



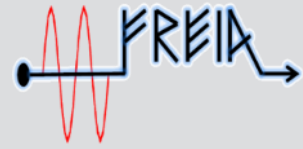
ESS spoke CM05/CM02 (2<sup>nd</sup> run)/CM03  
weekly meeting  
20210422  
Han Li



- CM02 departure
- CM03 arrival
- CM05 FPC warm conditioning
- CM05 cooldown
- Test plan



# CM02 shipment



- CM02 departure to ESS on this Tuesday
- Arrived at ESS on Wednesday **All OK?**



Departure to ESS



Box at ESS



# CM03 arrival

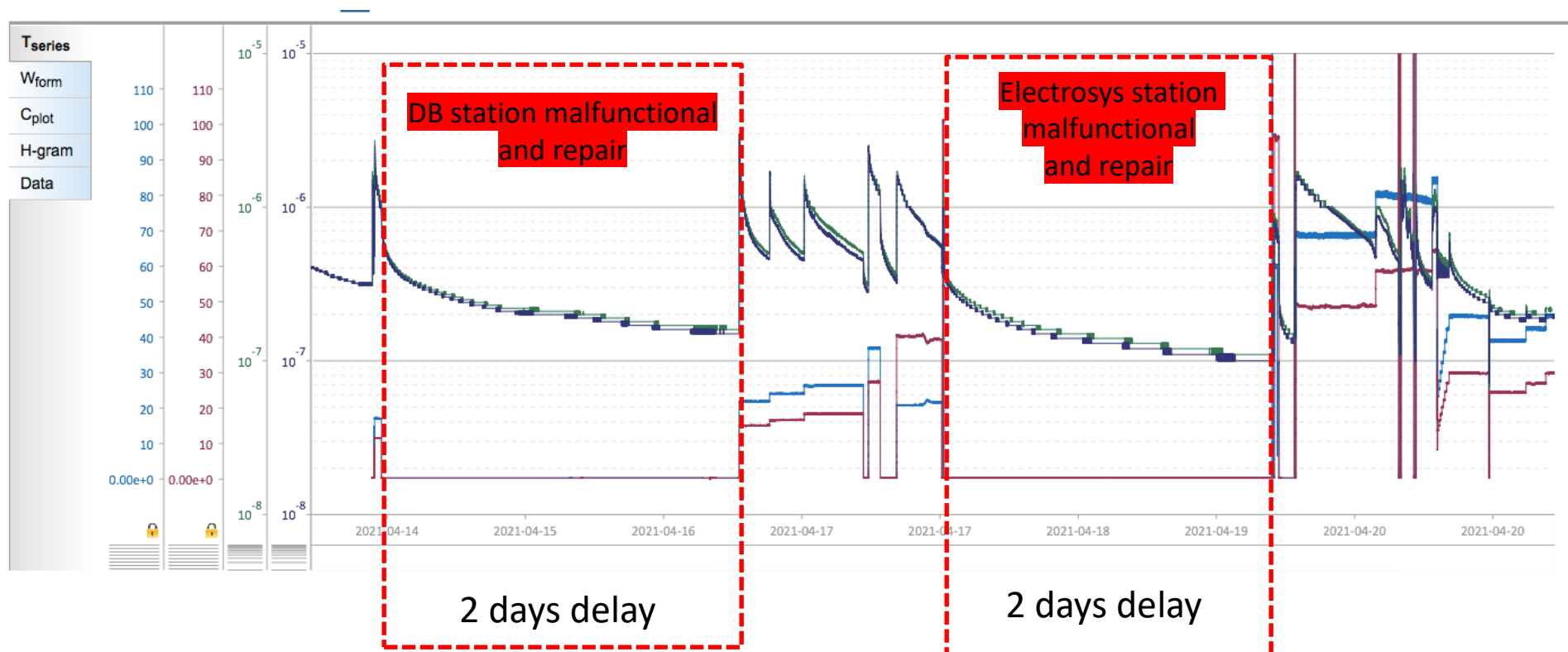


- CM03 has arrived at UU this morning
- Will open the box and perform the incoming test tomorrow or next week



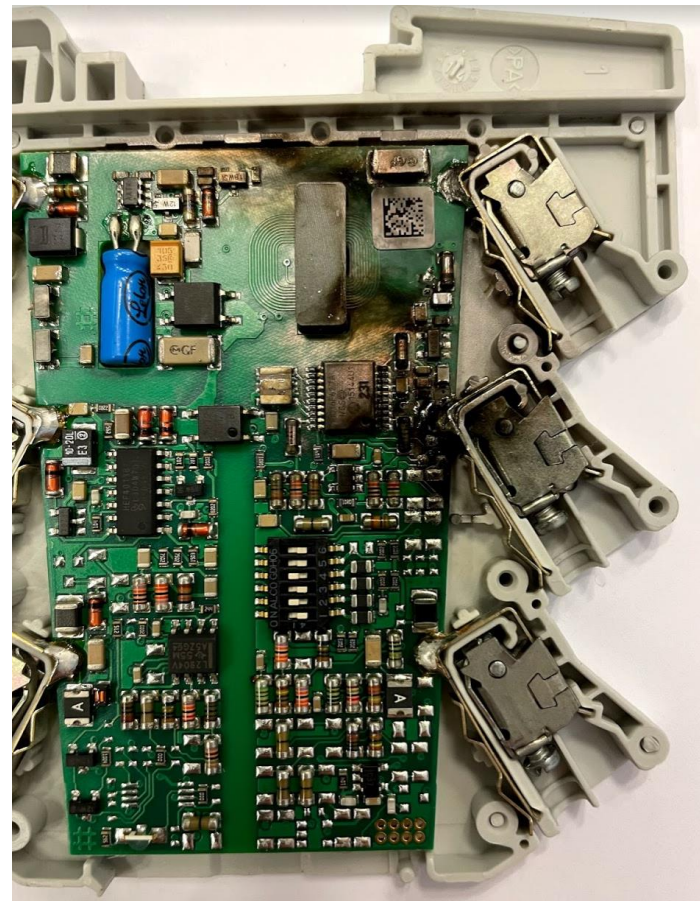
## FPC conditioning:

- FPCs' conditioning are done by FREIA auto conditioning program
- Two pumping carts on both sides
- RF stations' issue has been the main cause of FPC conditioning interruption
- Four days RF station trouble shooting in this run



# DB station issue

- April 14th DB station tripped
- Two components (CV1, CV3) of DB section A was exploded during FPC conditioning (10 kW, 50us)
- New components are ordered and the broken ones have been replace
- DB station was tested with the dummy load up to full power without significant issue
- Changed back the RF distribution and continue the FPC conditioning



# Electrosys station issue



- April 17th Electrosys station tripped (Cause the HPA2 power off )
- Power supply for the module 3 pre-amplifier in HPA2 has a local fault
- Electrosys's interlock seems blind to this module 3 fault
- Risky unbalanced power condition: HPA1 almost 10 times higher than HPA2 ( Electrosys lose gain)
- First add : repair some components with previous part
- Test with the test load, HPA2 is unstable when above 100 kW.

3 spare power supply modules have been ordered

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HPRF-Esys:hpa1:sFwdPwr	DBR_SCALAR_DOUBLE	kW	<input type="text"/>	linear	2021-04-17 09:35:16
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HPRF-Esys:hpa2:sFwdPwr	DBR_SCALAR_DOUBLE	kW	<input type="text"/>	linear	2021-04-17 09:35:17

WINDOW SIZE:                  END: 2021-04-17 19 :36 :07

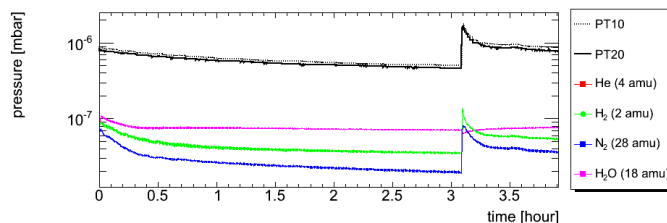
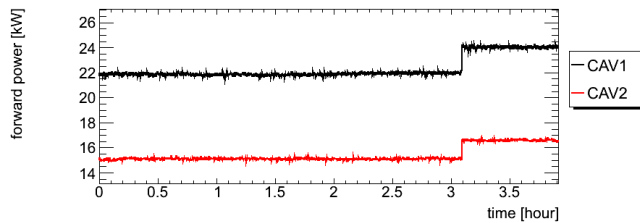


## Strategy of FPC conditioning:

- Run FPC warm conditioning simultaneously with RF power lower than 100 kW (80 dBm)
- First run of conditioning below 100 kW (80 dBm), from (50us, 100us, 250us, 500us, 1000us, 2000us, 3200us)  
All Multipacting band is below 100 kW (80 dBm)  
For the safety reason of keeping two functional RF stations
- After first run, conditioning each FPC separately by DB station up to 350 kW

## observation:

- Outgassing for short pulses is at 70 dBm, 74dBm and 76 dBm
- Observe outgassing band at 78 dBm in this run for long pulses
- Overall conditioning time is 1 week, with uptime 3 days (previous experience 4 days) and downtime 4 days
- Is it thanks to the two pumping carts? Need more statistic
- After FPC conditioning ,the vacuum baseline is 7 E-8 mbar without RF and  $\leq 2.5 \text{ E-7 mbar}$  with RF
- FPC warm conditioning finished with around 350kW @ 3.2ms



Connect RGA to the beam vacuum during the FPC warm conditioning:  
H<sub>2</sub> and N<sub>2</sub> are the dominating gas component



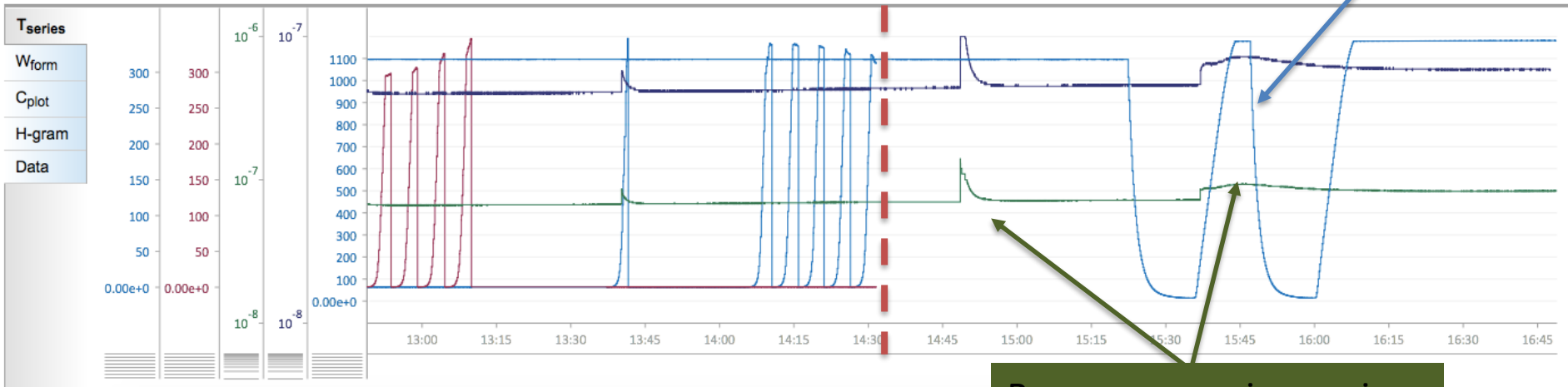
- Strange beam vacuum spike without RF
- The baseline is slowly going up
- No clear correlation to purging in the He circuit.
- No He signal by RGA, no leak is suggested

Del	Plot	Name	DBRType	Units	Processing	Scale	Time (local)	Value	Notes
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HPRF-Cav1:FwdPwr:sRdV	DBR_SCALAR_DOUBLE	kW	raw	linear	2021-04-21 08:38:24	46.092085625011784	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	HPRF-Cav2:FwdPwr:sRdV	DBR_SCALAR_DOUBLE	kW	raw	linear	2021-04-21 08:38:24	29.83767162052608	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CM-Vac:PT10:sRdV	DBR_SCALAR_DOUBLE			log10	2021-04-21 16:17:22	8.35e-8	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CM-Vac:PT20:sRdV	DBR_SCALAR_DOUBLE			log10	2021-04-21 16:17:22	7.75e-8	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CM-CM:PT02-direct:sRdV	DBR_SCALAR_DOUBLE	mbar		linear			

FPC finished and RF off

He circuit pressure

WINDOW SIZE: 1 year 1 month 2 w 1 w 2.5 d 1 d 18 h 12 h 8 h 4 h 2 h 1 h 30 m 10 m 5 m 1 m 30 s END: 2021-04-21 16:45

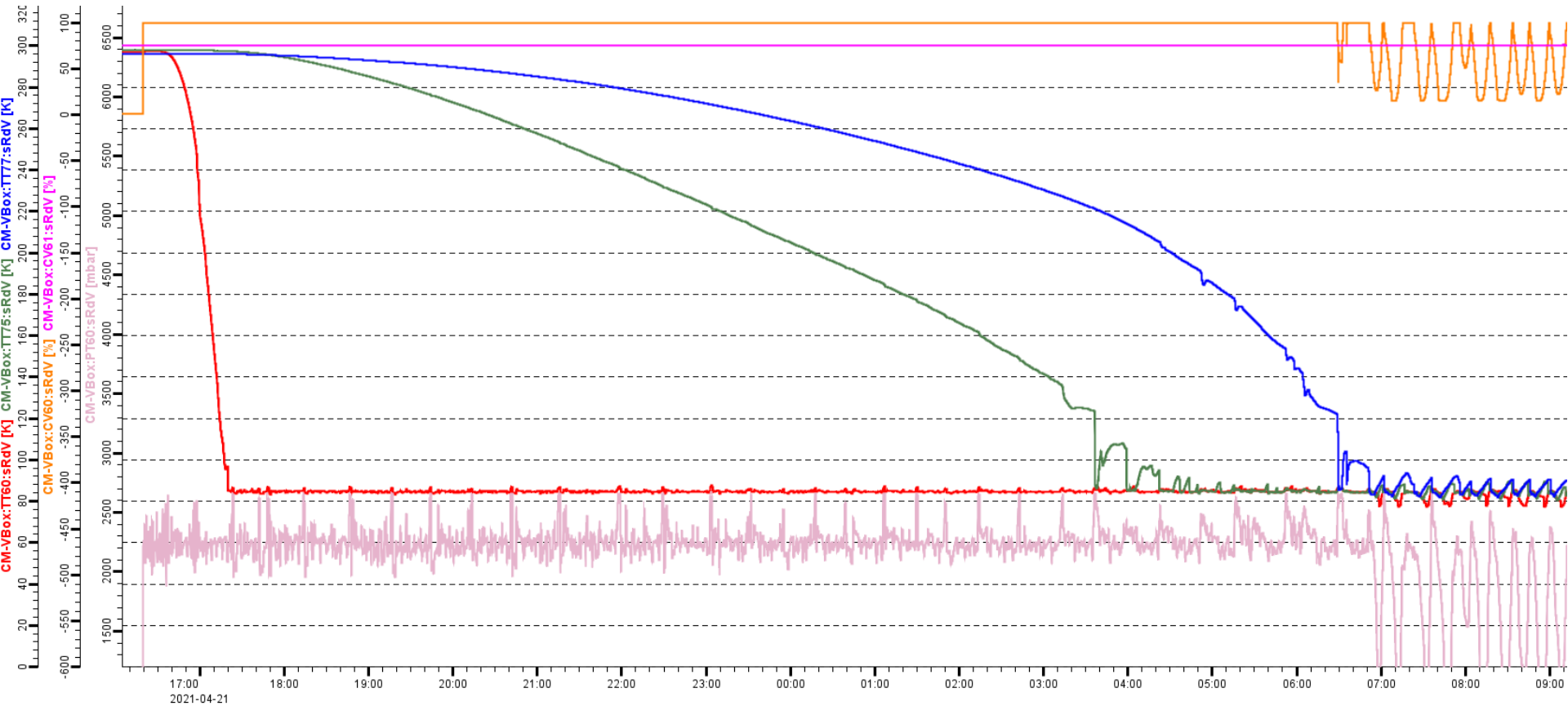


Beam vacuum increasing

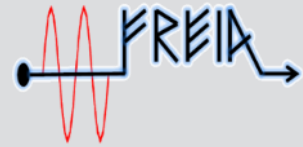
# N2 screen shield cooldown



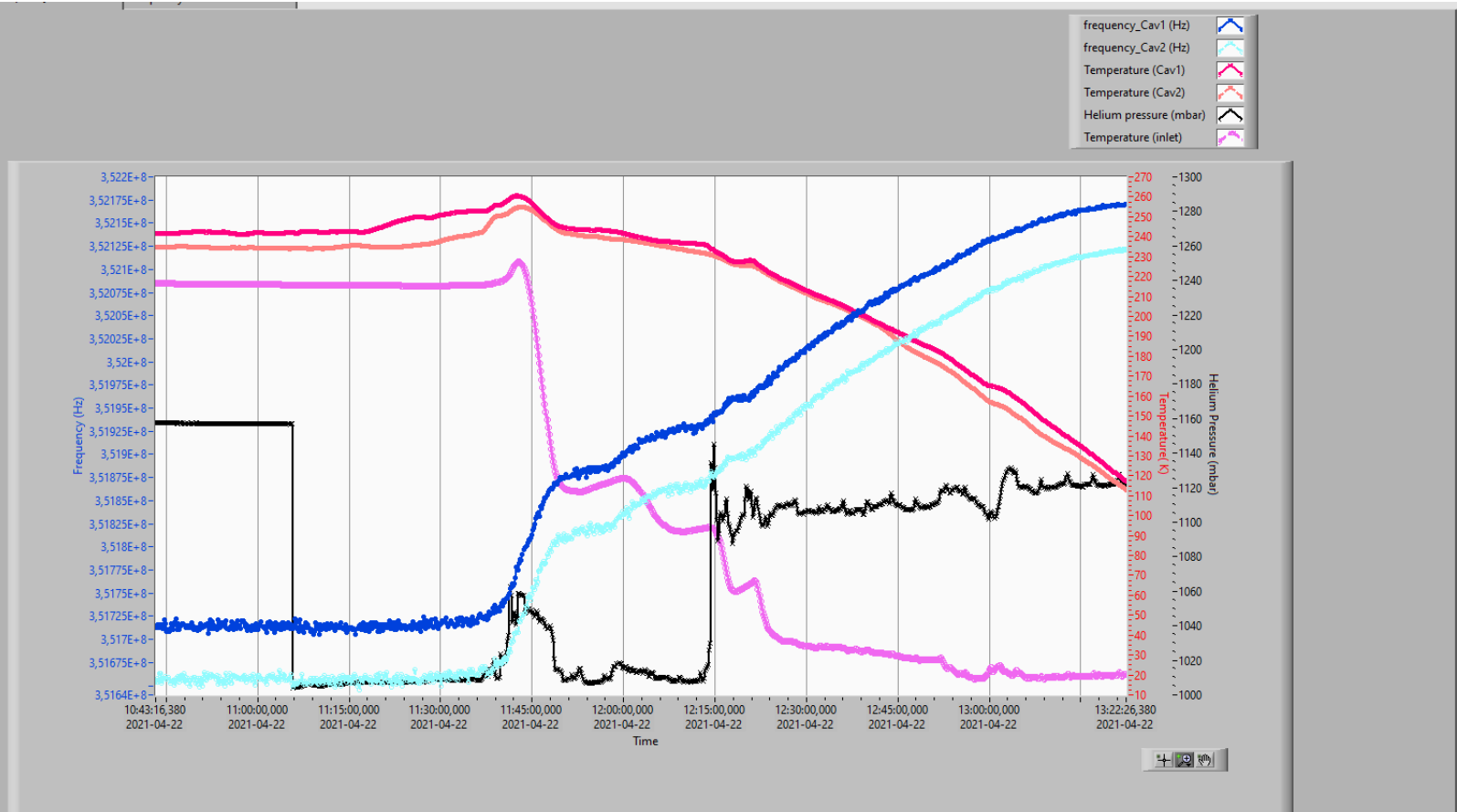
- N2 screen shield cooldown on this Wednesday
- it took 14h from the beginning of the cooldown with LN2 until CV60 started to regulate (when TT77 is <96 K). It has taken much longer than the usual 3h because CV61 was opened to 75% only, to avoid possible frost at the outlet during the night.



# 4 K cooldown



- Start 4 K cooldown this morning
- Take the advantage of weekend for CTS cooldown





Test item	time	comment
Disconnect, packing, shipment CM05 installation	2 <sup>nd</sup> -9 <sup>th</sup> Apr.	
DB station repair	15 <sup>th</sup> – 16 <sup>th</sup> Apr.	Order new components
CM05 FPC warm conditioning	19 <sup>th</sup> – 21 <sup>th</sup> Apr.	
CM alignment measurement	21 <sup>th</sup> Apr.	
CM cooldown to 4 K	22 <sup>th</sup> Apr.	
FPC cold conditioning	23 <sup>th</sup> Apr.	Simultaneously
CM cooldown to 2 K	26 <sup>rd</sup> Apr.	
CTS test	27 <sup>th</sup> – 28 <sup>th</sup> Apr.	CTS measurement
alignment at cold	28 <sup>th</sup> Apr.	
Cavity conditioning (on resonance) Heat load/Q measurement	29 <sup>th</sup> -30 <sup>th</sup> Apr.	Open loop
CM warm up	1 <sup>st</sup> -5 <sup>th</sup> May	
alignment at warm	6 <sup>th</sup> May	