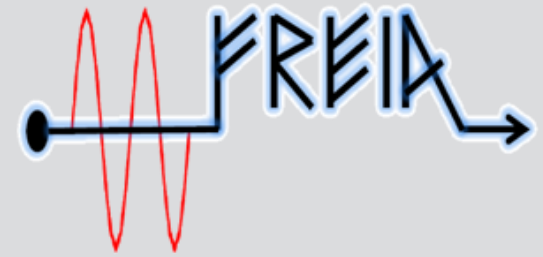




UPPSALA
UNIVERSITET



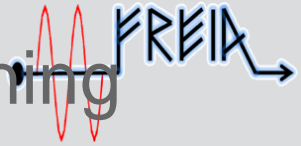
ESS weekly meeting (2022 W11)

A. Miyazaki et al



- Dedicated tests on TH595A
 - Install 907196 in the DB station is already planned in April
 - Anything more to investigate the issues in tubes?
- LLRF upgrade for closed loop
 - We stopped upgrading the LLRF before the series production
 - Closed loop with active piezo compensation should be done at least for one spoke cryomodule
- Arc detectors
 - ESS observed an interesting arcing signal which FREIA's system may overlook
 - Upgrading the arc detectors are straightforward (PMT + ADC)
- Cavity qualification with HNOSS
 - The HNOSS can potentially provide a very similar environment as Orsay's VT with the vacuum insert
 - An issue is a conflict with magnet testing in terms of cryogenic capacitance

W10 & W11 progress / W12 & W13 planning



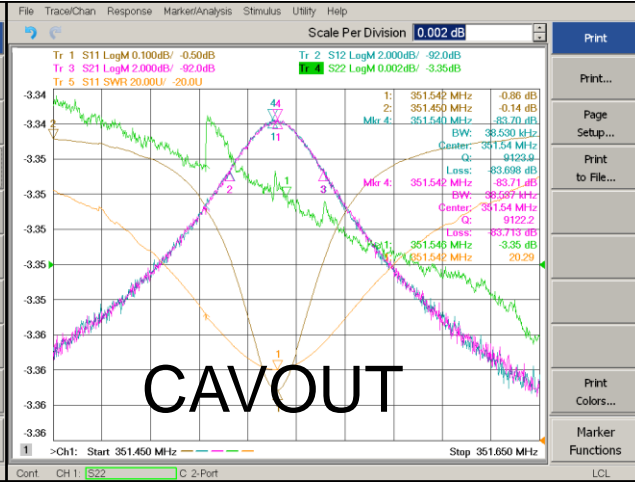
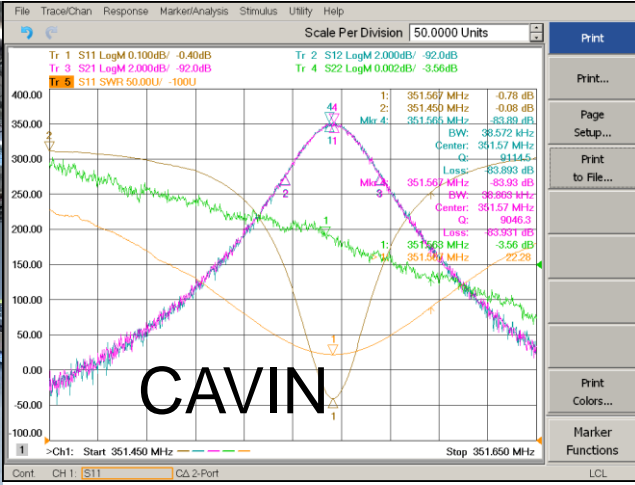
week		W10											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		07-mar		08-mar		09-mar		10-mar		11-mar		12-mar	13-mar
		m	a	m	a	m	a	m	a	m	a		
previous CM	CM08	activate shock sensors		departure to ESS		preparing report		publish report					
present CM	CM09	RF calibration		Esys PS for filament fixed	coupler warm conditioning with DB station & Esys				purging & LN2 cooling start		LN2 cooling		
next CM	CM10	transport from Orsay						arrival at UU		reception test LEMO			

week		W11											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		14-mar		15-mar		16-mar		17-mar		18-mar		19-mar	20-mar
		m	a	m	a	m	a	m	a	m	a		
present CM	CM09	LHe cooling, VNA f vs T	4K filling		coupler cold conditioning	2K pumping	RF calibration	CTS test, RF interlock setup		static heat load with CTS engaged	MP conditioning at target		
next CM	CM10			reception test VNA		We are here							

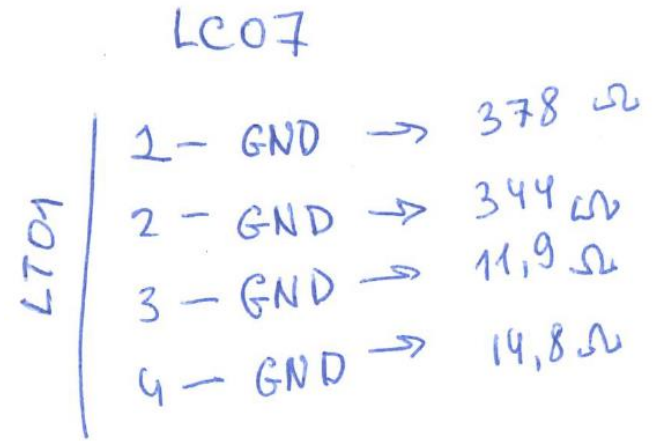
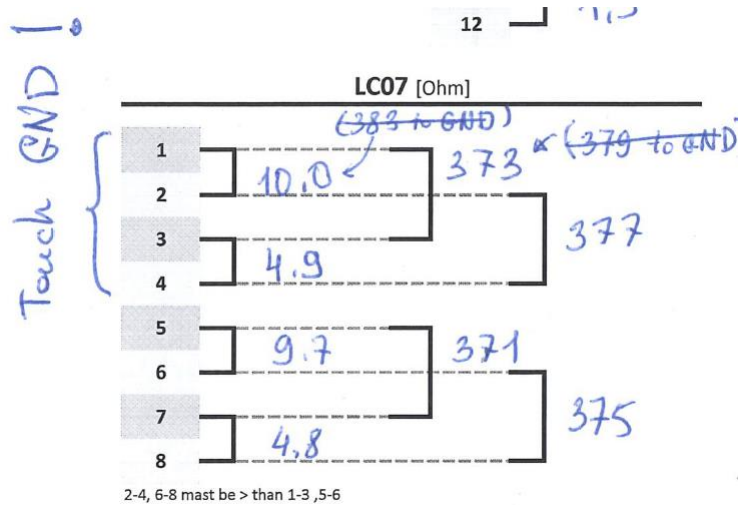
week		W12											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		21-mar		22-mar		23-mar		24-mar		25-mar		26-mar	27-mar
		m	a	m	a	m	a	m	a	m	a		
present CM	CM09	heat load measurement at target frequency				start warming up	warming up			warming up completed			
next CM	CM10	Nuno may										doorknob mounting	
next next CM	CM11	remotely join us										preparation at Orsay	

week		W13											
date		MON		TUE		WED		THU		FRI		SAT	SUN
		28-mar		29-mar		30-mar		31-mar		01-apr		02-apr	03-apr
		m	a	m	a	m	a	m	a	m	a		
previous CM	CM09	disconnect cryogenics	swap modules	N2 filling		out going test		waiting in the box					
present CM	CM10			connect cryogenics	connect vacuum pumps		pumping vacuum						
next CM	CM11	preparation at Orsay						departure from Orsay		transport 5			

CM10: reception tests



Electrical continuities were OK except for LT01

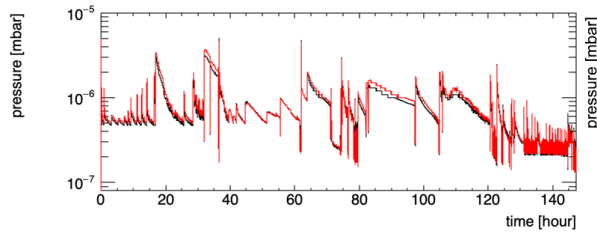
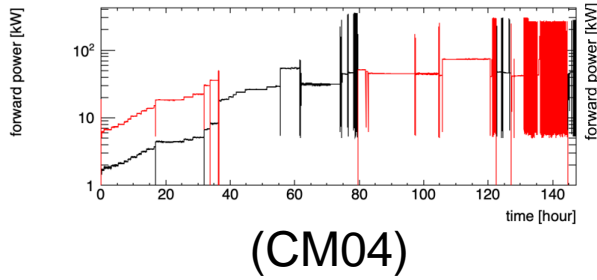


2-4, 6-8 must be > than 1-3, 5-6

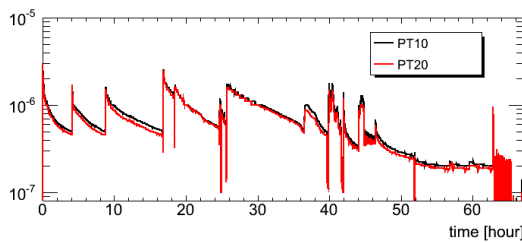
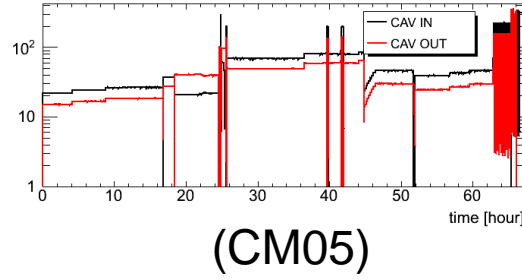
CM10 test is planned after W16 (Apr 18th) → any actions?

CM09's coupler conditioning was exceptional

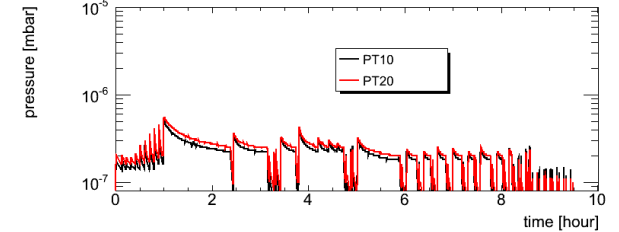
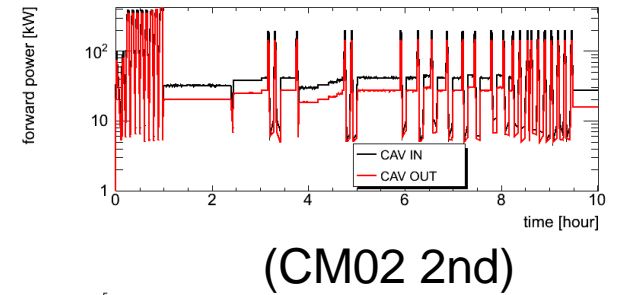
1 station dead: 6-7 days



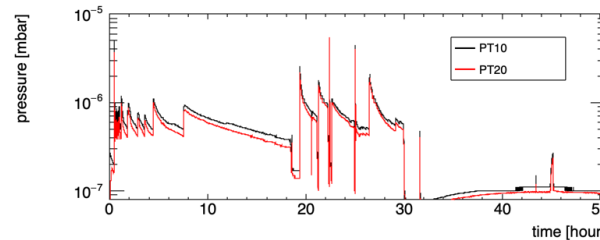
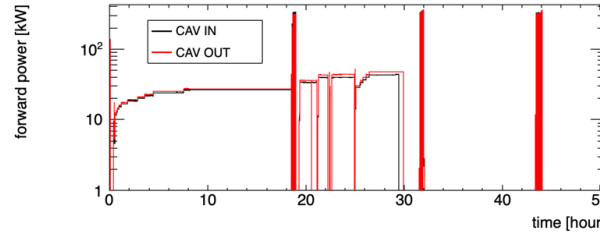
Standard: 3-4 days



2nd conditioning: <1 day



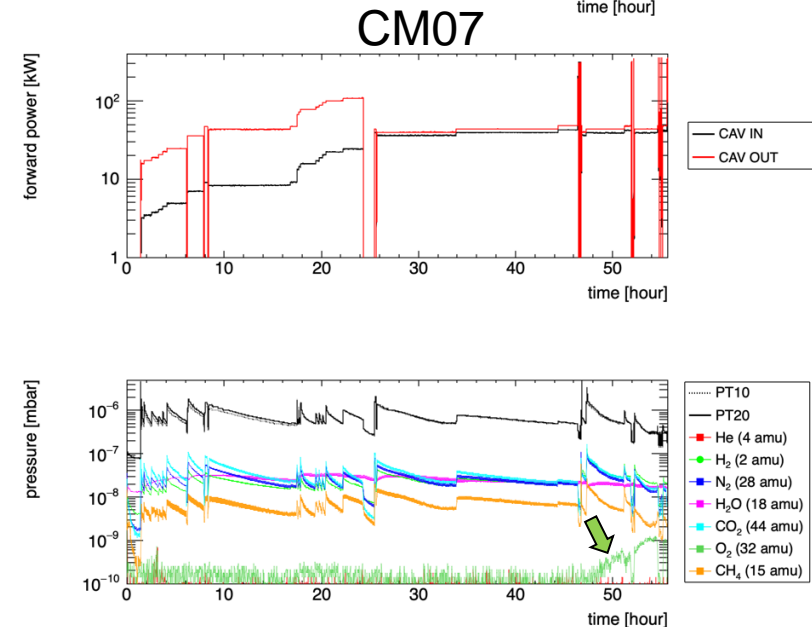
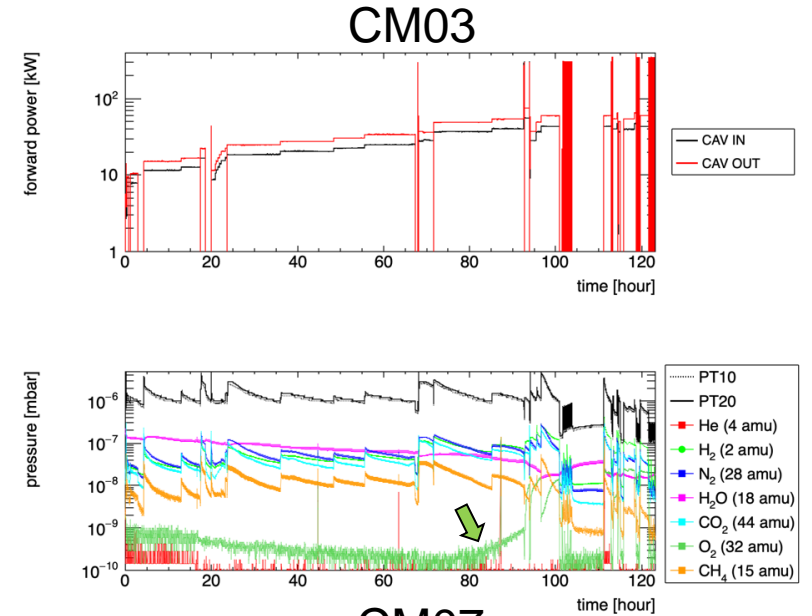
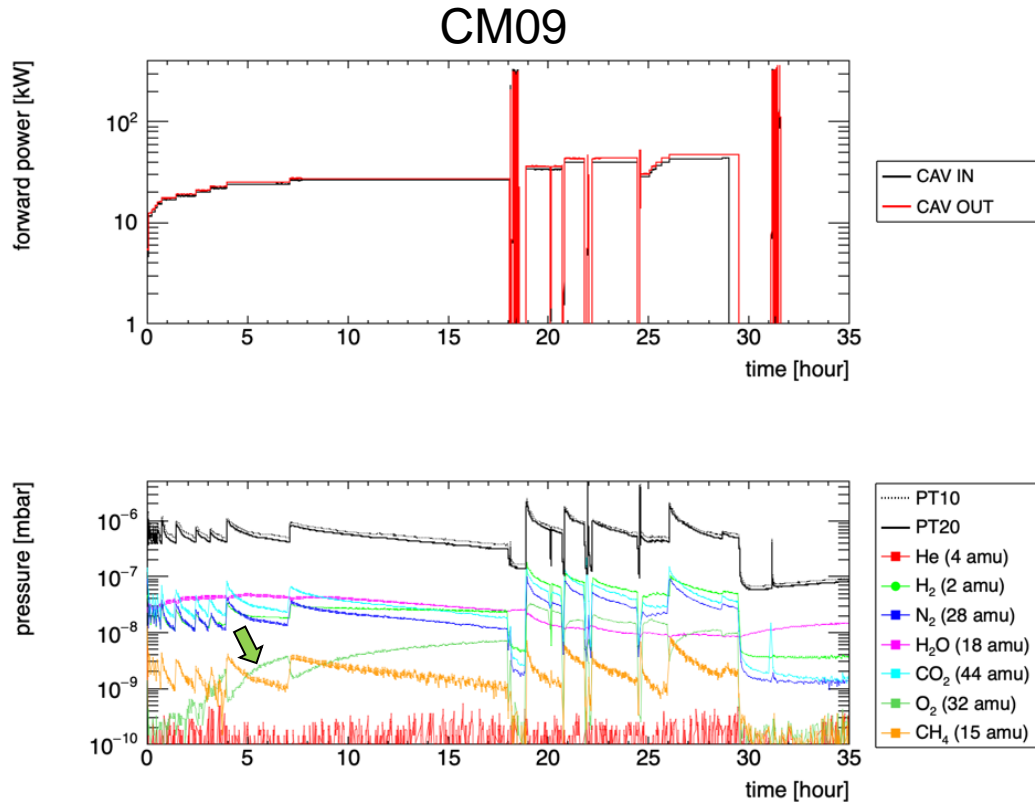
CM09: only < 2 days



STR-10
Coupler-27 (CAVIN)
Coupler-28 (CAVOUT)

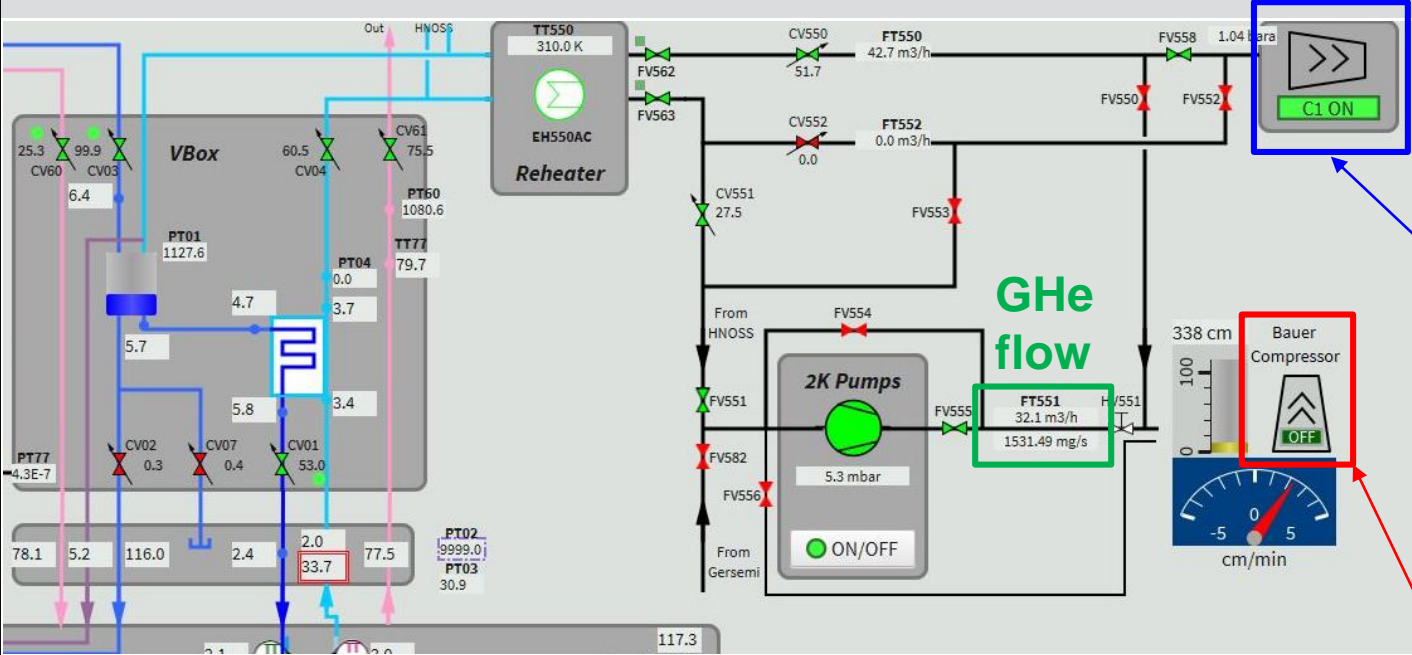
Good 😊
But why?

Outgassing profile was peculiar



- The 32 amu signal (one candidate is O_2) appeared from the shortest pulse 50 μs
- This signal is often observed in longer pulse length (>1 ms)
- This signal is anti-correlated to other molecules (H_2 , CH_4 , 28 amu, CO_2 , ...)
- Any relation to the fast conditioning??

Recovery compressor was upgraded



Circulation compressor



Recovery compressor



Old configuration

- Bauer 1 25 m³/h
 - Bauer 2 25 m³/h
 - Bauer 3 25 m³/h
- Max 75 m³/h

New configuration (preliminary)

- Bauer 1 25 m³/h
 - Bauer 2 25 m³/h
 - Sauer Max 200 m³/h
- Max 250 m³/h

New recovery compressor

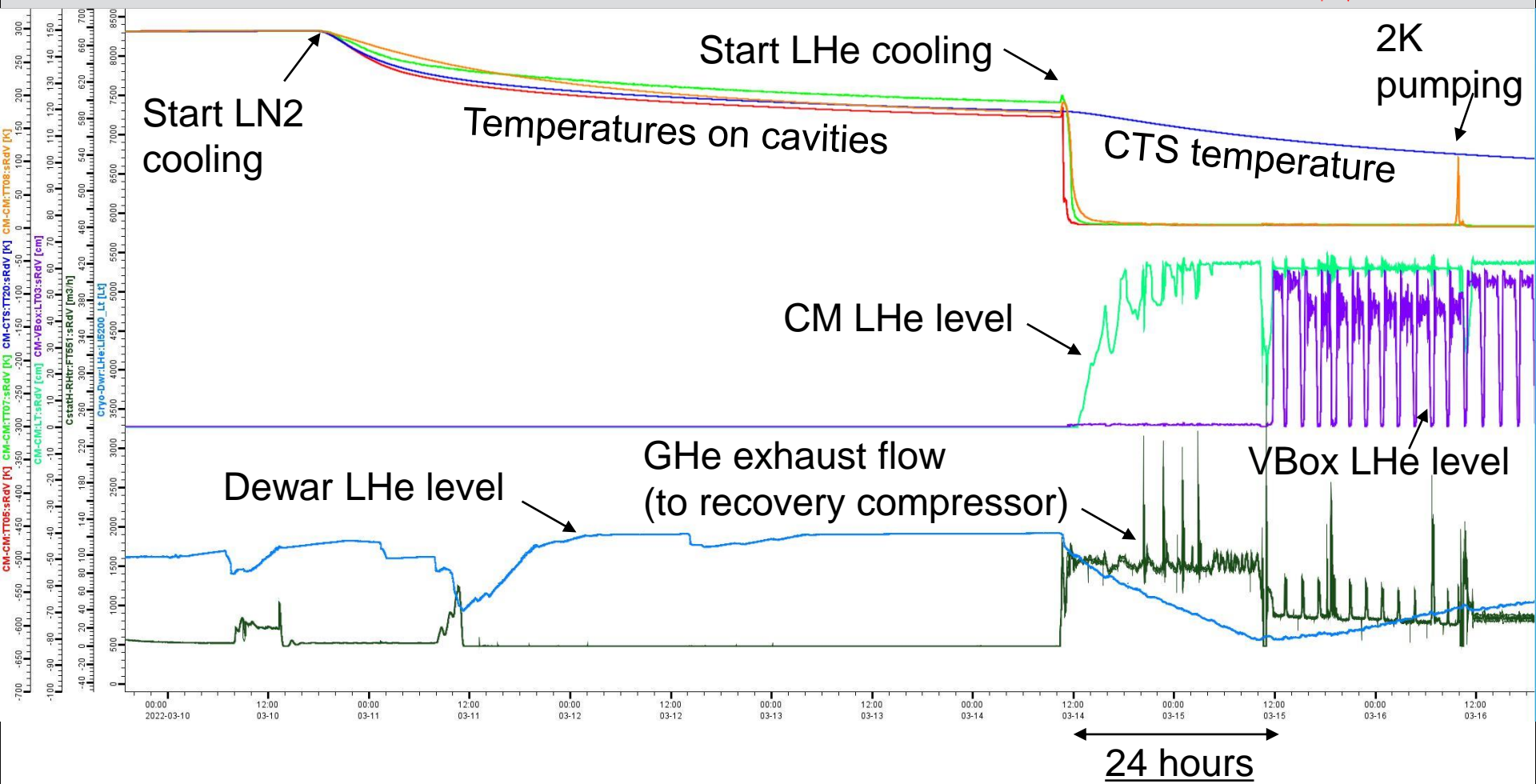


Bottleneck so far...

We can handle more flow 😊



CM09: cooling down summary

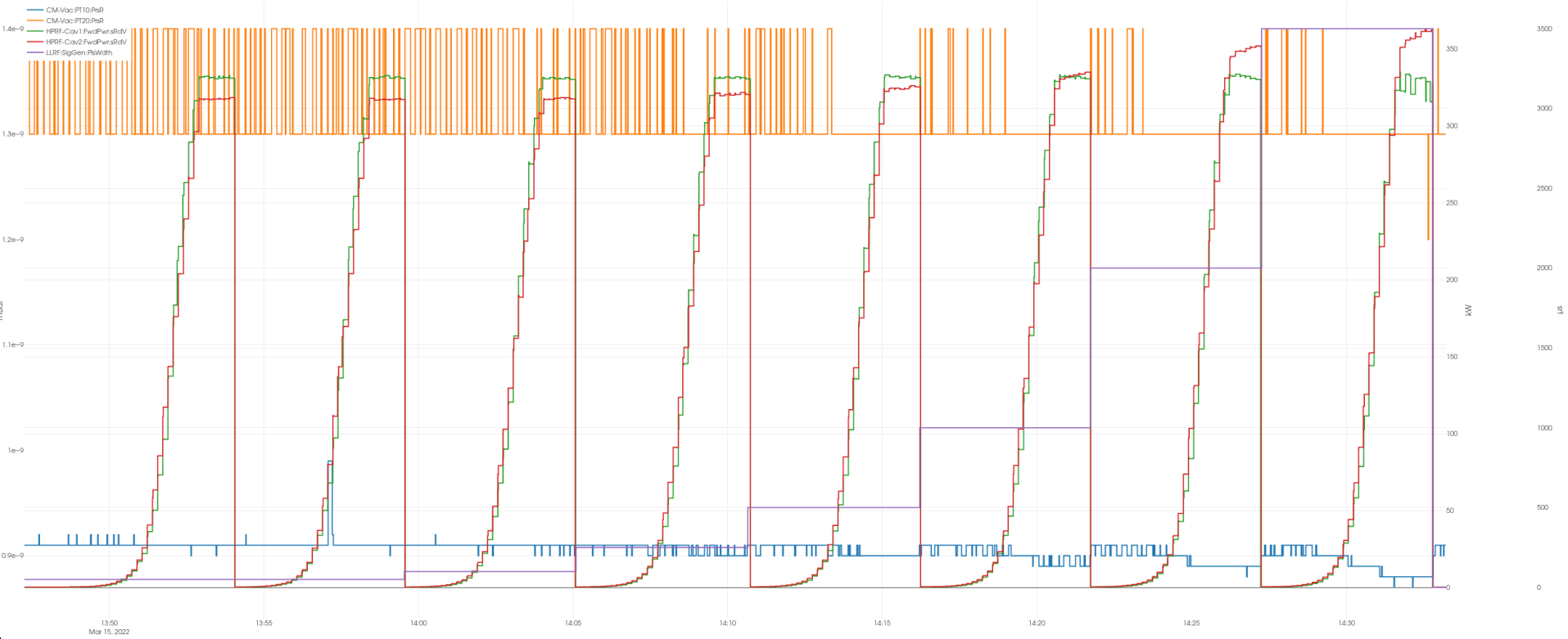


- Higher GHe flow accelerated the CM LHe filling
 - LHe drop in the Dewar seems faster than before
- The liquifier became the new bottleneck

24 hours

This may be limited by the thermalization of CM + VBox

CM09: coupler cold conditioning

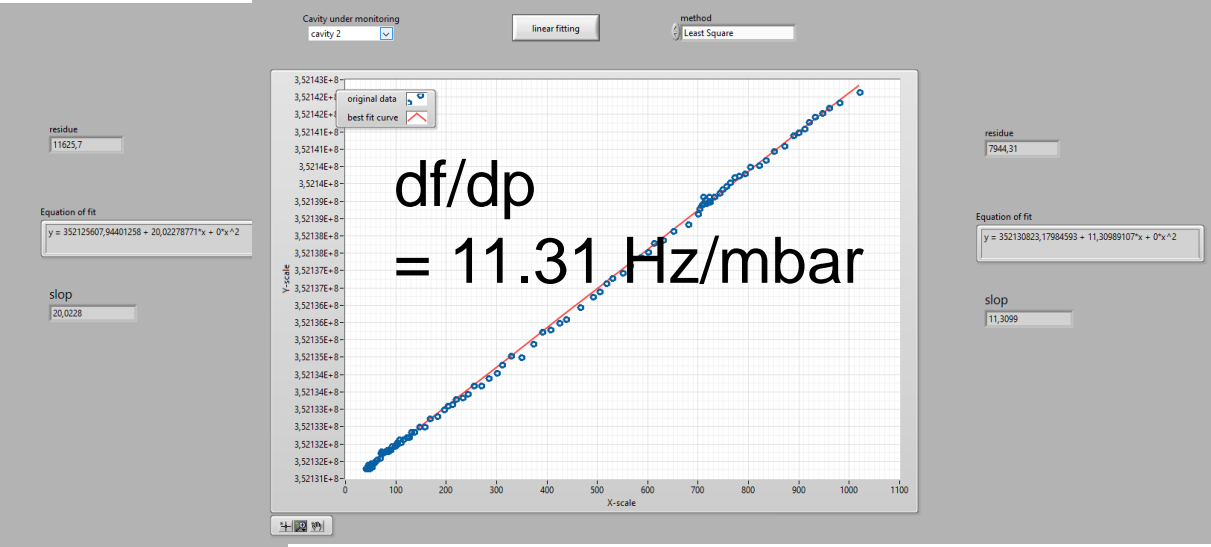
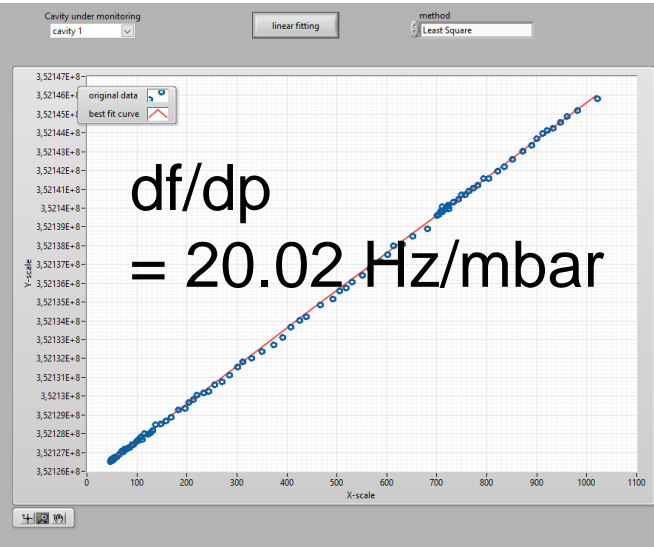


No more than $1e-9$ mbar



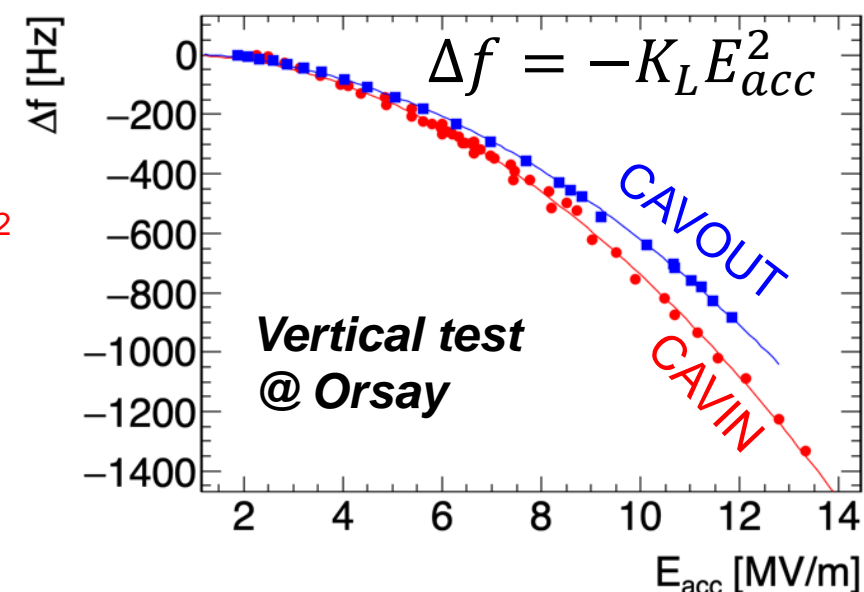
CAV IN (DSPK06)

CAV OUT (DSPK23)



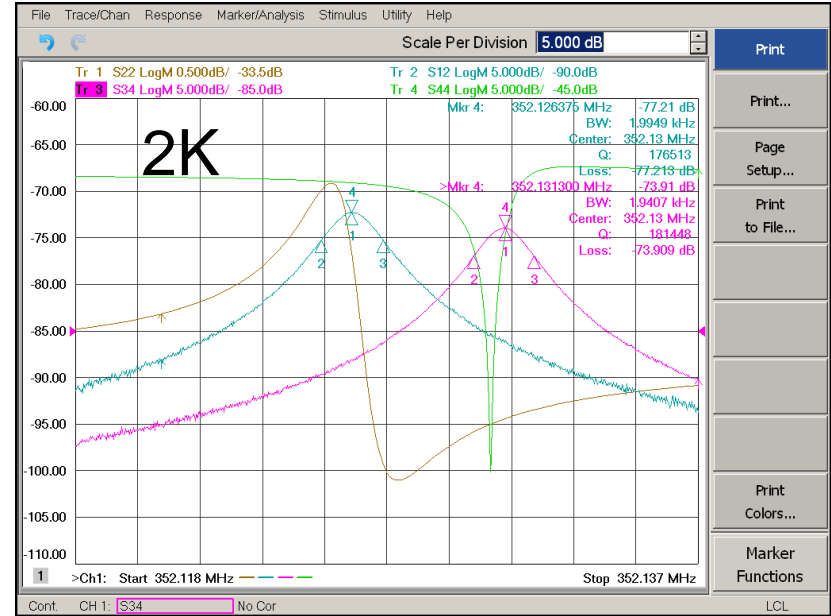
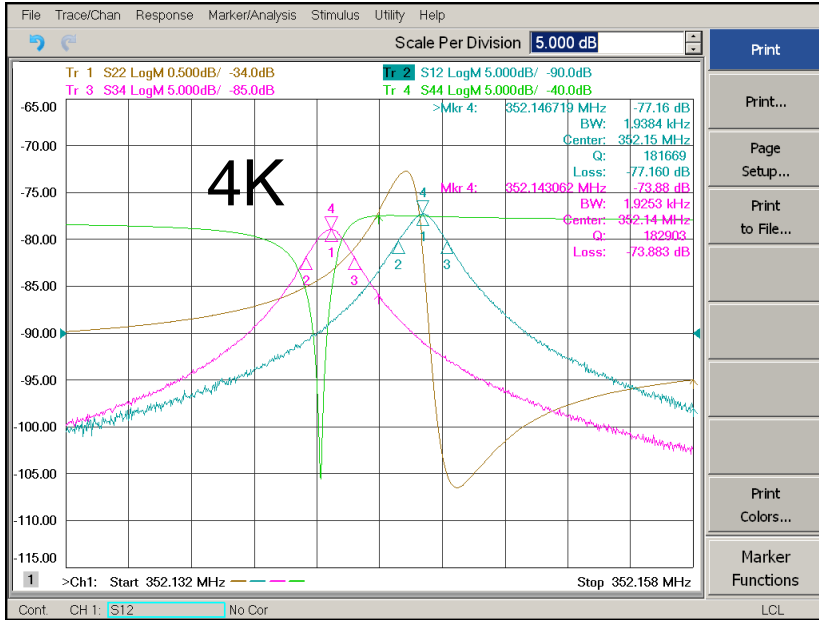
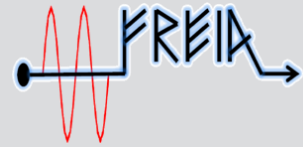
$K_L = -8.20 \text{ Hz}/(\text{MV}/\text{m})^2$

CAVIN is soft
(just on spec)



$K_L = -6.81 \text{ Hz}/(\text{MV}/\text{m})^2$

CM09: f and Q_L from VNA



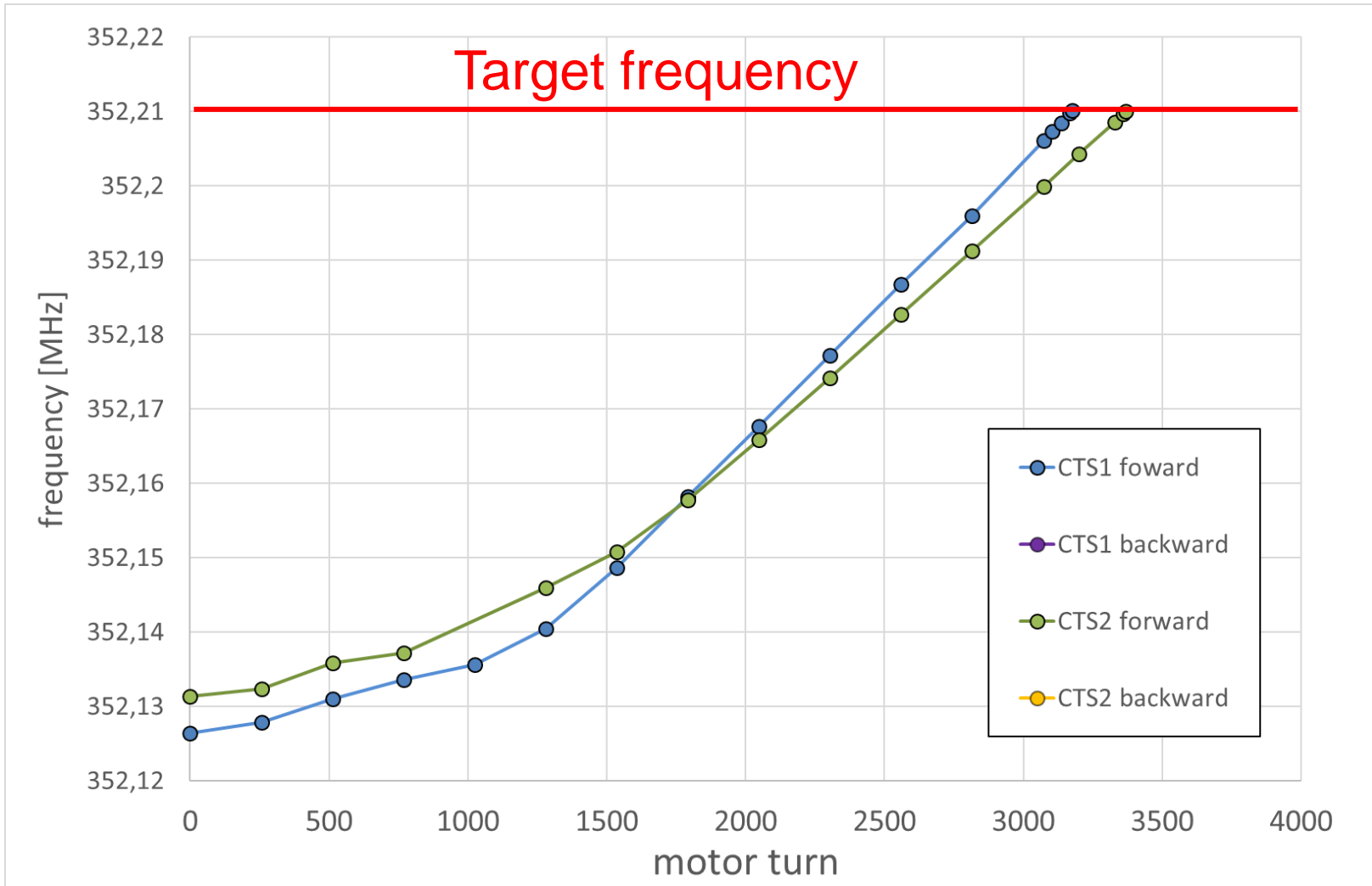
T	Insulation	CAVIN			CAVOUT		
		f [MHz]	BW [kHz]	Q_L	f [MHz]	BW [kHz]	Q_L
300K	1 bar	351.579	39.9	8.8e3	351.583	38.9	9.1e3
4K	1e-7 mbar	352.147	1.94	1.82e5	352.143	1.93	1.83e5
2K	1e-7 mbar	352.126	1.99	1.77e5	352.131	1.94	1.81e5

$\Delta f = 547$ kHz

$\Delta f = 548$ kHz

$Q_L > 1.74e5$ @ 2K

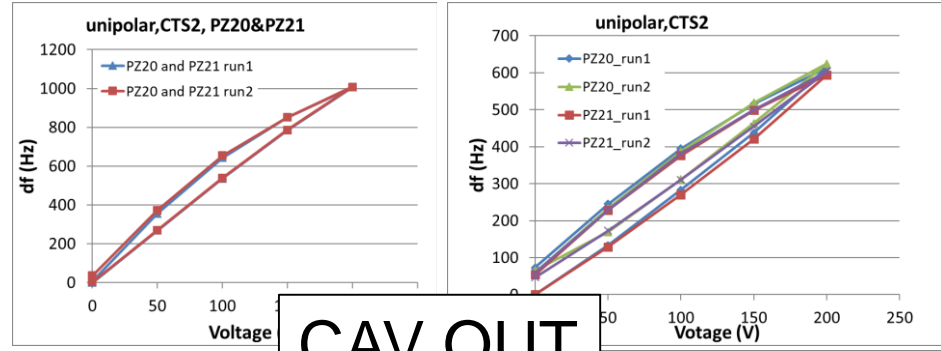
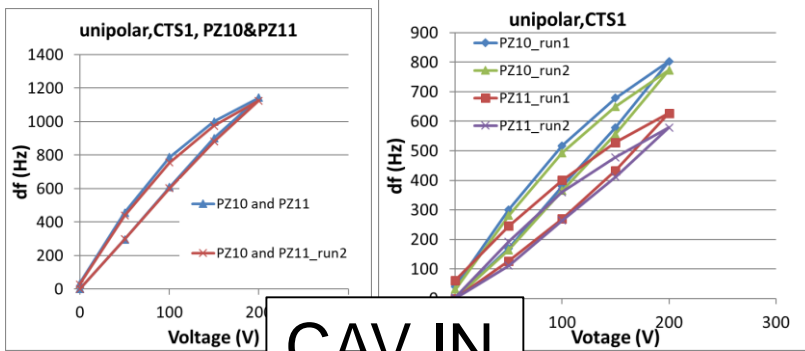
OK 😊



- Both reached the target position
- New Beckhoff driver was used
- Backward will be measured after the meeting

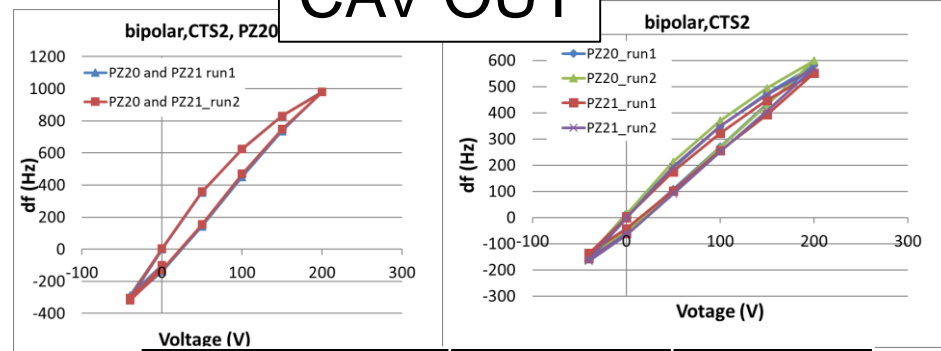
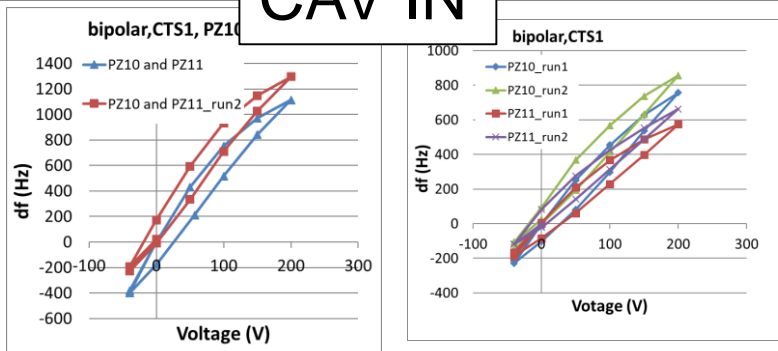


CM09: CTS piezos



CAV IN

CAV OUT



		Δf [Hz]
PZ10	unipolar	773
	bipolar	1004
PZ11	unipolar	781
	bipolar	579
PZ10&PZ11	unipolar	1125
	bipolar	1525

		Δf [Hz]
PZ20	unipolar	566
	bipolar	736
PZ21	unipolar	545
	bipolar	717
PZ20&PZ21	unipolar	1005
	bipolar	1298

CAVIN
is soft