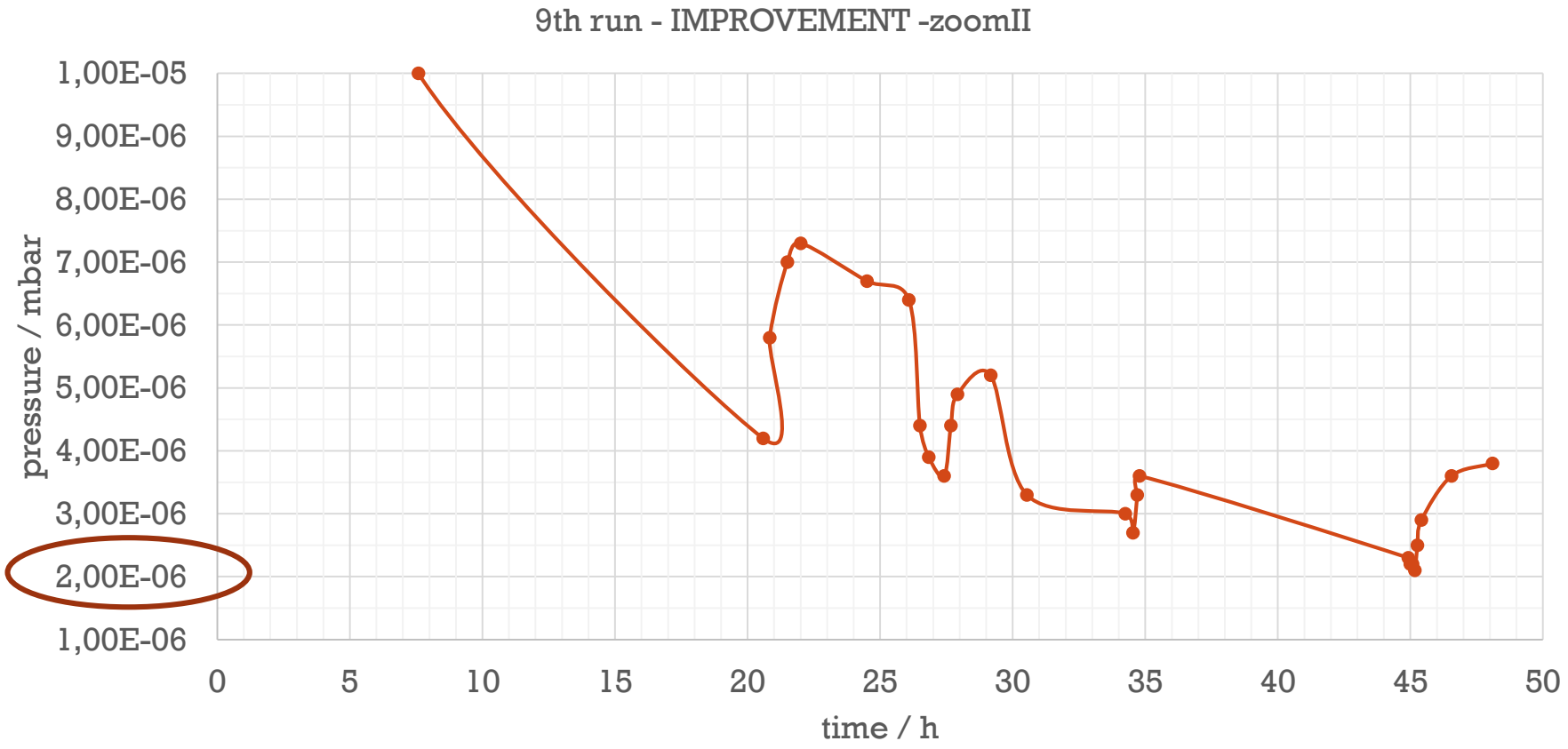
Minimum:

p ~ 2.2E-06 mbar

T ~ -12.5° C (reached -14.8° C)

→ 1E-05 took 7 hours → chamber was open for 45 min (Si-Det mounting)

IMPROVED PRESSURE TEST IX



Coolant exchanged
+
Gauge closer to TP2
+
Opening procedure

Minimum:

p ~ 2.2E-06 mbar / ~4E-06 mbar with preamp ON

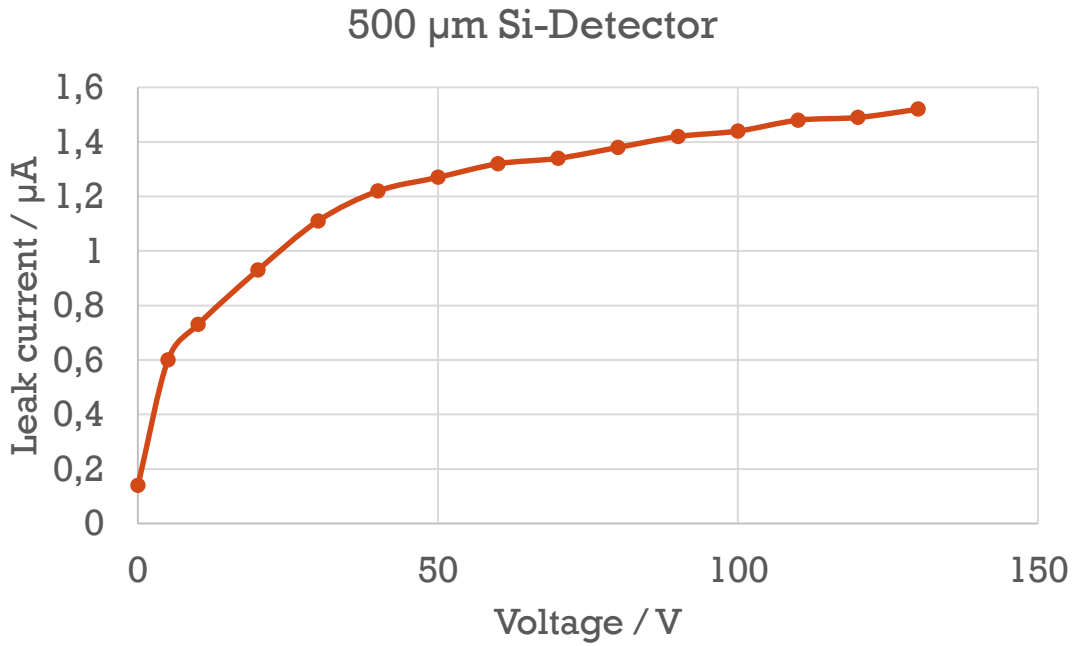
T ~ -12.5° C (reached -14.8° C) → constant with preamps on

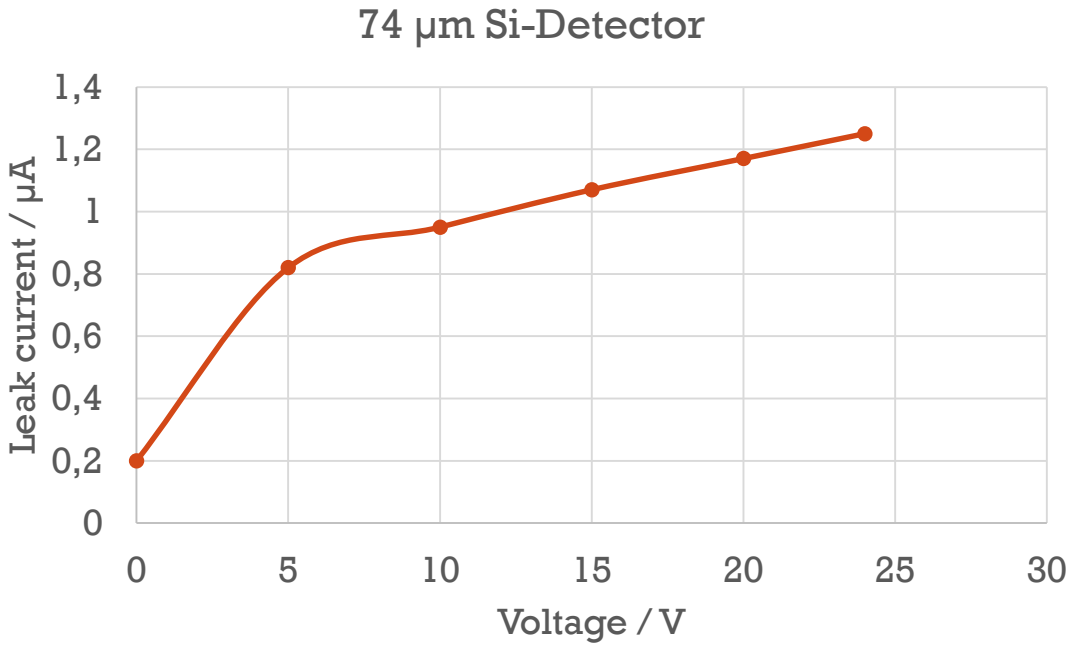
→ 1E-05 took 7 hours → chamber was open for 45 min (Si-Det mounting)

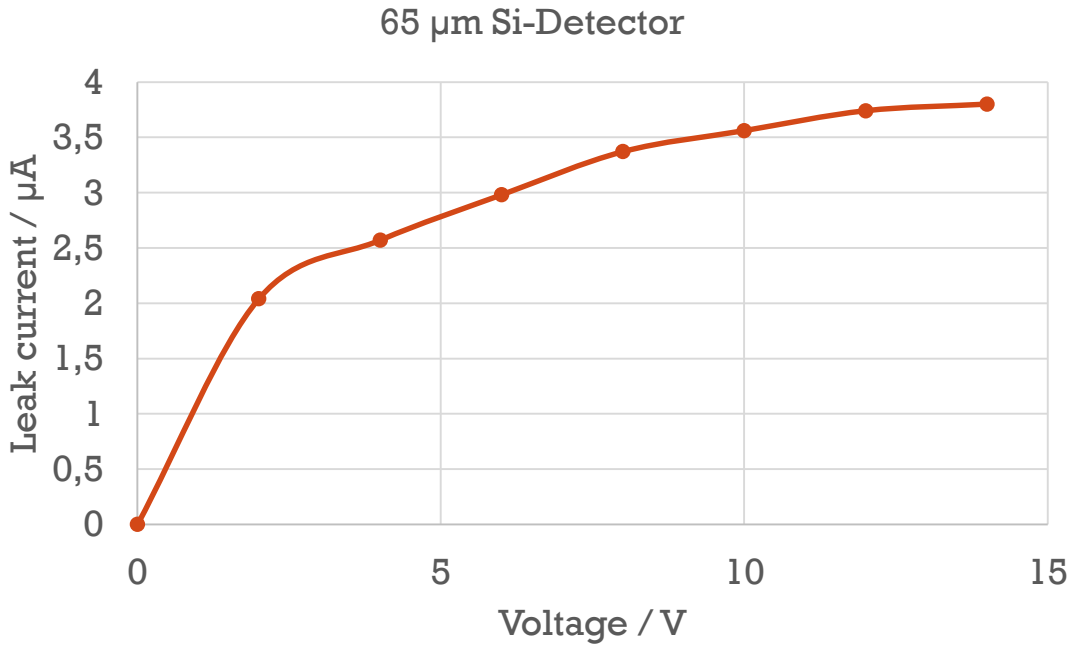
SI-DETECTOR MOUNTING AND DISTANCES

- 65 µm and 500 µm Si-Det at UPSTREAM board
  - Changed position of board, because added 12.5mm stand-off between them
  - New distance „board (Si-Det side) to end of chamber“: 662 mm
  - Calc: 738mm (end to target) – 40mm (proposed distance) – 32mm (stand off I) +10 mm (board inset) – 20mm (new stand off between) = 662 mm
- Downstream board with 32mm standoff and 74µm:
  - Distance: 326mm
  - Calc: 738mm (end to target) – 400mm (proposed distance) – 32mm (stand off) +20 mm (board inset) = 326 mm
- HANDLING Si-Detector – WEARING CLOVES and MASK

RAMPING SI-DETECTOR

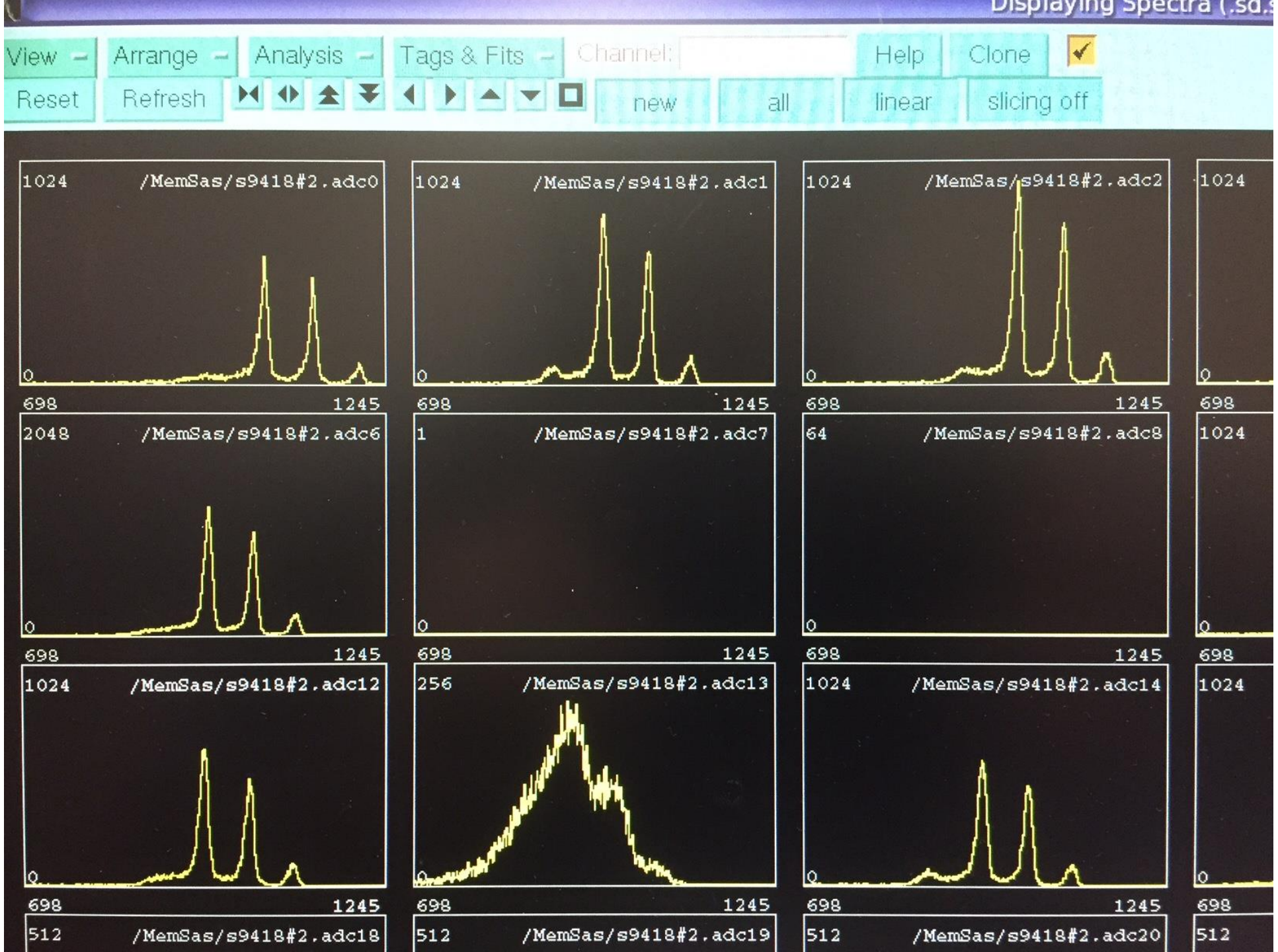






SI-DETECTOR CHANNEL TEST

Detector	Preamp U1 – U4	Preamp U5 – U8	Preamp D5-D8
74 μm	No signal: #1 adc 14, 15 #2 adc 7 Strange peak: #2 adc 8	Worked	Low stat, but everything works
500 μm		#4 adc 6 no signal #4 adc 7 (no usual alpha peak) low (#4 adc 0, 4)	
65 μm	No signal: #2 adc 7,8 Broad overlapping peak: #2 adc 13 (>100 ch)		


Displaying Spectra (.sd.s
View
Arrange
Analysis
Tags & Fits
Channel:
Help
Clone
Reset
Refresh
new
all
linear
slicing off
1024 /MemSas/s9418#2.adc0
0
698 1245
1024 /MemSas/s9418#2.adc1
0
698 1245
1024 /MemSas/s9418#2.adc2
0
698 1245
1024
0
698
2048 /MemSas/s9418#2.adc6
0
698 1245
1 /MemSas/s9418#2.adc7
0
698 1245
64 /MemSas/s9418#2.adc8
0
698 1245
1024
0
698
1024 /MemSas/s9418#2.adc12
0
698 1245
256 /MemSas/s9418#2.adc13
0
698 1245
1024 /MemSas/s9418#2.adc14
0
698 1245
1024
0
698
512 /MemSas/s9418#2.adc18
512 /MemSas/s9418#2.adc19
512 /MemSas/s9418#2.adc20
512

SAMPLE MEASUREMENT

Target	Thin	Middle (200-400)	Thick
Fine	1,	25, 30, 33	16, 26
Questionable	2, 10, 11, 13		29 (irregularities)
Broken	17, 31		

SAMPLE MEASUREMENT

OPEN QUESTIONS

- Back up shiping:
  - AMP, Preamp Board
  - Cabling (also for Si-Det.)
  - Power supply for Shaping Amps
- Gain Resistors

OLDER SLIDES!

STATUS QUO

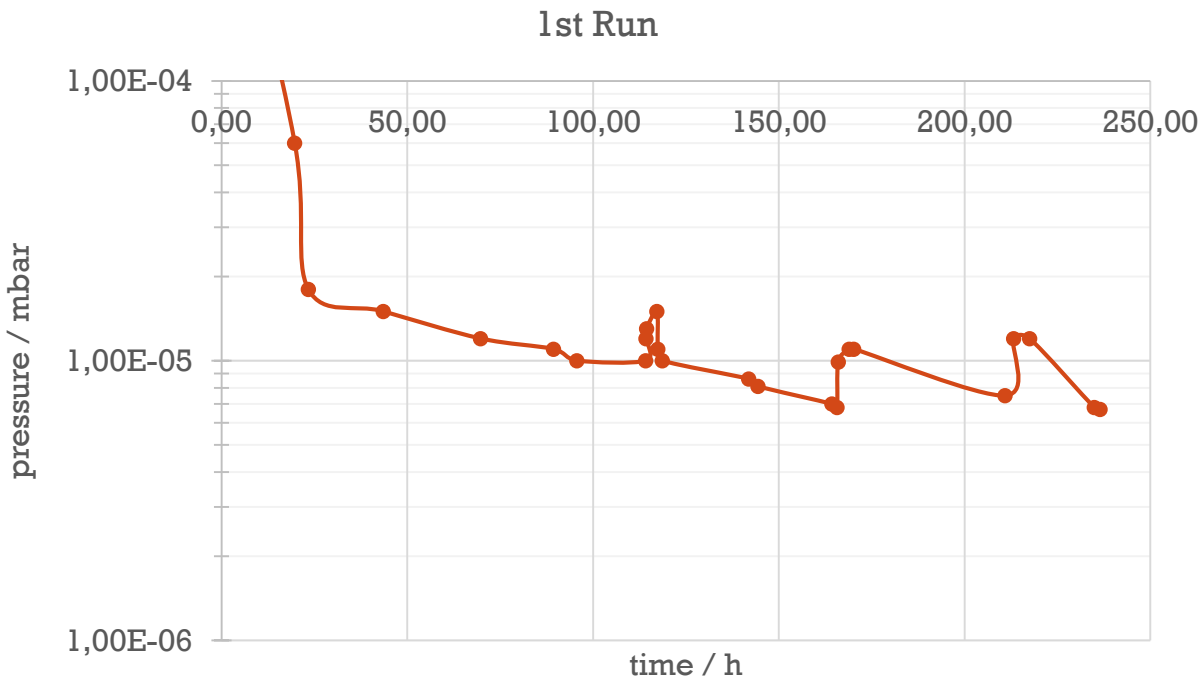
- Preamp, Amp DAQ checked
- Vacuum test

TARGETHOLDER POSITION

- Alignment test → marker on scale
- Additional block of metal to align target holder inside chamber ($\Delta L = 15.8mm$)
- Extrapolation for other sample positions

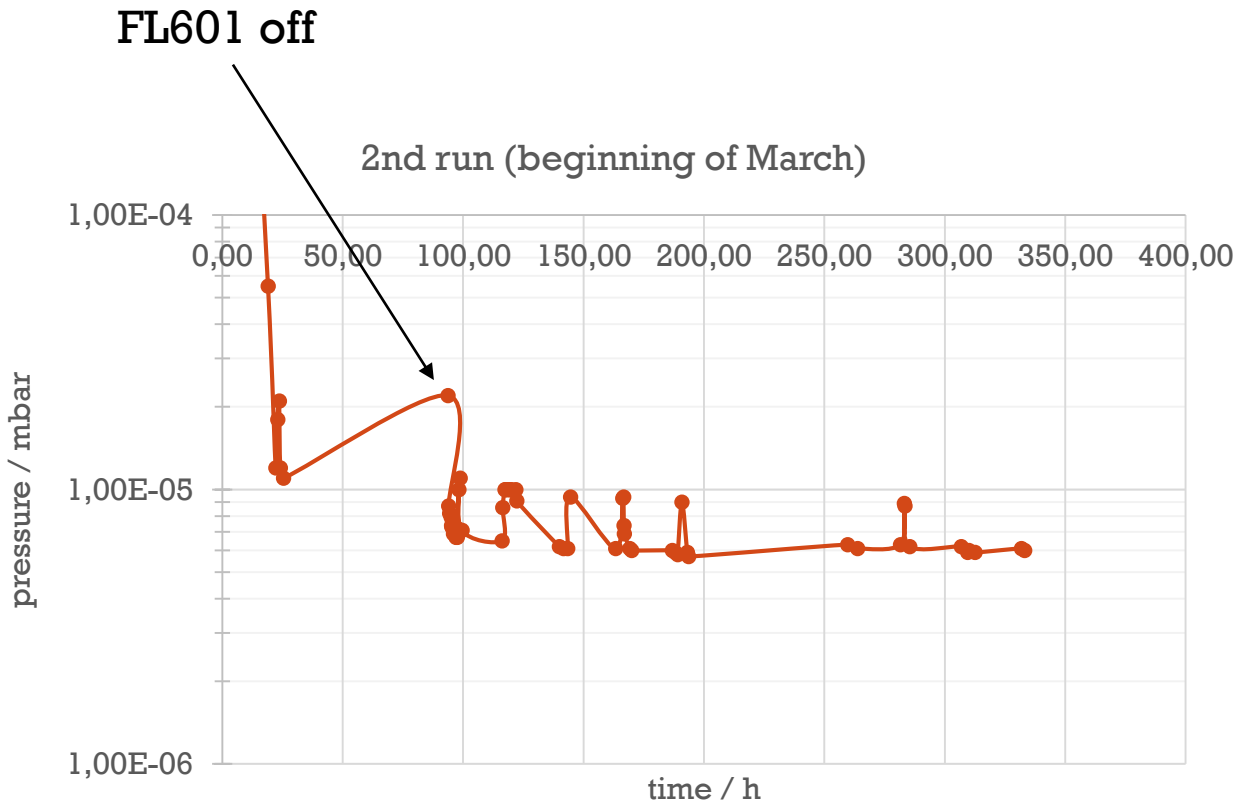
POS	Marker on scale	Marker on scale *NEW*
Pos 1 (bottom of ladder)	34.54	19.74
Pos 2 (middle of ladder)	94.05	78.25
Pos 3 (top of ladder)	Bottom .8	???

PRESSURE TEST 1



Minimum:
p = 6.7E-06 mbar (>6-9 days)
T ~ -2.4° C

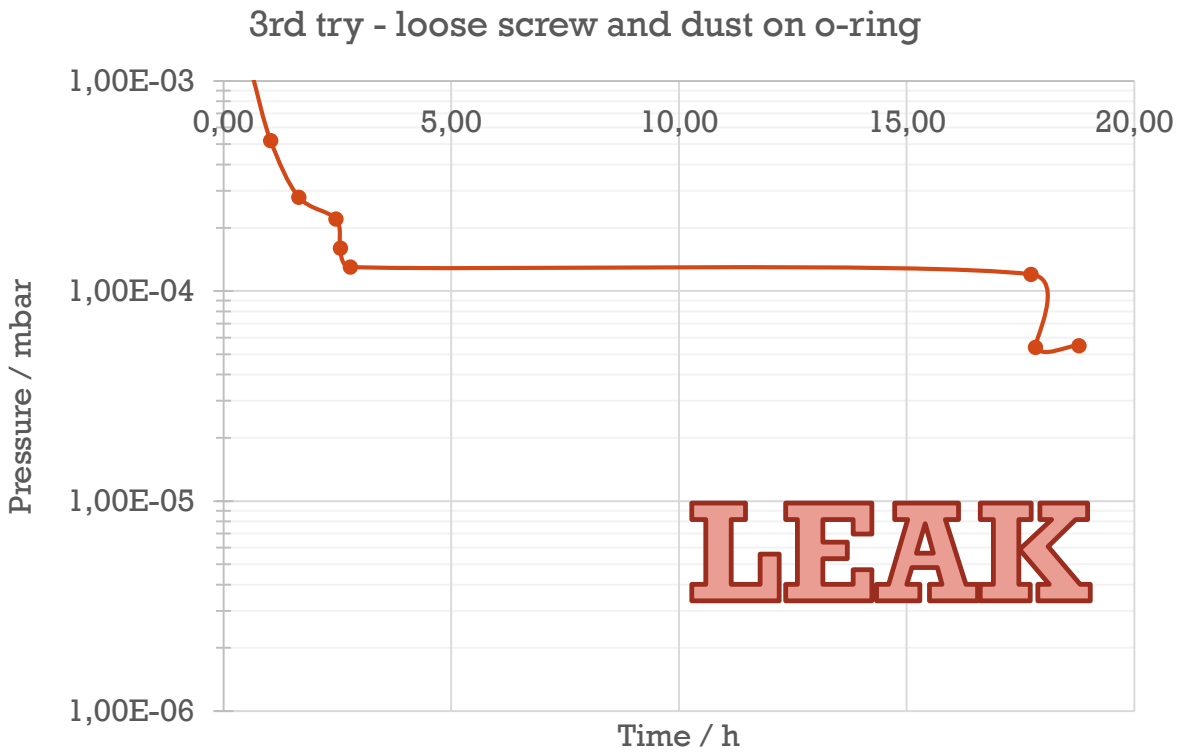
→ Add alcohol



Minimum:
p = 6.0E-06 mbar
T ~ -10.0° C (>100 h)

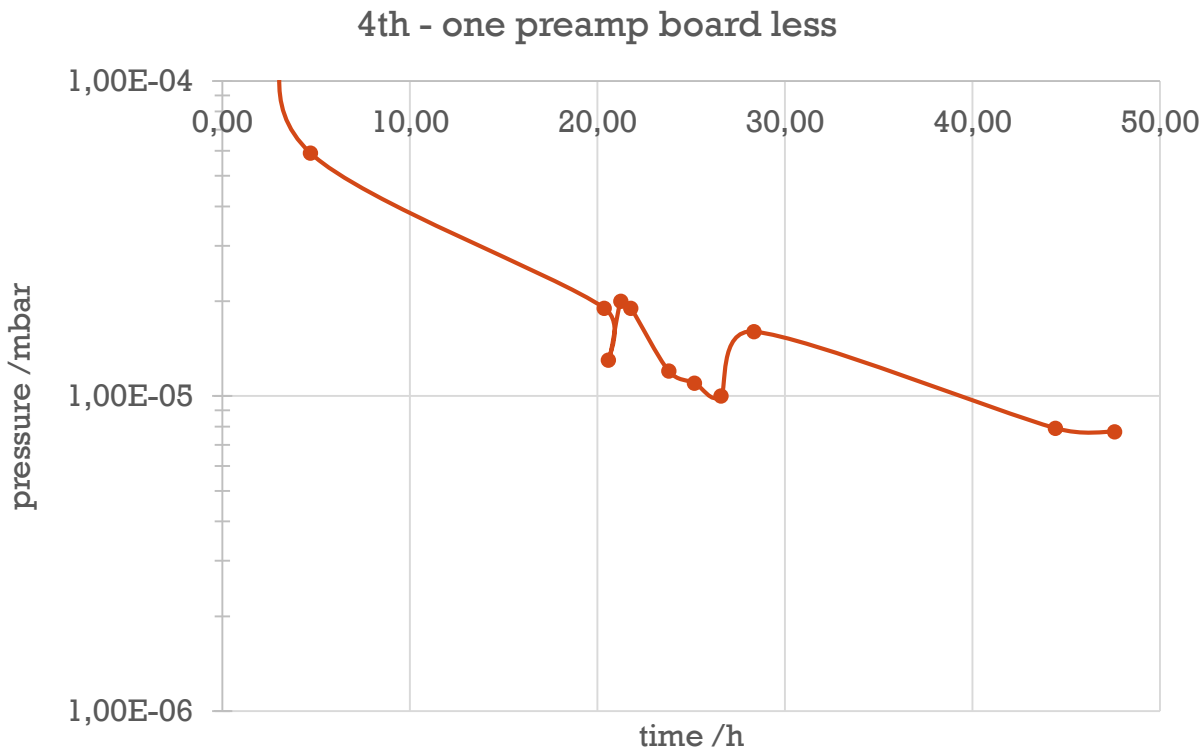
→ Additional Turbopump (TP2)

PRESSURE TEST II



Minimum:
p = 5.5E-05 mbar
T ~ -9.7° C

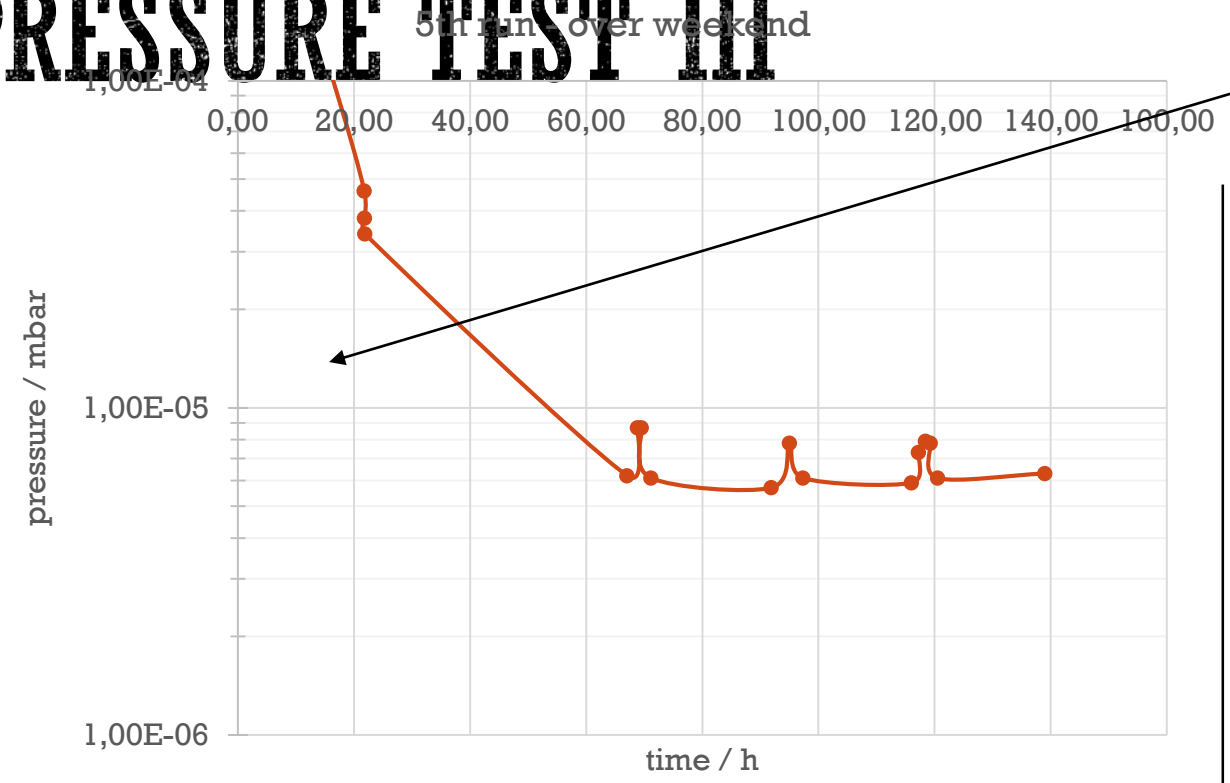
→ Cleaning and check!!!



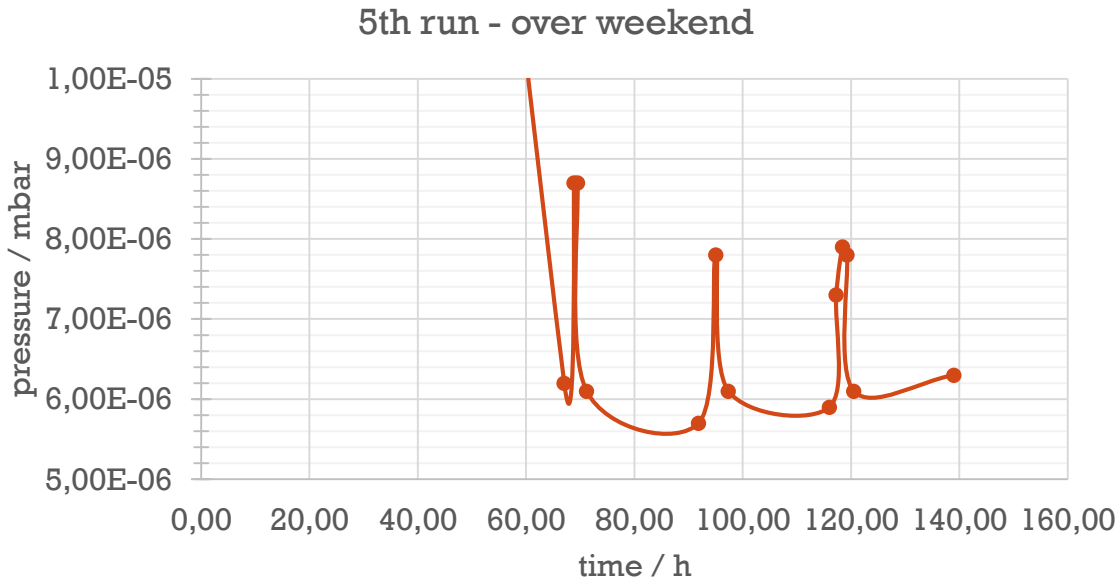
Minimum:
p = 7.7E-06 mbar
T ~ -7.7° C

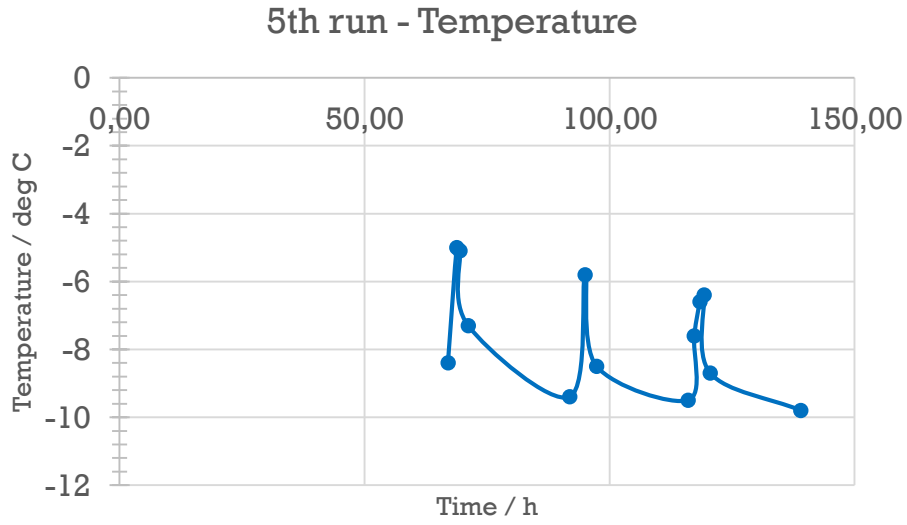
Less chamber load → <45h
(properly ~30h)

PRESSURE TEST III



TP2 and FL601 switch on

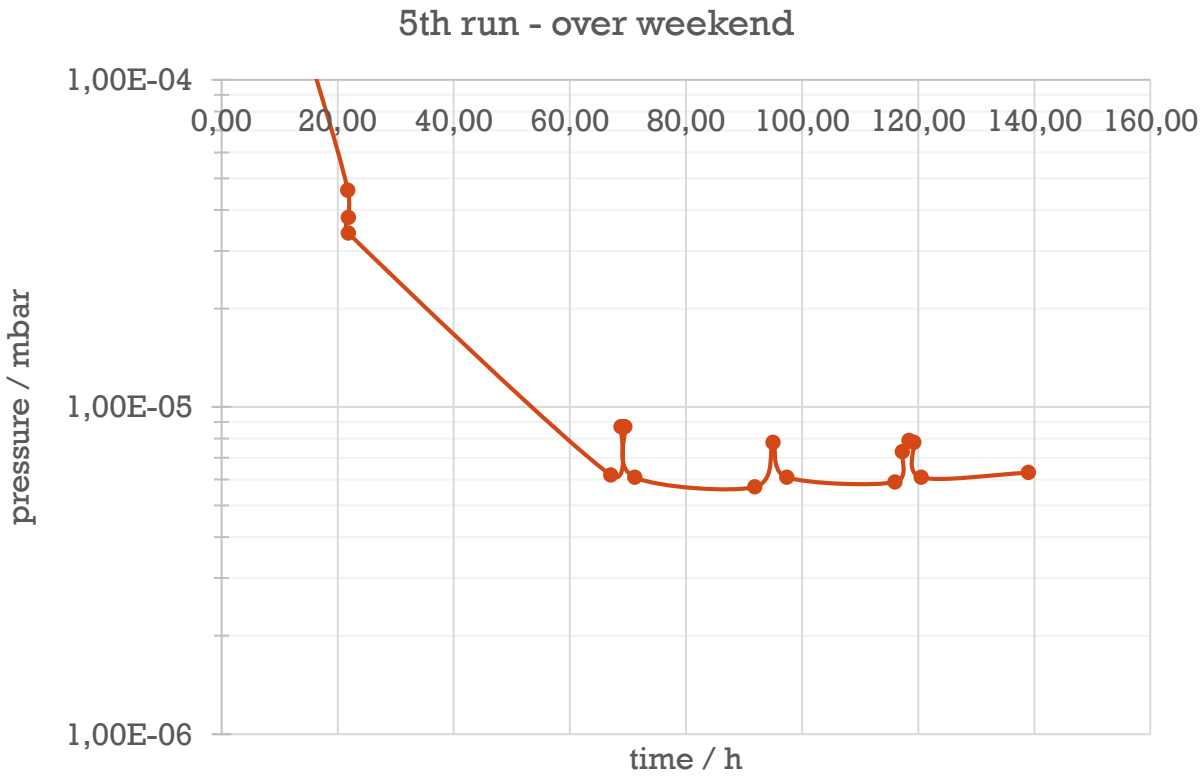




Minimum:
p ~ 6.0E-06 mbar
T ~ -9.8° C (needed some heating cycling)

→ not always improvement with preamp heating.
→ Influence of room temperature

PRESSURE TEST III



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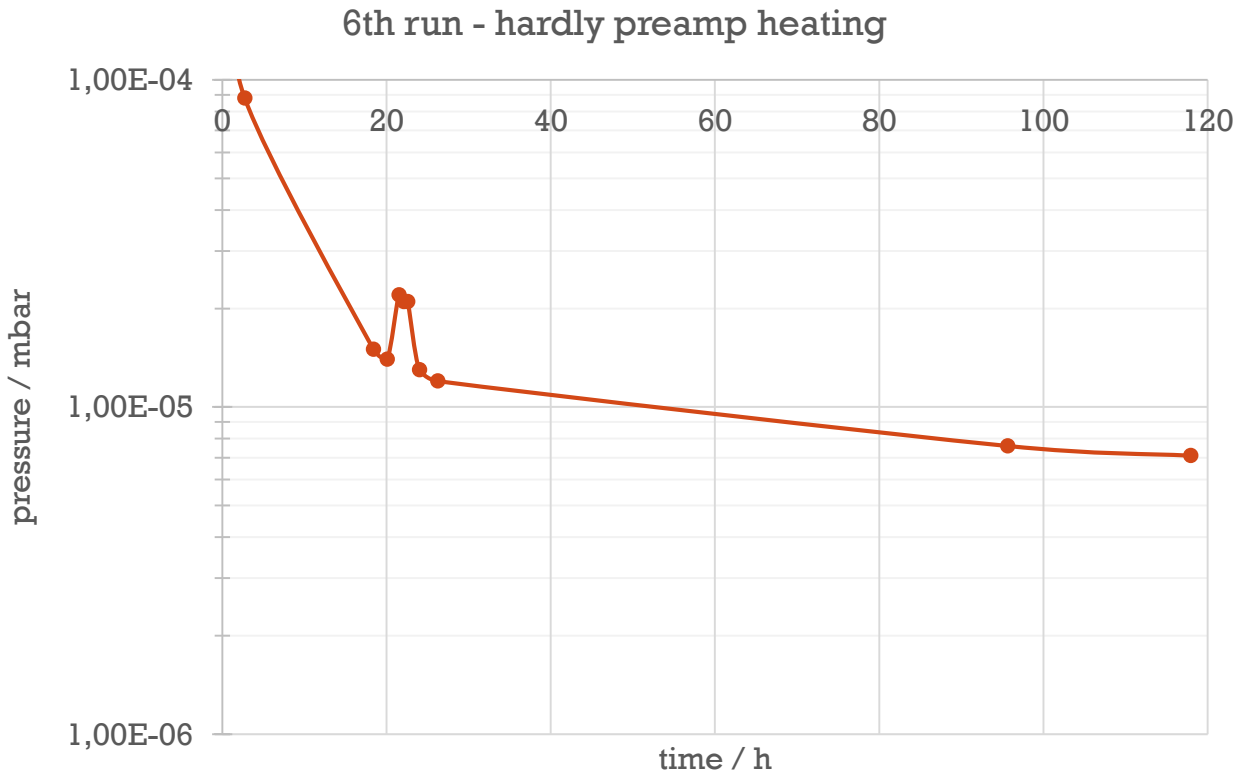
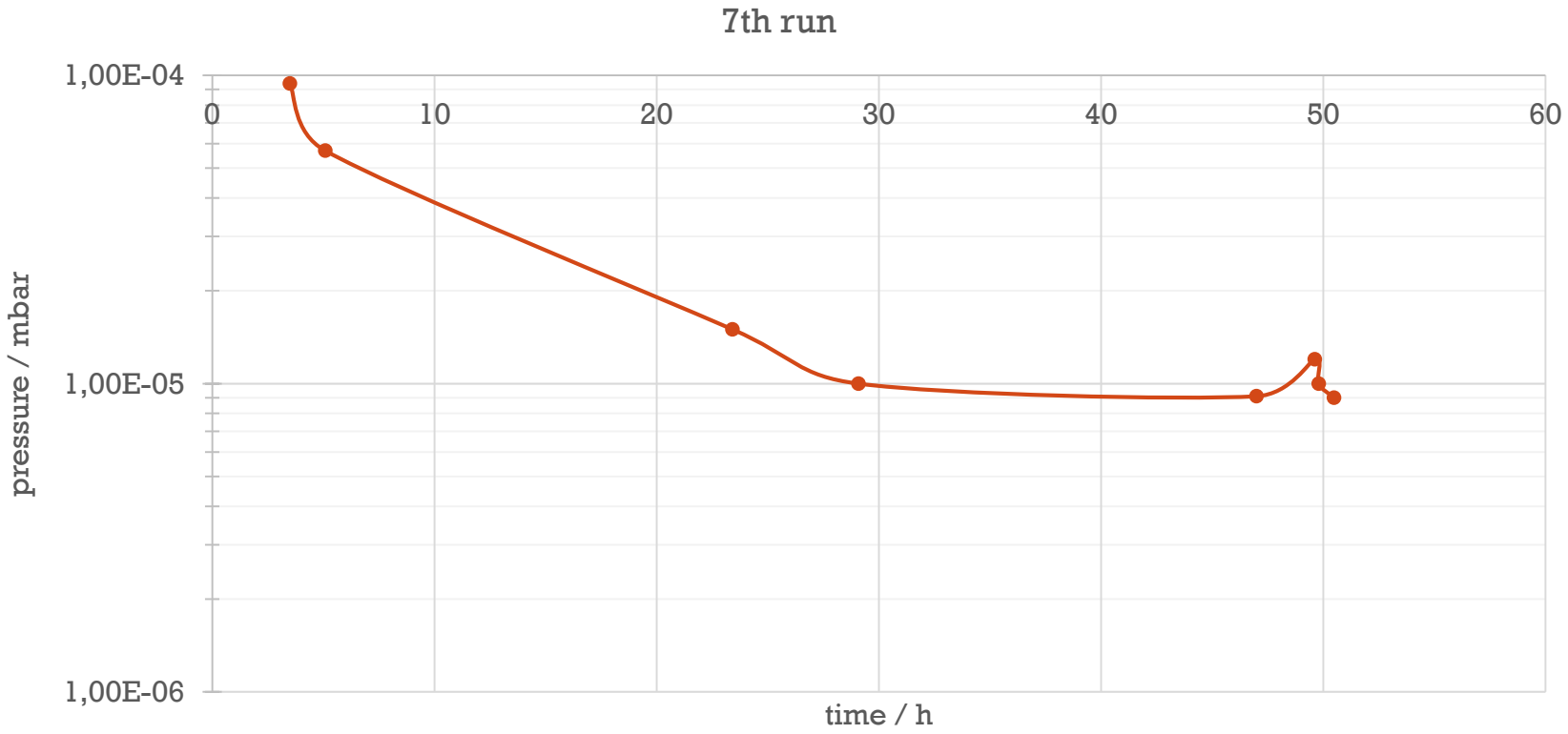


Minimum:
p = 7.1E-06 mbar (120h)
T ~ -7.7° C

Preamp heating improves at least pumping time

PRESSURE TEST IV



Minimum:
p ~ 9.0E-06 mbar
T ~ -9.8° C

→ Influence of TP2 ?

PRESSURE TEST OVERVIEW

# run	Time	Minimum pressure	notes
1st	17.2. – 27.2 (236.4h)	6.7E-06	
2nd	2.3 – 16.3 (	5.7E-06	
3rd	16.3 – 17.3 (18.8h)	5.5E-05	LEAK
4th	20.3 – 22.3 (48h)	7.7E-06	Reduced load
5th	24.3 – 30.3 (139h)	6.0E-06	
6th	30.3 – 4.4 (118h)	7.1E-06	Hardly preamp heating
7th	5.4 -	9.0E-06	TP2 test

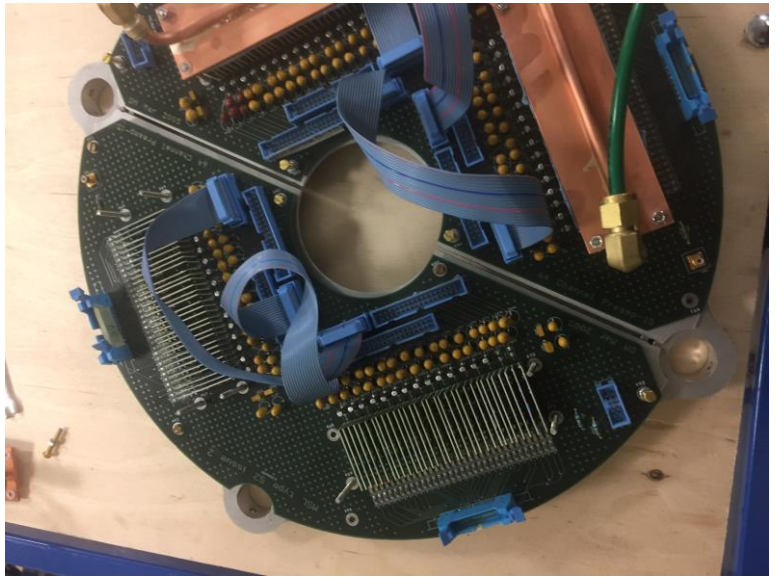
- Tests
- 24.03 Si-Det U1-U4 (new)
- 30.03 Si-Det U5-U8 (new)

CHANGES ON PREAMPS

- 4 broken channels in a row on the old Upstream preamp board U1 – U4

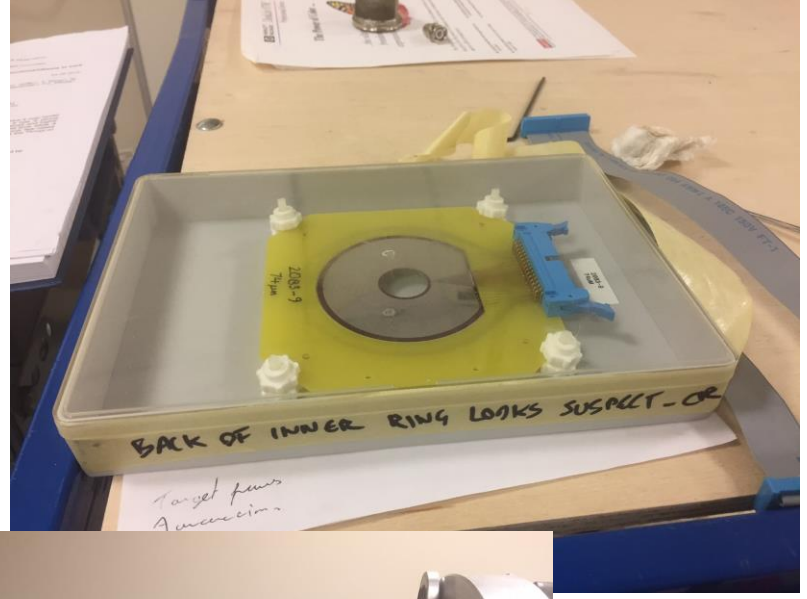
- Request: 128 channels UPSTREAM
- 64 channels DOWNSTREAM

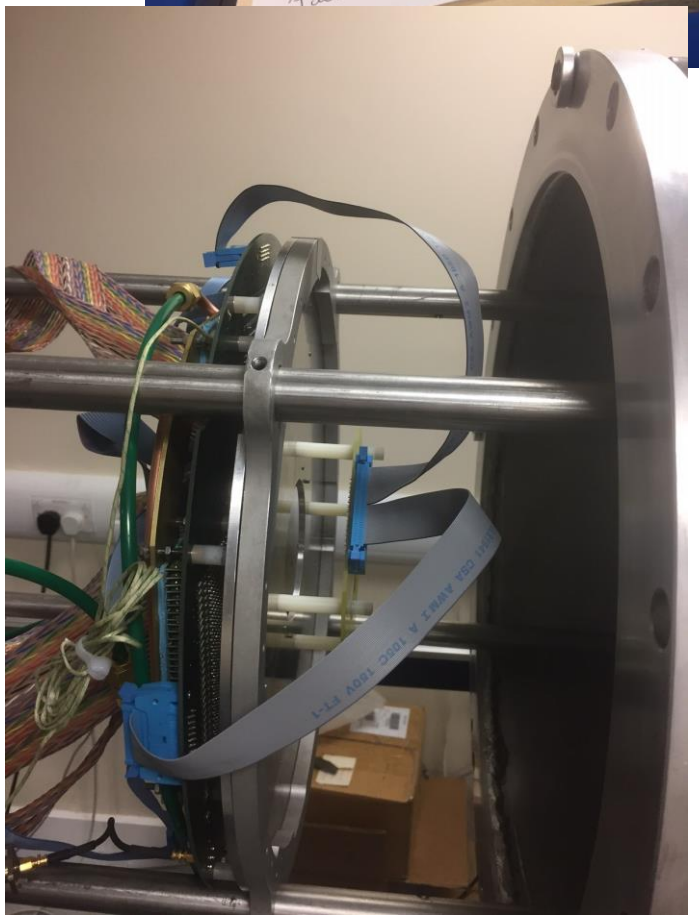
- → exchange UPSTREAM and DOWNSTREAM boards and removed the old U1-U4



SI-DET TESTING

- Used 74µm Si-Det.
  - Dead zone should be orientated oppositely on up- and downstream board
- QUESTION: MOUNTING off ΔE-E telescope for alphas → CABLING



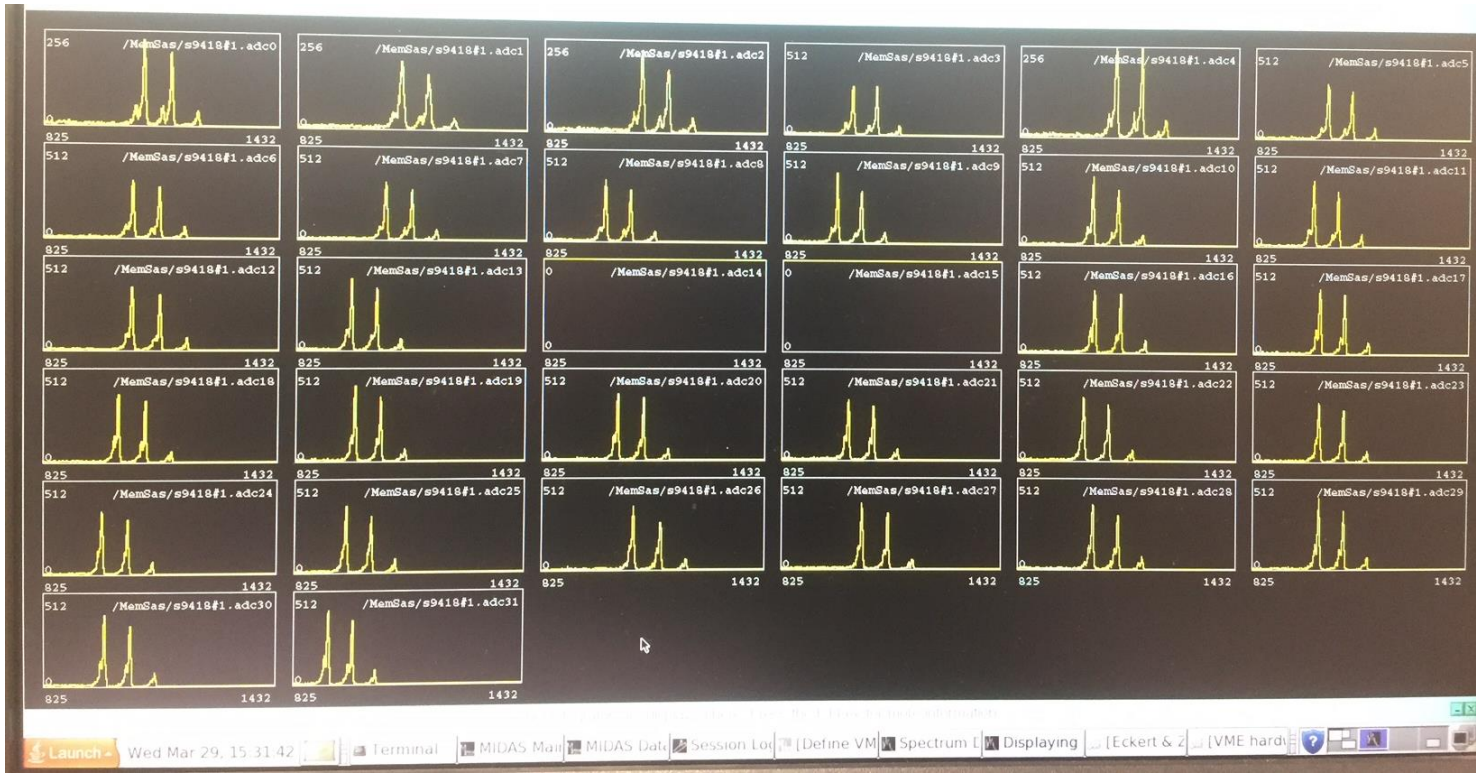


- Cabling and testing for UPSTREAM BOARD:
- FWHM of test pulse:
  - 2-3ch without Si-Det
  - 7-12 ch with Si-Det, but no BIAS for front side
  - 30 ch with Si-Det, but no BIAS for back side
  - .
  - 4-6 ch with Si-Det and BIAS for front side
  - 7-10 ch with Si-Det and BIAS for back side
- Of course few deviations and #1 adc 14,15

SI-DET TESTING II

- Details on ELOG

- FWHM of alpha source:
  - Problem with #1 adc14, 15 ; #2 adc 7;
  - #4 adc 6, 7
  - Cabling issue maybe on #2/4 adc 7



OUTLOOK

- Test of DOWNSTREAM board with Si-Det
- N – gas for opening chamber

ATTACHMENT!