UPPSALA UNIVERSITET

ESS spoke CM04/CM02 (2nd run) weekly meeting 202103011

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CM status

- CM04 packing
- CM02 installation
- Series CM statistic
- Test plan

CM04 dismounting

- Dismount with valve-box, waveguide √
- Move out of the bunker √
- Fill the insulation vacuum with dry nitrogen √
- Dismount the doorknob √
- Electric continuity check √
- Outgoing test √
- Mount shock sensors √
- Packing √

CM04 outgoing test

- Electrical sensors verification

Incoming

Cables verification CM04 at UU			v1
Socket assembly		Verified by :	
Socket name	*PID name*	*Electrical value (Ω) (before shipment)*	*C / NC*
LC01	TT004	0,85	NC
	TT005	68	C
	TT006	71,35	C
	TT007	61,6	C
	TT008	71,7	C
	TT009	68,3	C
	TT010	103,8	C
	TT011	99,85	C
	TT012	59,55	C
	TT013	105,25	C
	TT020	100,25	C
	TT021	73,15	C
LC02	EH01	84,9	C
	EH02	84,4	C
	EH10	82,8	C
	EH20	82,5	C
LC03	SM10	2,2 AB / 2,2 CD	C
	LS10	1,9	C
	SM20	2,1 AB / 2,2 CD	C
	LS20	1,8	C
LC07	LT01	363,65	C
	LT02	365,2	C
Socket name	*PID name*	*Electrical value (µF) (after shipment)*	*C / NC*
LC04	PZ10	13,2	C
	PZ11	13,06	C
	PZ20	13,4	C
	PZ21	13,33	C

outgoing

Cables verification CM04 at UU			v1
Socket assembly		Verified by :	
Socket name	*PID name*	*Electrical value (Ω) (before shipment)*	*C / NC*
LC01	TT004	7	NC
	TT005	64,2	C
	TT006	66,5	C
	TT007	57,25	C
	TT008	67,85	C
	TT009	65,1	C
	TT010	107	C
	TT011	103,5	C
	TT012	65,5	C
	TT013	106,5	C
	TT020	106	C
	TT021	65,5	C
LC02	EH01	85	C
	EH02	85	C
	EH10	83	C
	EH20	83	C
LC03	SM10	2,5AB / 2,4 CD	C
	LS10	1,9	C
	SM20	2,3 AB / 2,4 CD	C
	LS20	1,9	C
LC07	LT01	365,6	C
	LT02	368,55	C
Socket name	*PID name*	*Electrical value (µF) (after shipment)*	*C / NC*
LC04	PZ10	14,06	C
	PZ11	14,06	C
	PZ20	14,12	C
	PZ21	14	C

CM04 Cavity parameters @ RT

CONFIG								
Cryomodule	CM4							
Location	Hall 106		FREIA		FREIA		FREIA	
Date	12/15/2020	12/15/2020	1/12/2021	1/12/2021	2/11/2021		3/8/2021	
VNA model	Agilent	Keysight			Keysight		Keysight	
T° (C)			20		2		20	
Pcavity (mbar)	1,50E-03	1,50E-03	4,90E-03	4,90E-03	1,50E-09		3,60E-03	
Pinsulating vacuum (mbar)	PA	PA	PA	PA	Vacuum		PA	
Pcryolines (mbar)	PA	PA	PA	PA	Vacuum		PA	
	RF measurements @ T=300K before testing		**RF measurements @ T=292K at the reception**		**RF measurements @ T=2K during the test**		**RF measurements @ T=300K after testing**	
Cavity location	Cavity IN	Cavity OUT	Cavity IN	Cavity OUT	Cavity IN	Cavity OUT	Cavity IN	#REF!
Cavité	**DSPK10**	**DSPK17**	**DSPK10**	**DSPK17**	**DSPK10**	**DSPK17**	**DSPK10**	**#REF!**
Coupleur	**CPL11**	**CPL03**	**CPL11**	**CPL03**	**CPL11**	**CPL03**	**CPL11**	**#REF!**
Manchette	**DWT26**	**DWT03**	**DWT26**	**DWT03**	**DWT26**	**DWT03**	**DWT26**	**#REF!**
S11 (off resonance)	-0,1782	-0,1566	-0,03	-0,02			-0,16	-0,16
S11 (@ resonance)	-0,9024	-1,027	-0,77	-0,86			-0,81	-0,9
S21 (@ resonance)	-84,05	-83,09	-83,91	-83,06	-75,78	-74,29	-83,79	-83,1
Frequency (MHz)	351,554	351,564	351,580	351,580			351,573	351,576
Frequency @ 2K (MHz)	352,132	352,144			352,128	352,125		
Shift (MHz)	0,578	0,580						
Bandwidth (kHz)	39,3	40	39,636	39,933	2,03	2,274	39,735	40,07
Qloaded	8890	8778	8871	8804	175838	154829	8838	8803
For information S11 pick-up cable (measurement @ reception)	-1,85	-1,82						
S11 pick-up cable (measurement on CM)	-3,76	-3,51						
Qt (calculated)	3,00E+11	3,00E+11	3,00E+11	3,00E+11				
Qt (measurement in vertical test @ 2K)	2,50E+11	2,10E+11	2,50E+11	2,10E+11				
	Results (under coupled)		**Results (under coupled)**		**Results (over coupled)**		**Results (under coupled)**	
S11 (corrected)	-0,72	-0,87	-0,74	-0,84	0,0	0,0	-0,7	-0,7
S21 (corrected)	-82,1	-81,3	-83,9	-83,1	-75,8	-74,3	-83,7	-83,0
Qext (measured on CM @ 300K)	**2,22E+05**	**1,84E+05**	**2,17E+05**	**1,91E+05**			**245151**	**215582**
Qext (measured on CM @ 2K)					**175838**	**154829**		
For information Qext (calculated with CST Studio)	**1,86E+05**	**2,01E+05**	**1,86E+05**	**2,01E+05**				
Qt (measured on CM)	**2,30E+11**	**2,24E+11**	**3,55E+11**	**3,28E+11**			**2,99E+11**	**2,88E+11**
Qt (measured on CM @ 2K)					**2,50E+11**	**2,10E+11**		
Qo	9260	9217	9249	9229			9169	9178
G (Ohm)	131	131	131	131			130	130

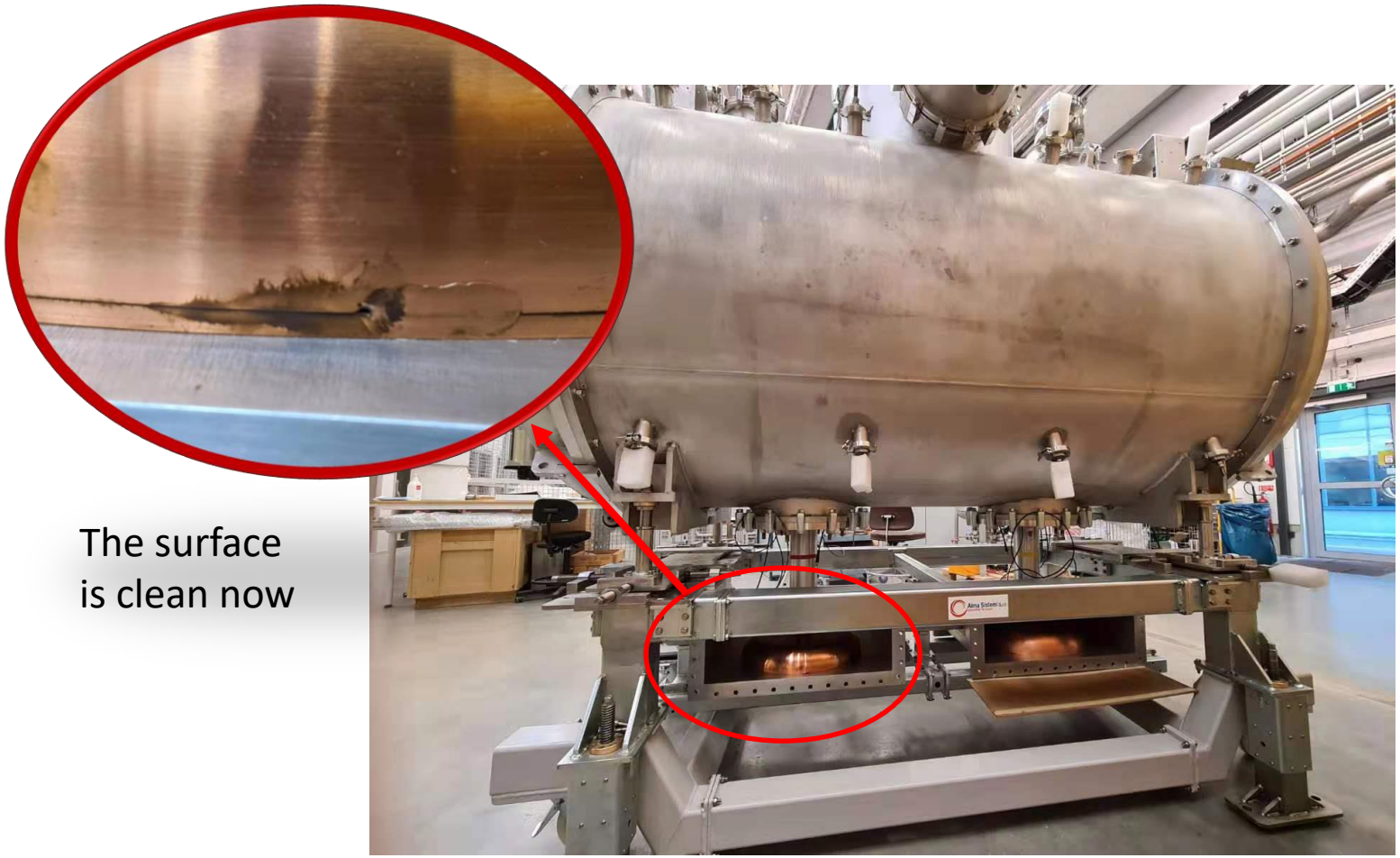
CM02 installation

Hardware:

- Doorknob √
- Sensors and gauges: arc detector, electron pickup √
- Waveguide bellows mounting √
- Safety valve mounting √
- Pressure gauge mounting √
- Turbo-pump mounting for insulation vacuum √
- Cryogenic jumper √
- View ports for alignment √
- Beam vacuum pumping cart connection √
- FPC water cooling pipe connection √
- Cabling: arc, e-pickup, lemo connector… √
- CM alignment checking with insulation vacuum
- Close buncker

CM02 doorknob

- Keep the installation with the new set of doorknob (doorknob pair 2) (No doorknob swap)
- Polished and cleaned dark marker on the doorknob (CAV_IN) with alcohol



The surface is clean now

Qext discussion

- Both CM02 and CM04 were installed with doorknob pair 1, in which doorknob_1 was at CAV_IN side while doorknob_2 at CAV_OUT side
- Unexpected Qext is not due to a certain doorknob
- Could it be the installation procedure?

	CAV_IN	CAV_OUT
CM02	1.5E5	2E5
CM04	1.77E5	1.54E5

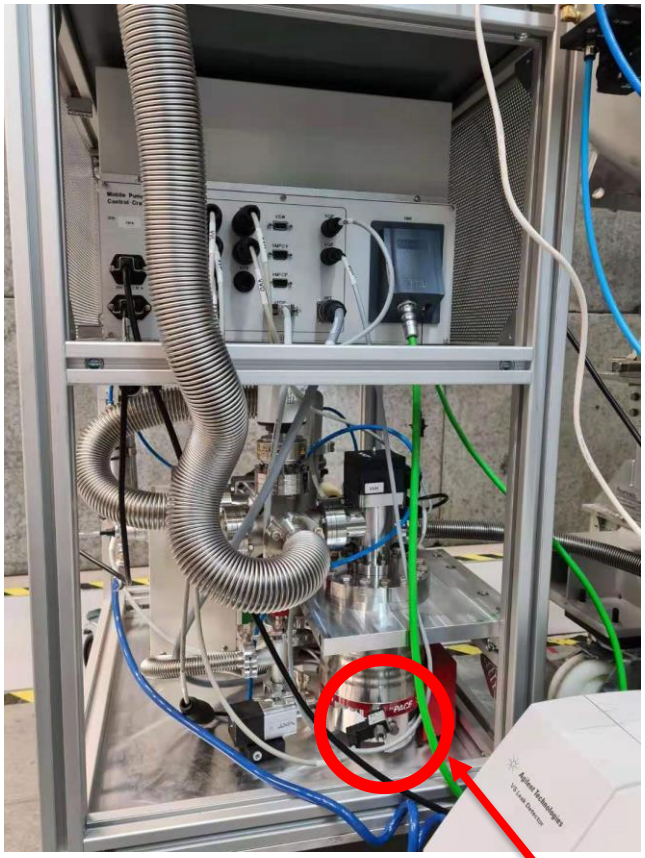
Doorknob_1 Doorknob_2

Beam vacuum pumping cart connection

- Will connect two pumping carts on both sides.
- Connect compress gas to both gate valves.
- One gate valve (CAV_IN) is fully open.
- The other side (CAV_OUT) is still close and will be open after pipe leak check.

Beam vacuum pumping cart connection

- A leak in the pumping cart has been found .
- This issue might happened from the beginning.
- Should not affect/block the CM test.
- Further checking and repair need to be done after CM02 test



Leak detector background 2E-7 mbar.l/s
Leak signal 2.4E-6 mbar.l/s

FPC warm conditioning prepare

- Will perform two pumping carts on both sides.
- RF stations are powered on (filament on).
- Pre-amplifier for Electrosys section 2 is not functioning.
  - ✓ Similar issue has occurred 3 times.
  - ✓ Solution is prepare.
  - ✓ Need further investigation after CM02 test.
- RF calibration and system checking will be done tomorrow

Preliminary time plan

Test item	time	comment
CM04 Warm up (RGA connect) CM02 arrival	15th -21th Feb.	
CM04 Leak test /alignment at warm CM02 unpack, incoming test	22th Feb.	
CM04 Disconnect, packing	23th -26th Feb.	
CM02 installation CM04 Disconnect, packing, shipment	1st- 12th Mar.	
CM02 FPC warm conditioning	15th -17th Mar.	CM02
CM alignment measurement	18th Mar.	CM02
CM cooldown to 4 K	19th Mar.	CM02
CM cooldown to 2 K	22th Mar.	CM02
FPC cold conditioning	23rd Mar.	Simultaneously
CTS test	24th -25th Mar.	CTS measurement
Cavity conditioning (on resonance) Heat load/Q measurement	29th -31st Mar.	Open loop
Warm up	1st -4th Apr.	
alignment at warm	5th Apr.	
Disconnect, packing, shipment	6th -14th Apr.	