



# ESS spoke CM04/CM02 (2<sup>nd</sup> run) weekly meeting 20210225 Han Li







CM04 warm up
CM04 leak test
CM04 alignment test
CM02 arrival
Test plan





- CM04's warm-up took around 3 days
- Breaking insulation vacuum (by injecting N<sub>2</sub> gas) is effective to shorten the warming procedure







#### ≻1st run:

 ✓ With RGA connected, 1 hour RGA running for measurement stabilization, then angle-valve on ( all pipes and accessory have been leak test when installed)

✓ Pump down the helium circuit (< 10 mbar) @ around 220 K of the cavities

✓ Refill the helium circuit with helium gas to 1 atm





### Separate cavity helium vessel and FPC supercritical helium gas line







- ➤ 2<sup>nd</sup> run:
- ✓ Isolate the 4 K tank and the 2 K tank by closing relate valves (CV01, CV02, CV07, CV04 for the cryomodule)
- ✓ With RGA connected and angle-valve on
- ✓ Start purging procedure , pump down the 4 K tank(< 10 mbar) @ RT
- Monitor pressure in interested region:
   Cavity helium vessel pressure (2 K tank , PT03)
   FPC supercritical helium line pressure (4 K tank , PT01)
- $\checkmark$  Refill the helium circuit with helium gas to 1 atm
- Purpose: localize the leaking position

Observation:

the pressure is only pumping down in the 4 K tank (including the supercritical helium line)

the 2 K tank pressure(including cavity vessels) are constant (PT03 around 1025 mbar)

supercritical helium line pressure 🦊

Helium peak 🦊





### Leak test with purging system at warm





Baseline 1 atm

Purging < 10 mbar

Venting with helium gas 1 atm 7





**RGA** analysis







#### Leak rate at warm 8.8 E-7 mbar.l/s





after angle-valve open

Helium pressure from 31mabr to 1bar



Discussion



- What cause the leak?
- ✓ Welding procedure?
- ✓ CM assembly (FPC, doorknob)?
- ✓ Transportation? → No shock has been logged during the shipment
- ✓ Cooldown procedure at FREIA?





### FPC cooldown







## CM alignment checking



date	20210126					
E	Side B	Y (mm)	Z (mm)			
t ro re	View port in B	/	/			
easurement a temperatu	Cross B1	0.29 (red)	0.04 (black)			
	Cross B2	0.61 (red)	>-1.2 (black) (-1.35?)			
	Cross B3	0.89 (red)	1.05 (red)			
	Cross B4	0.74(red)	0.1(red)			
ž	View port out B	/	/			

ate	20210128					
plo	Side B	Y (mm)	Z (mm)			
it co	View port in B	/	/			
nta	Cross B1	0.6 (black)	0 (without offset)			
me	Cross B2	0.32 (black)	> -1.2 (black) (-1.35?)			
ure	Cross B3	0.14 (black)	1.15 (red)			
eas	Cross B4	0.4 (black)	0.39 (red)			
Σ	View port out B	/	/			

date		20210222	
E L	Side B	Y (mm)	Z (mm)
t ro ifte	View port in B	/	/
easurement ai emperature a cold	Cross B1	0.1 (red)	0.04 (red)
	Cross B2	0.43 (red)	>-1.2 (black) (-1.35?)
	Cross B3	0.74 (red)	0.98 (red)
	Cross B4	0.6 (red)	0.14 (red)
Š -	View port out B	/	/



#### Conclusion:

- Mainly displacement at Y axis
- ~ 1 mm from 300K to 2 K
- ~ 0.15 mm before and after cooldown what is the acceptance criteria?



### CM02 arrival



- CM02 arrival on 19<sup>th</sup> Feb.
- > No big vibration has been logged during transportation
- Incoming test:
  - Electrical continuity check
  - Cavity parameter check







- Instrumentation cabling has been modified
- Similar result as previous test -> TT12 is malfunctional

Socket assembly         Verfiel by: T. Gerardin JC. Roux         Socket assembly         Verfiel by: A Myszaki           Socket name         PID name (b) (before shipment)         Electrical value (c) (before shipment)         C/NC         Socket name         PID name (c) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	Cables verification CM02 at IJCLab v2			Cables verification CM02		at UU	v2					
Socket name         PID name (D) (bfore shipment)         C / NC (D) (bfore shipment)         Socket name         PID name (D) (c) (fet transport) (fet transport)         C / NC (c) (fet transport)           T104         60.51         C	Socket assembly Verified by : T. Gerardin / JC. Roux				Socket assembly		mbly	Verified by : A. Miyazaki		i		
Triad         60.51         C         Triad         50.51         C           Triad         60.51         C         Triad         59.8         C           Triad         60.51         C         Triad         59.95         C           Triad         91.99         C         Triad         51.25         C           Triad         91.99         C         Triad         51.25         C           Triad         106.5         C         Triad         51.25         C           Triad         106.5         C         Triad         106.55         C           Triad         106.56         C         Triad         106.55         C           Triad         106.56         C         Triad         107.7         C           Triad         106.56         C         Triad         107.7         C           Triad         107.54         C         Triad         107.7         C           Triad         107.55         C         Triad         107.7         C           LC02         85.44         C         C         Triad         107.7         C           LC03         8100         2.38 / 2.44	Socket name	PID name	Electrical value (Ω) (before shipment)	C/NC			Socket na	ame	PID name	Electrical value (Ω) (after transport)	<b>C</b> //	NC
Internal bit with the second		TT04	60,51	C					TT04	59,8	C	;
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		TT05	60,51	С					TT05	59,95	C	;
LC01         T107         61,25         C         T108         91,99         C           T108         91,99         C         T108         91,25         C           T110         106,5         C         T109         93,5         C           T110         106,5         C         T10         106,5         C           T112         1,33         NC         T11         106,55         C           T120         106,48         C         T120         106,55         C           T121         105,56         C         T120         107,54         C           T120         107,54         C         T120         107,76         C           T120         107,55         C         T120         107,76         C           T120         107,54         C         T120         107         C           T120         107,55         C         T120         107         C           L002         85,44         C         C         L002         EH01         84,1         C           L002         85,23         C         C         EH01         84,1         C         EH01         84,1         C<		TT06	60,77	C			]		TT06	60,4	C	;
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		TT07	61,25	С					TT07	61,9	C	;
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		TT08	91,99	С					TT08	91,25	C	;
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1.001	TT09	93,87	C			1.001	I	TT09	93,5	C	;
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	LCOT	TT10	106,5	С			2001		TT10	105,5	C	;
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		TT11	106,52	C					TT11	105,75	C	;
$ \begin{array}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline $T120 & 106,68 & C & $$T121 & 106,55 & $C$ \\ \hline $T121 & 106,56 & $C$ & $$T121 & 107,7 & $C$ \\ \hline $T122 & $8,71 & $C$ & $$T122 & $8,78 & $C$ \\ \hline $T120 & 107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$T1220 & $107 & $C$ \\ \hline $T1220 & $107,55 & $C$ & $$$T1220 & $107 & $C$ \\ \hline $T1220 & $107 & $C$ & $$$$$ \\ \hline $EH01 & $82,32 & $C$ & $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$		TT12	1,93	NC					TT12	2,95	N	C
$ \begin{array}{ c c c c c c c c } \hline T121 & 106,56 & C & T121 & 107,7 & C \\ \hline T122 & 88,71 & C & T122 & 87,8 & C \\ \hline T122 & 87,8 & C & T122 & 87,8 & C \\ \hline T122 & 107,55 & C & PT Coupler & T120 & 107 & C \\ \hline T122 & 107,55 & C & PT Coupler & T120 & 107 & C \\ \hline T122 & 107,55 & C & PT Coupler & T120 & 107 & C \\ \hline T120 & 107,55 & C & PT Coupler & T120 & 107 & C \\ \hline T120 & 107,55 & C & PT Coupler & H01 & 84,1 & C \\ \hline EH01 & 84,24 & C & & \\ EH02 & 85,44 & C & & \\ EH02 & 85,44 & C & & \\ EH10 & 82,32 & C & EH01 & 84,1 & C \\ \hline EH20 & 82,33 & C & & \\ EH20 & 82,33 & C & & \\ \hline EH20 & 82,33 & C & & \\ \hline EH20 & 82,33 & C & & \\ \hline EH20 & 82,33 & C & & \\ \hline EH20 & 82,33 & C & & \\ \hline EH20 & 82,33 & C & & \\ \hline EH20 & 2,38/2,41 & C & & \\ \hline EH20 & 2,38/2,41 & C & & \\ \hline EH20 & 2,45/2,55 & C & & \\ \hline LC03 & & \\ \hline LC03 & & \\ \hline LC03 & & \\ \hline LC04 & & \\ \hline ID1 & 369,1 & C & & \\ \hline LC07 & & \\ \hline LC04 & & \\ \hline PD name & & \\ \hline P21 & 12,89 & C & & \\ \hline P21 & 12,89 & C & & \\ \hline LC04 & & \\ \hline P21 & 14,36 & C & \\ \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline P221 & 14,36 & C & \\ \hline \hline \hline P221 & 14,36 & C & \\ \hline \hline \hline P221 & 14,36 & C & \\ \hline \hline \hline \hline \hline P221 & 14,36 & C & \\ \hline \hline \hline \hline \hline \hline \hline P221 & 14,36 & C & \\ \hline \hline$		TT20	106,48	C		Т		TT20	105,55	C	;	
$ \begin{array}{ c c c c c c } \hline \mbox{TT22} & 88,71 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,54 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{TT20} & 107,55 & \ \mbox{C} & \\ \hline \mbox{EH01} & 84,1 & \ \mbox{C} & \\ \hline \mbox{EH02} & 82,32 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,32 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,33 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH10} & 82,3 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{C} & \\ \hline \mbox{EH20} & 82,4 & \ \mbox{EH20} & 1,9 & \ \mbox$		TT21	106,56	C			-		TT21	107,7	C	;
$\begin{array}{ c c c c c c } \hline PT Coupler & \hline T120 & 107,54 & C & \\ \hline T1220 & 107,55 & C & \\ \hline T1220 & 107,55 & C & \\ \hline T1220 & 107,55 & C & \\ \hline T1220 & 107 & C & \\ \hline FH02 & 85,44 & C & \\ \hline EH02 & 85,44 & C & \\ \hline EH02 & 82,32 & C & \\ \hline EH0 & 82,32 & C & \\ \hline EH20 & 82,33 & C & \\ \hline EH20 & 2,38/2,41 & C & \\ \hline LS10 & 2,45/2,55 & C & \\ \hline LS20 & 2,21 & C & \\ \hline LS20 & 2,21 & C & \\ \hline LS20 & 2,21 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LT02 & 368,91 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT02 & 368,91 & C & \\ \hline LC07 & \hline LT01 & 369,1 & C & \\ \hline LC07 & \hline LT02 & 368,91 & C & \\ \hline PID name & \hline (\mu F) & C/NC & \\ \hline P210 & 12,72 & C & \\ \hline P210 & 12,63 & C & \\ \hline P221 & 11,88 & C & \\ \hline \end{array}$		TT22	88,71	С					TT22	87,8	C	;
F1 600µm         TT220         107,55         C         TT20         107         C           LC02         EH01         84,24         C         EH02         85,44         C         EH02         85,22         C         EH02         85,23         C         EH02         85,23         C         EH02         81,43         C         EH02         82,33         C         EH02         82,23         C         EH10         82,32         C         EH10         82,33         C         EH20         82         C         EH10         82,33         C         EH20         82         C         EH20         EH20         82         C         EH20         EH20         EH20 <td< td=""><td>PT Coupler</td><td>TT120</td><td>107,54</td><td>C</td><td></td><td></td><td colspan="2">PT Coupler</td><td>TT120</td><td>107</td><td>C</td><td>;</td></td<>	PT Coupler	TT120	107,54	C			PT Coupler		TT120	107	C	;
$ \begin{array}{ c c c c c c } \hline \mbox{EH01} & \mbox{84,24} & \mbox{C} & \mbox{LC02} & \mbox{EH02} & \mbox{85,44} & \mbox{C} & \mbox{C} & \mbox{EH02} & \mbox{85,24} & \mbox{C} & \mbox{EH00} & \mbox{82,32} & \mbox{C} & \mbox{EH00} & \mbox{82,33} & \mbox{C} & \mbox{EH10} & \mbox{82,33} & \mbox{C} & \mbox{EH10} & \mbox{82,33} & \mbox{C} & \mbox{EH20} & \mbox{82,3} & \mbox{C} & \mbox{EH20} & \mbox{82,2} & \mbox{C} & \mbox{EH20} & \mbox{82,2} & \mbox{C} & \mbox{EH20} & \mbox{82,2} & \mbox{C} & \mbox{E10} & \mb$	PT Couplet	TT220	107,55	C			Pi Coupier		TT220	107	C	;
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		EH01	84,24	С			LC02		EH01	84,1	C	;
$ \begin{array}{ c c c c c c } \hline EH10 & 82,32 & C & EH10 & 82,3 & C \\ \hline EH20 & 82,33 & C & EH10 & 82,3 & C \\ \hline EH20 & 82,33 & C & EH20 & 82 & C \\ \hline EH20 & 82 & C & \\ \hline EH20 & 82,3 & C & \\ \hline SM20 & 2,2/2,3 & C & \\ \hline SM20 & $	1.002	EH02	85,44	C					EH02	85.2	C	;
EH20         82,33         C         EH20         82         C           LC03         SM10         2,38/2,41         C         SM10         2,2/2,3         C           LS10         2,07         C         LS10         1,9         C           SM20         2,45/2,55         C         LS10         1,9         C           LS20         2,21         C         SM20         2,2/2,3         C           LC07         LT01         369,1         C         LC07         LS20         1,9         C           LC07         LT02         368,91         C         LC07         LT01         367,6         C           Socket name         PID name         Electrical value (µF)         C/NC         Socket name         PID name         Electrical value (µF)         C/NC           P210         12,72         C         Socket name         PID name         Electrical value (µF)         C/NC           P211         12,96         C         P         P         14,21         C           P220         12,63         C         P         P         14,13         C           P221         11,88         C         P         P         14,3	LGUZ	EH10	82,32	С					EH10	82,3	C	;
$ \begin{array}{c c c c c c c c c c } & SM10 & 2,38/2,41 & C & & \\ \hline LS10 & 2,07 & C & & \\ \hline SM20 & 2,45/2,55 & C & & \\ \hline LS20 & 2,21 & C & & \\ \hline LS20 & 2,21 & C & & \\ \hline LC07 & \hline LT01 & 369,1 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,1 & C & \\ \hline LT02 & 14,13 & C & \\ \hline LT02 & 14,13 & C &$		EH20	82,33	С					EH20	82	C	;
$ \begin{array}{c c c c c c c c c c } LC03 & LS10 & 2,07 & C & & & & & & & & & & & & & & & & & $		SM10	2,38 / 2,41	C					SM10	2,2 / 2,3	C	;
$ \begin{array}{ c c c c c c c } \hline SM20 & 2,45/2,55 & C & & & & & & & & & & & & & & & & &$	1.003	LS10	2,07	C			1 003		LS10	1,9	C	;
$ \begin{array}{ c c c c c c c c c } \hline LS20 & 2,21 & C & & LS20 & 1,9 & C \\ \hline LS20 & 1,9 & C & \\ \hline LC07 & LT01 & 369,1 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & & \\ \hline LT02 & 368,91 & C & \\ \hline LT02 & 368,1 & C & \\ \hline PD name & \frac{Electrical value}{(\mu F)} & C/NC & \\ \hline PD name & \frac{Electrical value}{(\mu F)} & C/NC & \\ \hline PD name & \frac{PlD name}{(\mu F)} & \frac{Electrical value}{(\mu F)} & C/NC & \\ \hline PD name & \frac{PlD name}{(\mu F)} & \frac{PlD name}{(\mu F)} & \frac{PlD name}{(\mu F)} & C/NC & \\ \hline PD name & \frac{PlD name}{(\mu F)} & PlD$	LC05	SM20	2,45 / 2,55	С			LC03	,	SM20	2,2 / 2,3	C	;
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		LS20	2,21	C					LS20	1,9	C	;
LC01         LT02         368,91         C         LC01         LT02         368,1         C           Socket name         PID name         Electrical value (µF)         C/NC         Socket name         PID name         Electrical value (µF)         C/NC           P210         12,72         C         P210         14,22         C           P211         12,96         C         P210         14,21         C           P220         12,63         C         P210         14,13         C           P221         11,88         C         P221         14,36         C	1 C07	LT01	369,1	C			LC07		LT01	367,6	C	;
Socket name         PID name         Electrical value (µF)         C/NC         Socket name         PID name         Electrical value (µF)         C/NC           PZ10         12,72         C            7210         14,20         C           PZ11         12,96         C           PZ11         14,21         C           PZ20         12,63         C           PZ11         14,31         C           PZ21         11,88         C          PZ21         14,36         C	LCOT	LT02	368,91	С					LT02	368,1	C	;
LC04           PZ10         12,72         C           PZ11         12,96         C           PZ20         12,63         C           PZ21         11,88         C	Socket name	PID name	Electrical value (µF)	C/NC			Socket na	ame	PID name	Electrical value (µF)	<b>C</b> //	NC
LC04 PZ0 12,63 C LC04 PZ21 11,88 C LC04 PZ11 14,21 C PZ10 14,13 C PZ11 14,21 C PZ10 14,13 C PZ10 14,13 C PZ11 14,36		PZ10	12,72	С					PZ10	14,2	C	;
PZ20         12,63         C         PZ20         14,13         C           PZ21         11,88         C         PZ21         14,36         C	1.004	PZ11	12,96	С			1.000		PZ11	14,21	C	;
PZ21 11,88 C PZ21 14,36 C	LC04	PZ20	12,63	С			LC04		PZ20	14,13	C	;
		PZ21	11,88	С					PZ21	14,36	C	;



### CM02 Cavity parameters @ RT







Item/Cavity location	Cavity IN	Cavity OUT	
Cavity	DSPK2	DSPK7	
Frequency (MHz) Osary	351.588	351.546	
Frequency (MHz) UU	351.590	351.547	
Qext Orsay	1.9E5	2.4E5	
Qext UU	2E5	2.5E5	





Test item	time	comment
CM04 Warm up (RGA connect) CM02 arrival	15 <sup>th</sup> -21 <sup>th</sup> Feb.	
CM04 Leak test /alignment at warm CM02 unpack, incoming test	22 <sup>th</sup> Feb.	
CM04 Disconnect, packing	23 <sup>th</sup> -26 <sup>th</sup> Feb.	
CM02 installation CM04 shipment	1 <sup>st</sup> - 12 <sup>th</sup> Mar.	
CM02 FPC warm conditioning	15 <sup>th</sup> -17 <sup>th</sup> Mar.	CM02
CM alignment measurement	18 <sup>th</sup> Mar.	CM02
CM cooldown to 4 K	19 <sup>th</sup> Mar.	CM02
CM cooldown to 2 K	22 <sup>th</sup> Mar.	CM02
FPC cold conditioning	23 <sup>rd</sup> Mar.	Simultaneously
CTS test	24 <sup>th</sup> -25 <sup>th</sup> Mar.	CTS measurement
Cavity conditioning (on resonance) Heat load/Q measurement	29 <sup>th -</sup> 30 <sup>th</sup> Mar.	Open loop

Note: Plan might be adjusted depend on FREIA's situation