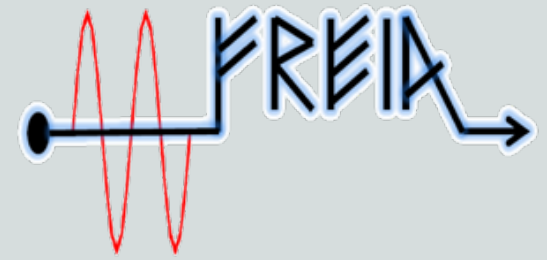




UPPSALA  
UNIVERSITET



# ESS weekly meeting (2021 W43)

A. Miyazaki et al.



# General planning: no major change



FREIA Planning		2021-10-20													2022															
		October					November					December			January					February				March						
Equipment	Responsible	27	4	11	18	25	1	8	15	22	29	6	13	20	27	1	8	15	22	29	7	14	21	28	7	14	21	28	4	
		week #																												
Liquefier & 2K pumps	Esat	Blue	Blue	Yellow	Blue	Blue	Yellow	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow	Grey	Grey	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue			Blue	Blue		
RF power stations	Mykhailo				Green		Green			Green			Green					Green			Green		Green			Green		Green		
Cryomodule test stand	Akira	CM04	Yellow				CM03	Yellow			CM06	Yellow				Yellow	CM07	Yellow		CM08	Yellow			CM09	Yellow					

We are here



Absence of Akira  
Oct 4 – Nov 26

Chance for CM07 warm coupler conditioning

## Lesson learned in past months

- Green weeks (coupler warm conditioning) are the best time-slot for departure/arrival of modules
  - If everything works fine, we need
    - 1w for mechanical preparation
    - 1w for coupler conditioning
    - 1.5w for cold RF tests (incl. thermalization)
    - 1.5w for preparing for departure (incl. warming up)
- 4-5 days
- 3 days
- In total 5 weeks  
→ 9-10 modules per year  
→ + maintenance weeks?



# W42 & W43 progress



week		W42											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		18-Oct		19-Oct		20-Oct		21-Oct		22-Oct		23-Oct	24-Oct
		m	a	m	a	m	a	m	a	m	a		
previous CM	<b>CM04</b>	departure to ESS 9:00 am		preparation of documents				publish test report					
present CM	<b>CM03</b>	coupler warm conditioning, purging He circuit			N2 cooling			cooling down		4K filling, coupler cold conditioning			
next CM	<b>CM06</b>	transport over the sea						reception at UU 8:00 am		thermalization at UU			

week		W43											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		25-Oct		26-Oct		27-Oct		28-Oct		29-Oct		30-Oct	31-Oct
		m	a	m	a	m	a	m	a	m	a		
present CM	<b>CM03</b>	2K pumping		2K pump does not work after restarting control cabinet		2K pump service	2K pumping	MP conditioning at 2K		CTS test at 2K			
		f vs p	RF calibration	RF interlock setup									
next CM	<b>CM06</b>	reception test LEMO		reception test VNA									
next next CM	<b>CM07</b>	preparation at Orsay											

**We are here**

Thanks everybody for the hard work!



# W44 & W45 & W46 planning



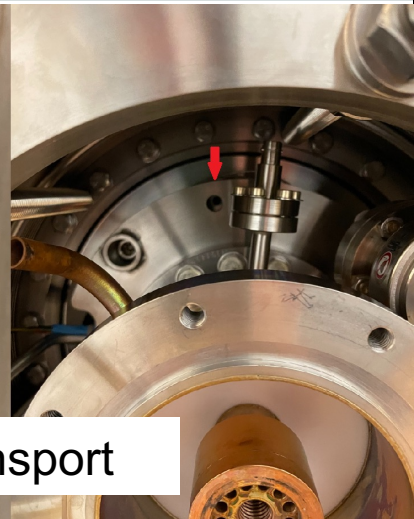
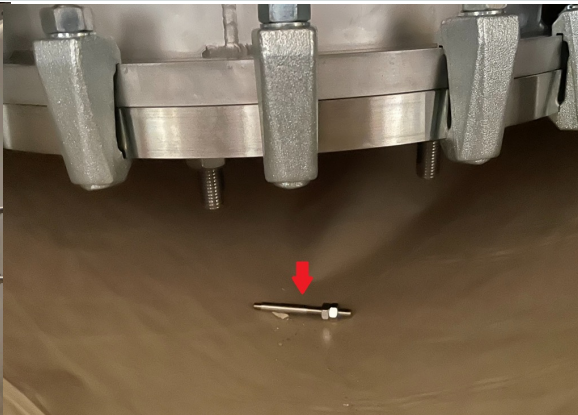
week		W44											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		1-Nov		2-Nov		3-Nov		4-Nov		5-Nov		6-Nov	7-Nov
		m	a	m	a	m	a	m	a	m	a		
present CM	<b>CM03</b>	heat load measurement				start warming up		vent insulation vacuum		start disconnecting things		warming up completed	
next CM	<b>CM06</b>	doorknob mounting & water leak check						waiting in the docking area					
next next CM	<b>CM07</b>	preparation at Orsay											

week		W45											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		8-Nov		9-Nov		10-Nov		11-Nov		12-Nov		13-Nov	14-Nov
		m	a	m	a	m	a	m	a	m	a		
present CM	<b>CM03</b>	disconnect cryogenic line		swap modules		filling dry N2		doorknob dismounting	outgoing test (LEMO, VNA) shock sensors	activate shock sensors, close the box		waiting in the box	
next CM	<b>CM06</b>	water leak check				connect cryogenic lines	beam pumps, leak check	beam vacuum pumping		RF calibration			
next next CM	<b>CM07</b>	preparation at Orsay											

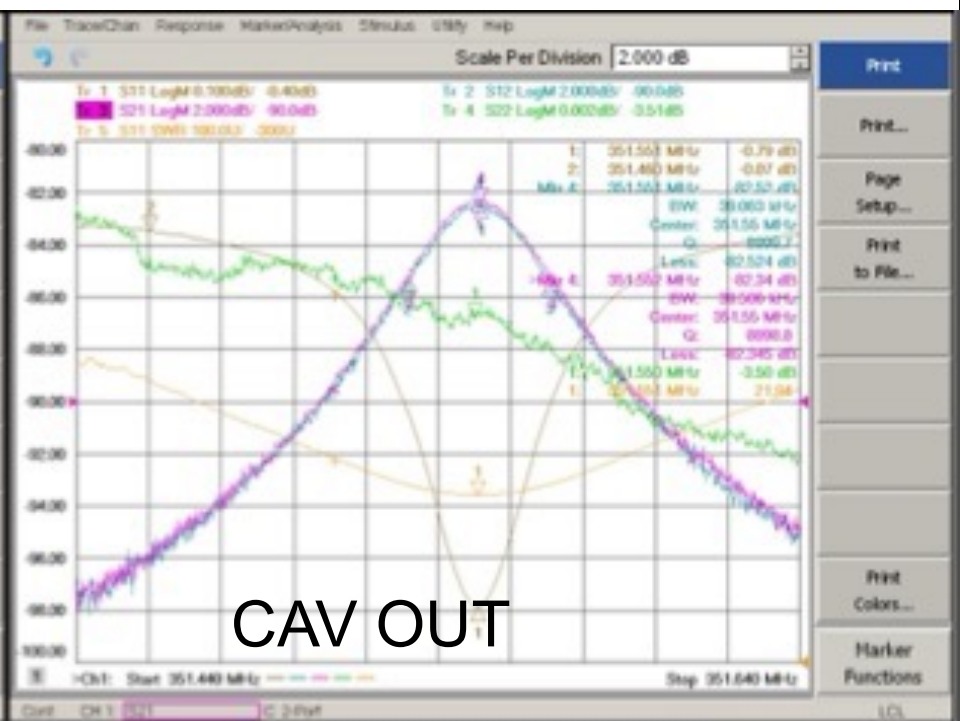
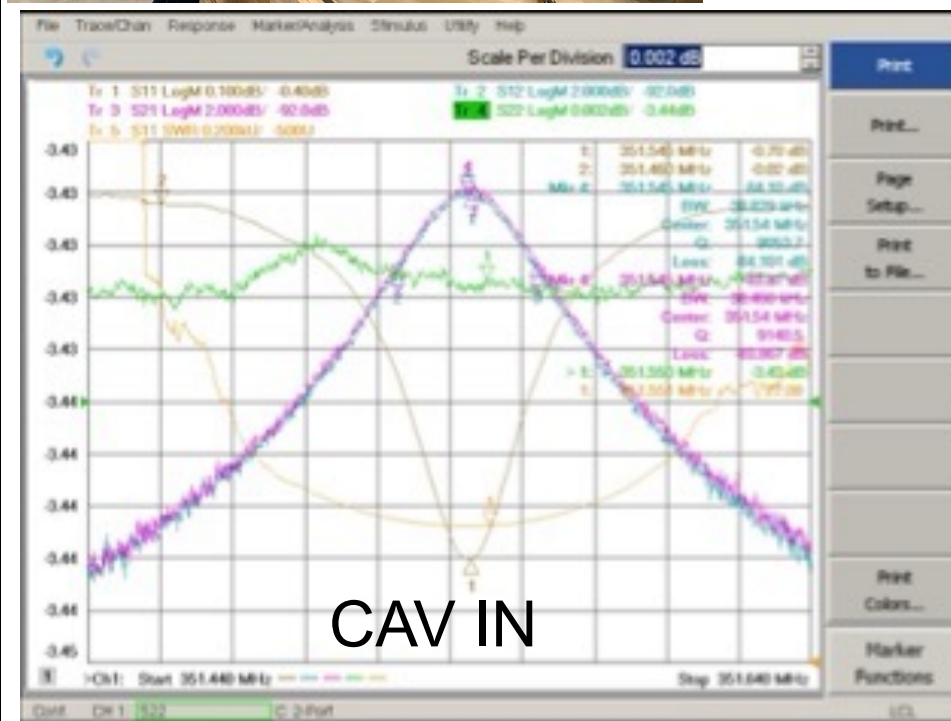
week		W46											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		15-Nov		16-Nov		17-Nov		18-Nov		19-Nov		20-Nov	21-Nov
		m	a	m	a	m	a	m	a	m	a		
previous CM	<b>CM03</b>	departure to ESS		preparation of documents				publish test report					
present CM	<b>CM06</b>	coupler warm conditioning											
next CM	<b>CM07</b>	preparation at Orsay						departure from Orsay		transport over the sea			



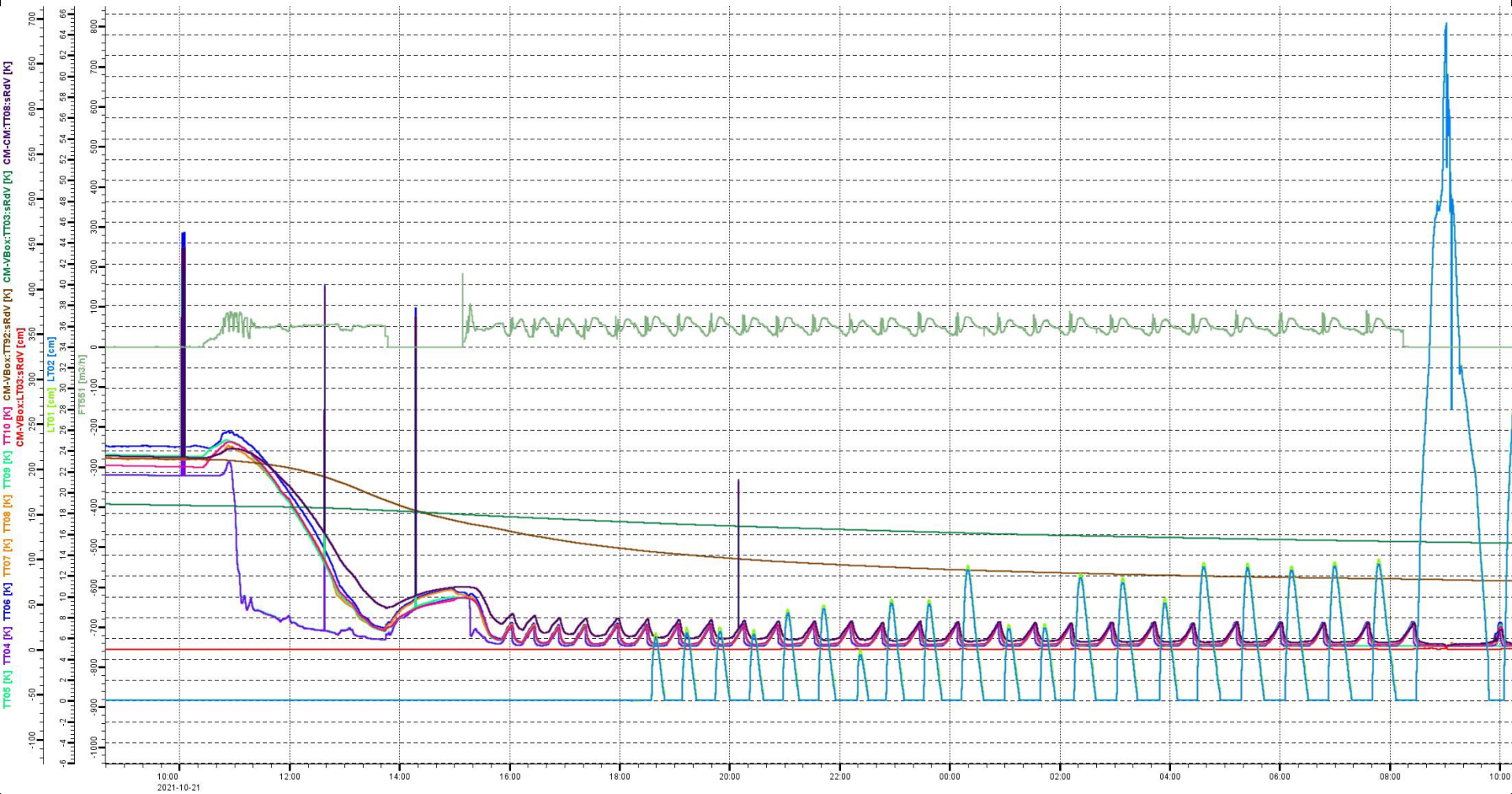
# CM06 reception tests



A screw dropped off during the transport



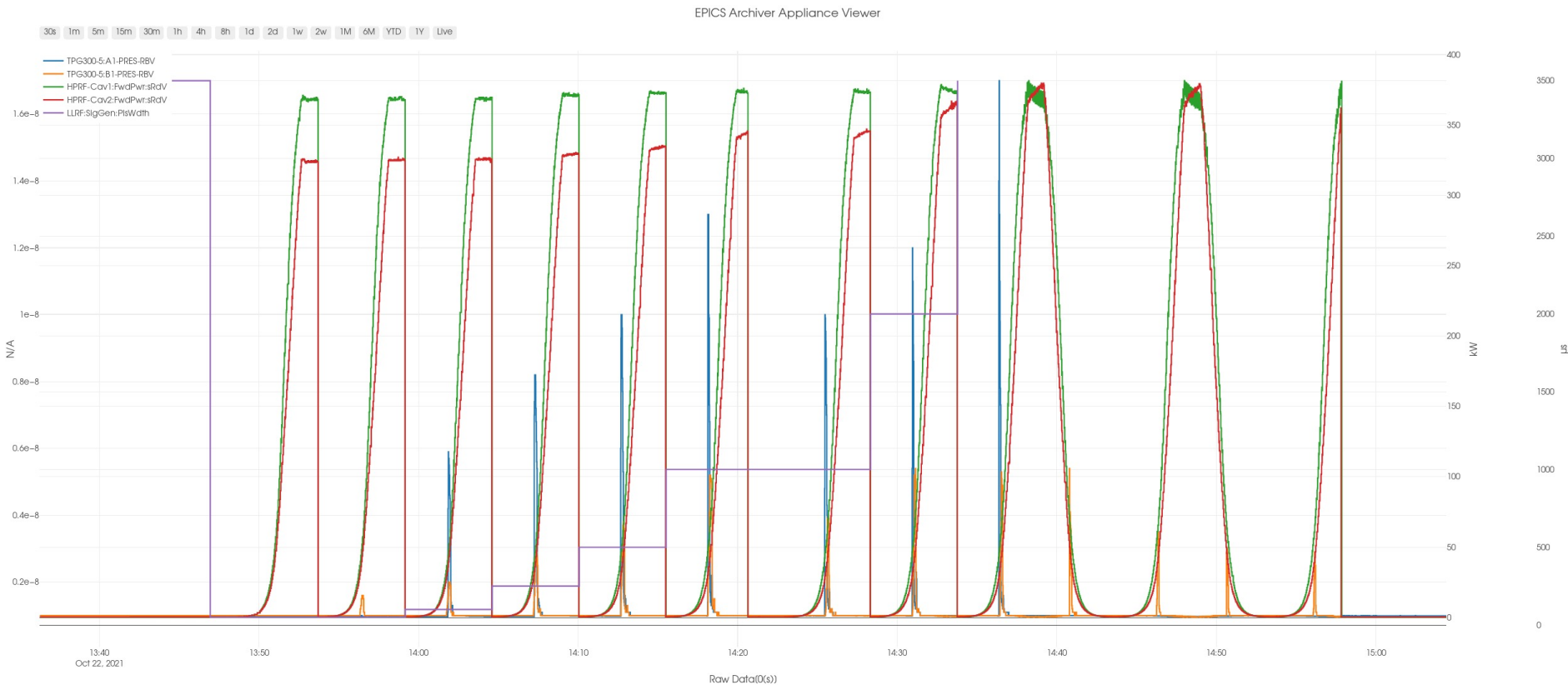
# CM03: 300K to 4K history



It was unstable even though we precooled the N2 longer (2 days) than usual (1 day)



# CM03: FPC cold conditioning



- As usual the case, it was very smooth
- The tube (916278) installed recently in DB-A tripped (?) by the fist Crowbar-IN → not sure if this is really from the tube



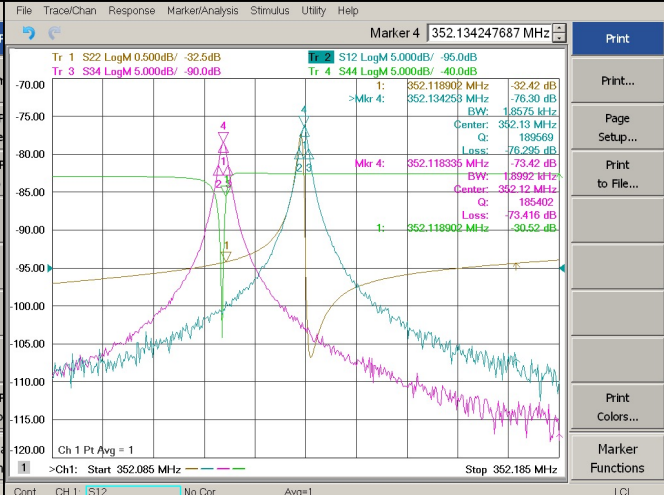
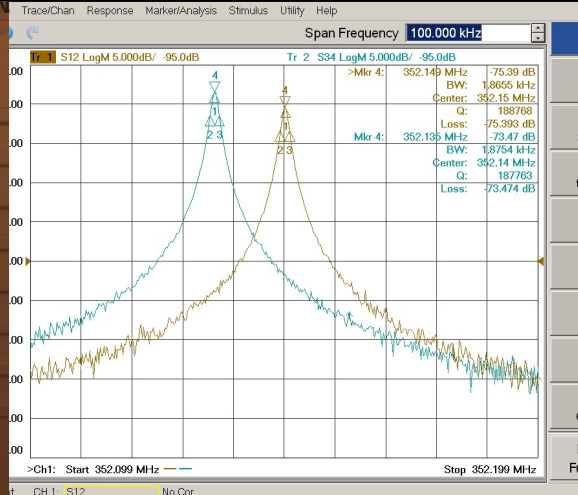
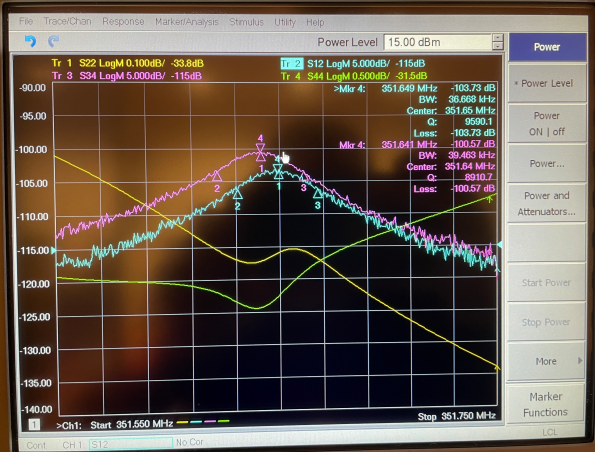
# CM03 cavities: f and QL shift



## 300K w/ insulation vacuum

## 4K

## 2K

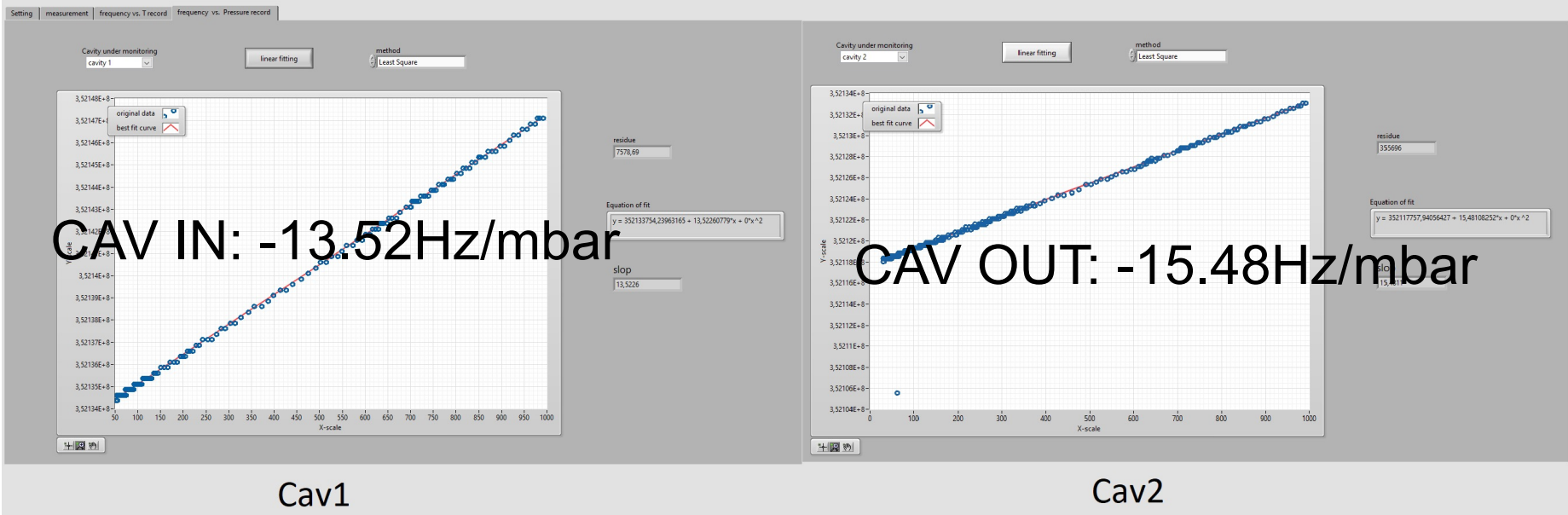


		300K w/o insulation	w/ insulation	4K	2K
CAV IN	f0 MHz	351.638	351.649	352.149	352.134
	QL	8974	9590	1.89e5	1.90e5
CAV OUT	f0 MHz	351.627	351.641	352.135	352.118
	QL	9223	8910	1.88e5	1.85e5

**+12 kHz      +500 kHz      -15 kHz**

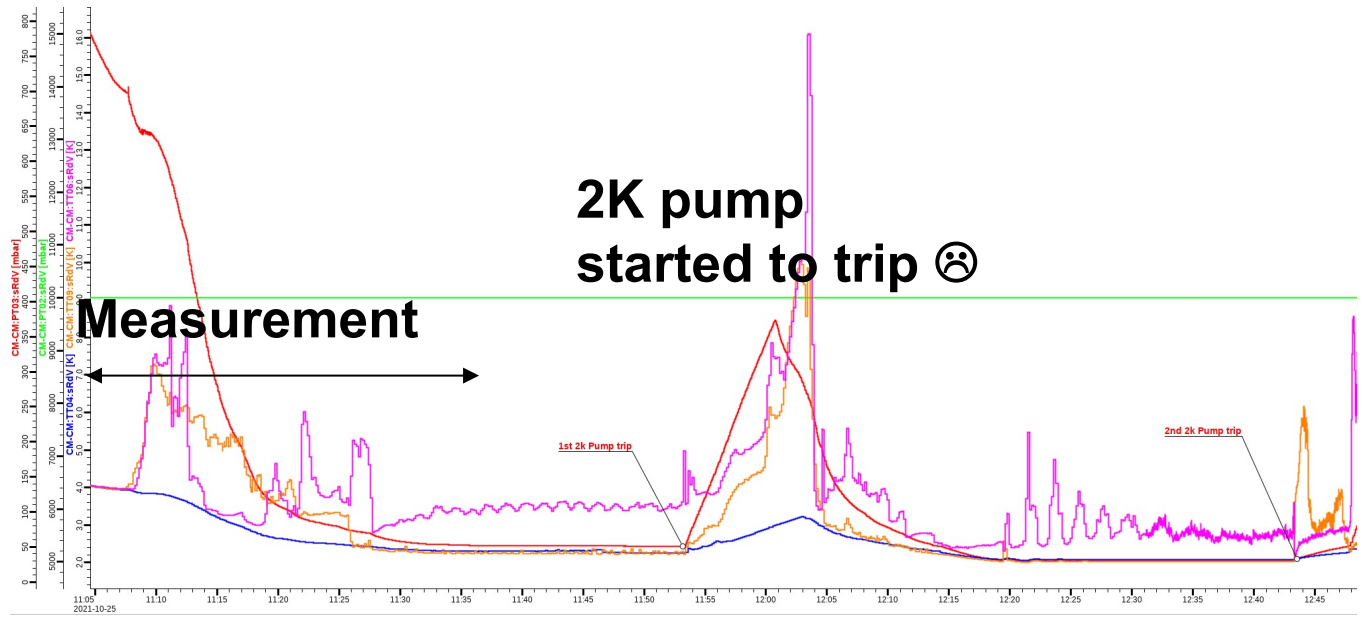


# CM03: f vs p during 2K pumping

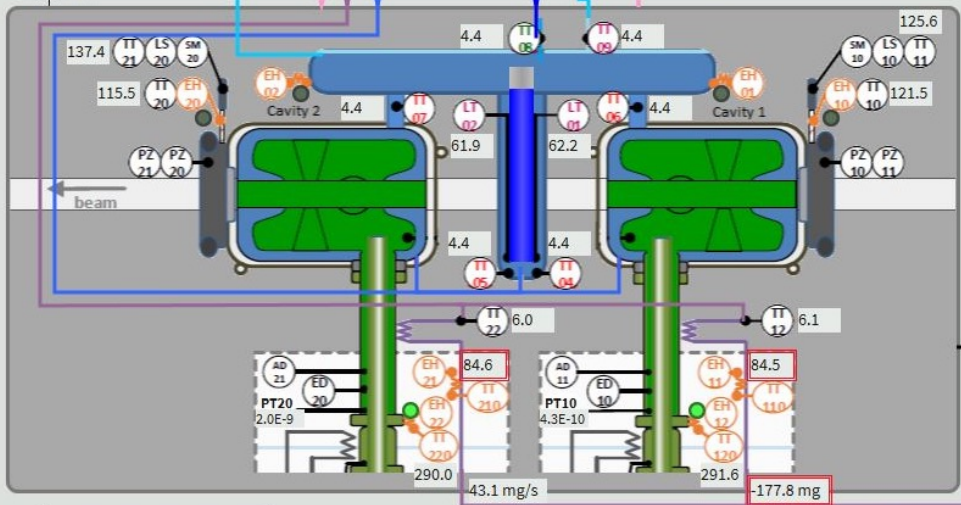
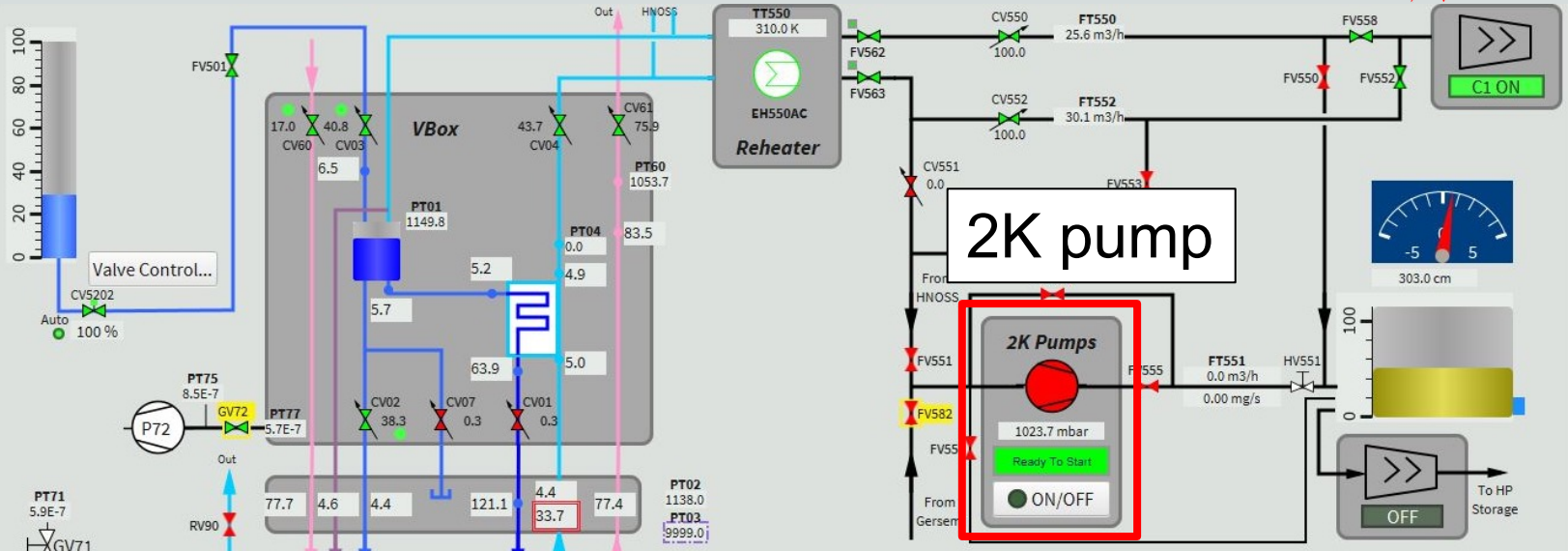


CAV IN: -13.52Hz/mbar

CAV OUT: -15.48Hz/mbar



# New issue in the 2K pump



Select He exhaust

4K Circuit:

2K Circuit:

**Current settings**

Step: Idle

Step: Idle

Power Coupler 2 Cooling

FT04 96.93 l/h  
TT04 26.1  $\mu$ C

WFGuard08

TT02 23.5  $\mu$ C

Mains OFF **0 kW**

RF Switch ON

LLRF-2

Power Coupler's Water Cooling

Interlock Closed

Standby **0 kW**

RF Switch ON

LLRF-1

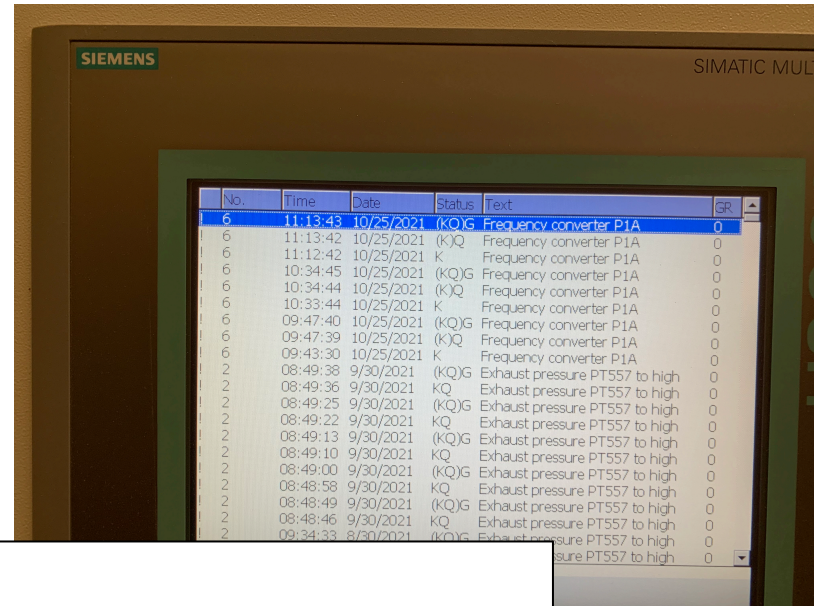
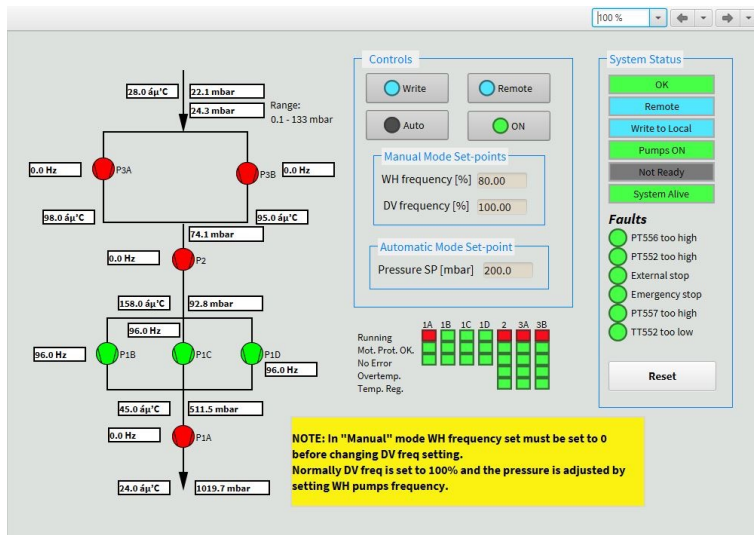
Power Coupler 1 Cooling

FT03 96.90 l/h  
TT03 26.0  $\mu$ C

WFGuard07

TT01 23.5  $\mu$ C

# 2K pump malfunctioning

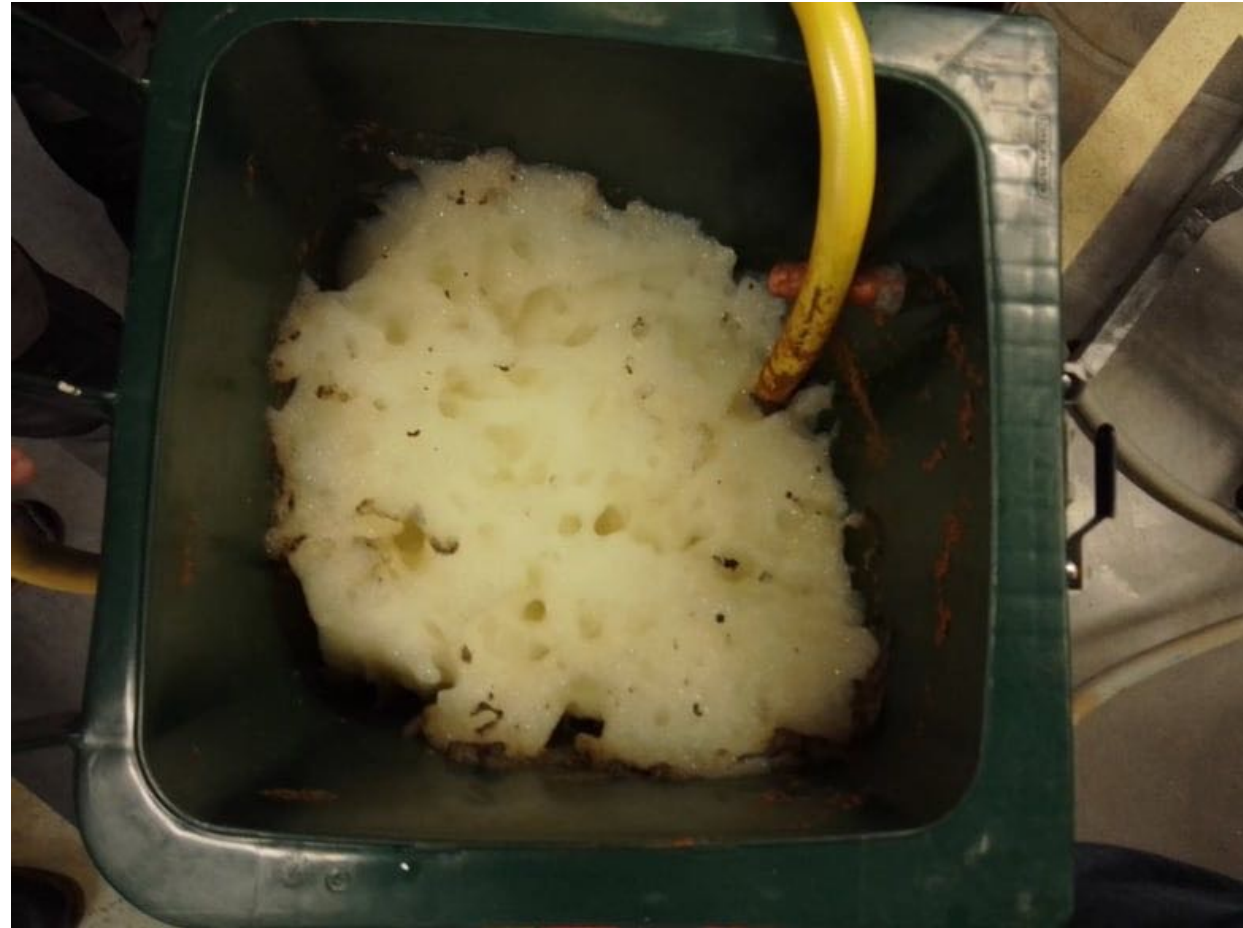


- Oil change
- Cooling water as messy as circulation compressor
- 2 days for recovery



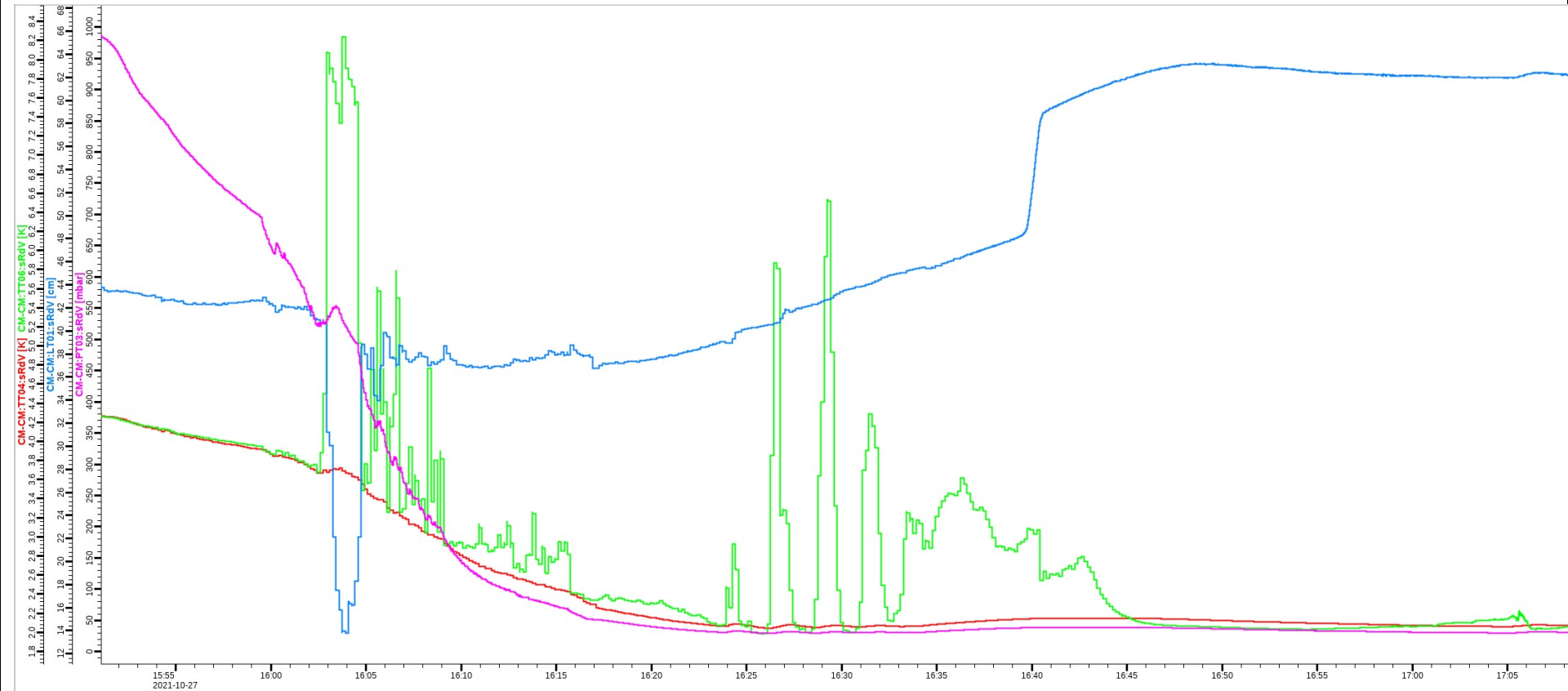
## Clean up the filter





We would seriously need some annual maintenance of something, for example, allocate some weeks before or after the summer vacation

# 2K pump was back after the service





# But unstable due to crazy 4K regulation

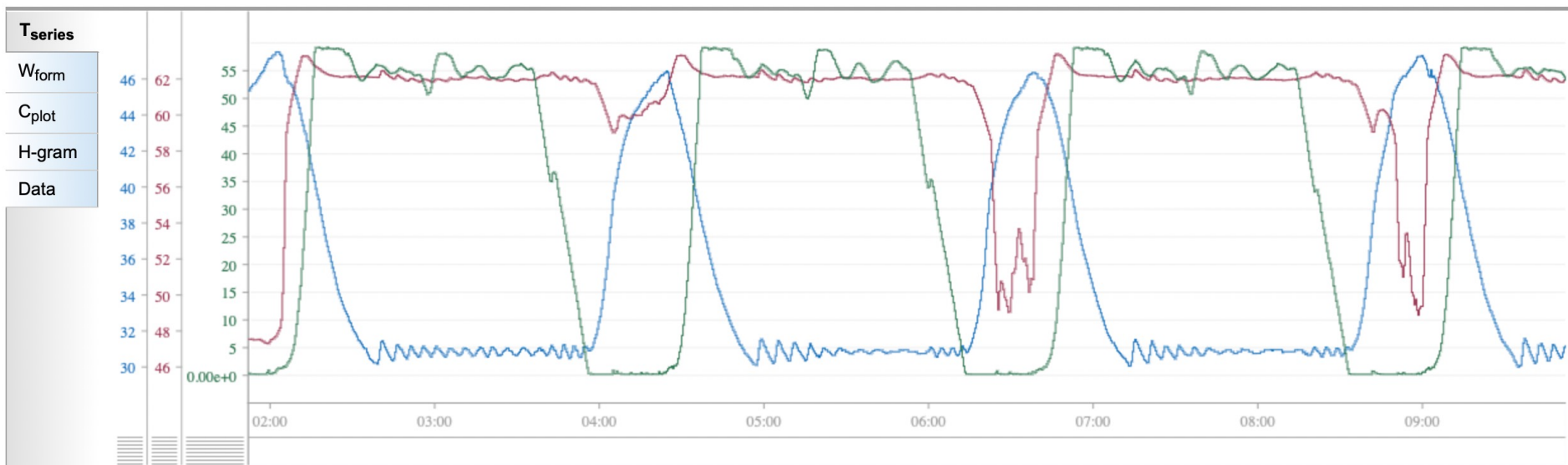


Del	Plot	Name	DBRType	Units	Processing	Scale	Time (local)	Value	Notes
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<input type="checkbox"/>	<input checked="" type="checkbox"/>	CM-CM:LT01:sRdV	DBR_SCALAR_DOUBLE	cm	<input type="text"/>	linear	2021-10-28 06:57:58	62.19888178507487	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	CM-VBox:LT03:sRdV	DBR_SCALAR_DOUBLE	cm	<input type="text"/>	linear	2021-10-28 06:57:58	59.1043586730957	

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: 2021-10-28 09 :52 :03 NOW < > AUTO



- 4K LHe in Vbox dropped down to 0cm every 1 hour
- 2K LHe drops and 2K pressure increase from 31 to 46 mbar
- $\Delta f/p = -15\text{Hz/mbar}$  leads to +225 Hz shifts every one hour ☹️

We are contacting Linde to investigate the reason of instability