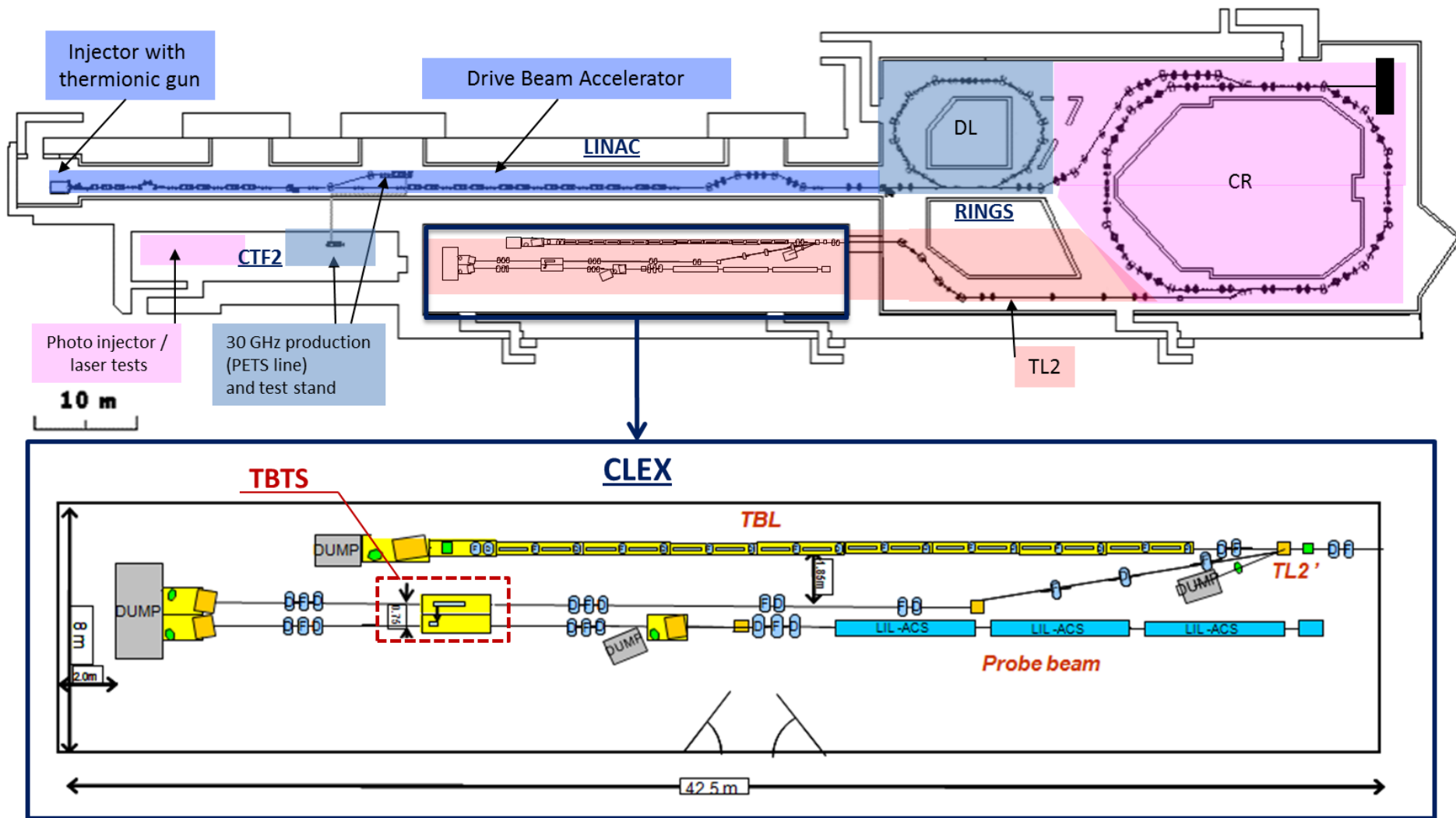


The background of the slide is a detailed technical drawing of a complex mechanical assembly, likely a particle accelerator component. It shows various pipes, flanges, valves, and structural supports in a light gray line-art style.

# **TBTS phase 2.3**

## **mechanical design, procurement, assembly and installation**

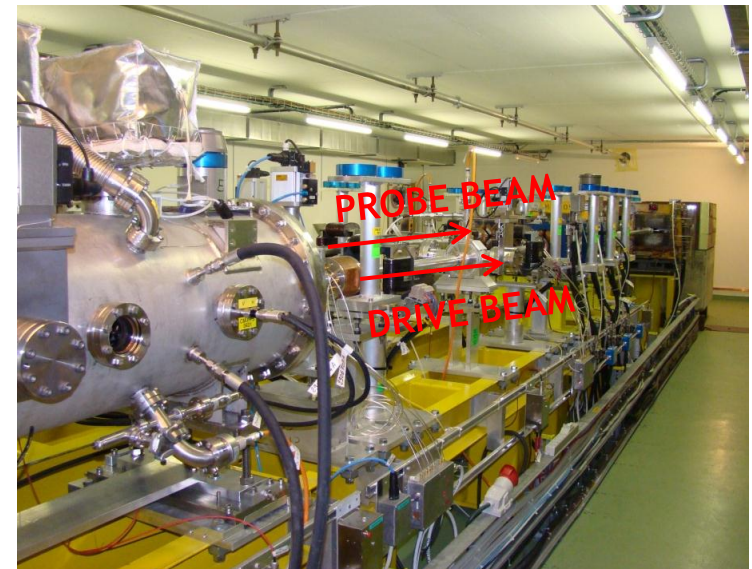
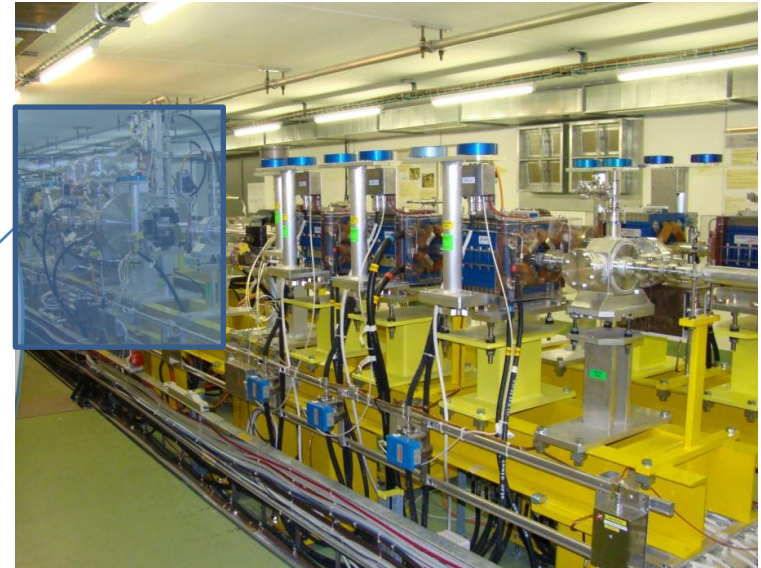
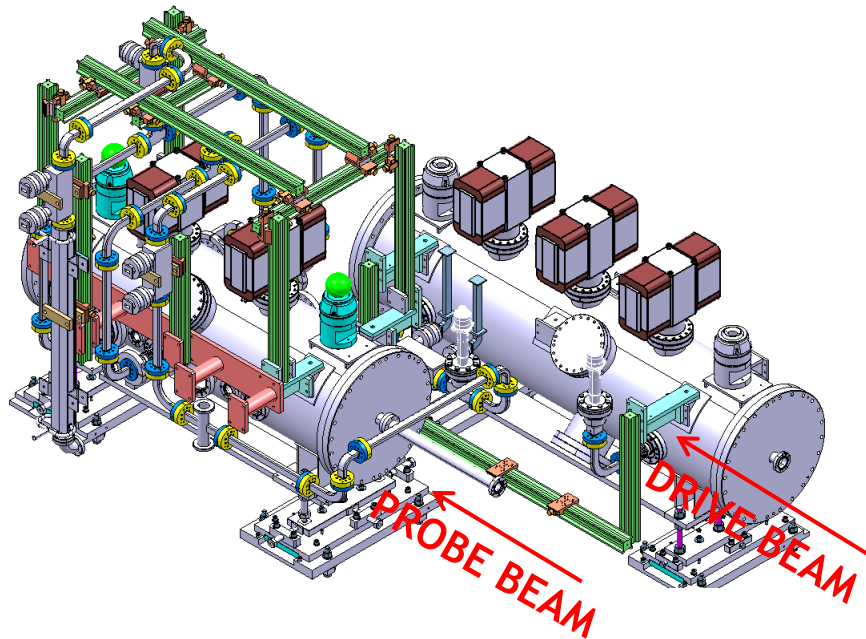
A. Solodko, A. Olyunin, F. Dunkel, S. Lebet, P. De Souza, P. Guyard



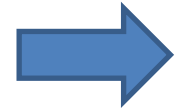
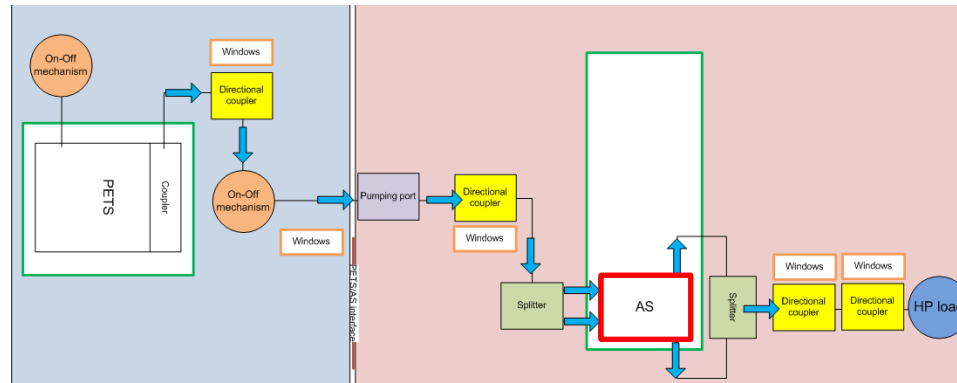
The previous configuration of TBTS had been prepared for tests of one Accelerating structure TD24 and PETS with On-Off Mechanism (Phase 2.2).

Experimental area

TBTS Phase 2.2

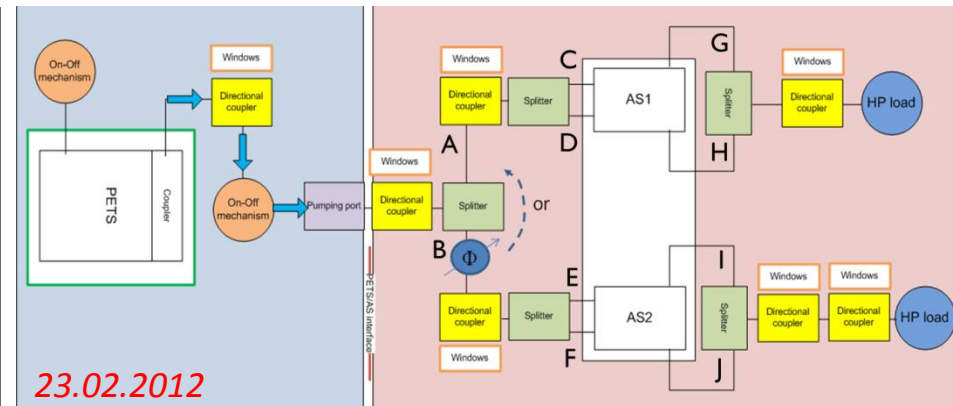
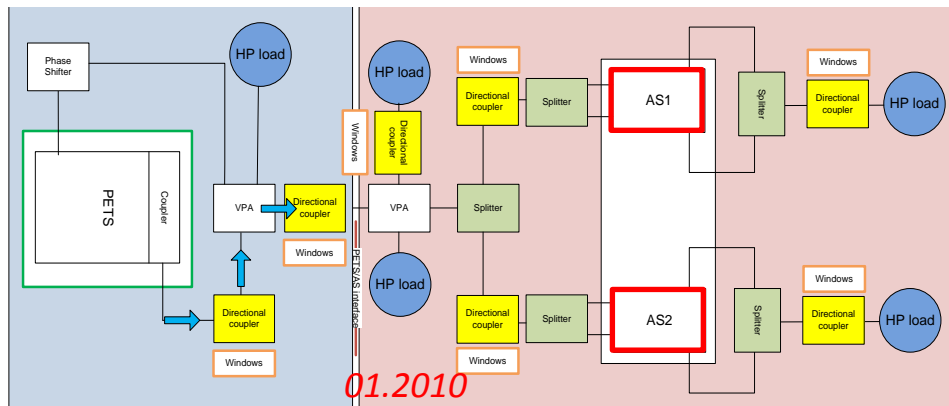


## Previous installation **TBTS phase 2.2** (1AS+PETS+On-off Mechanism)



## Obsolete layout of **phase 2.3** (**2AS**+PETS)

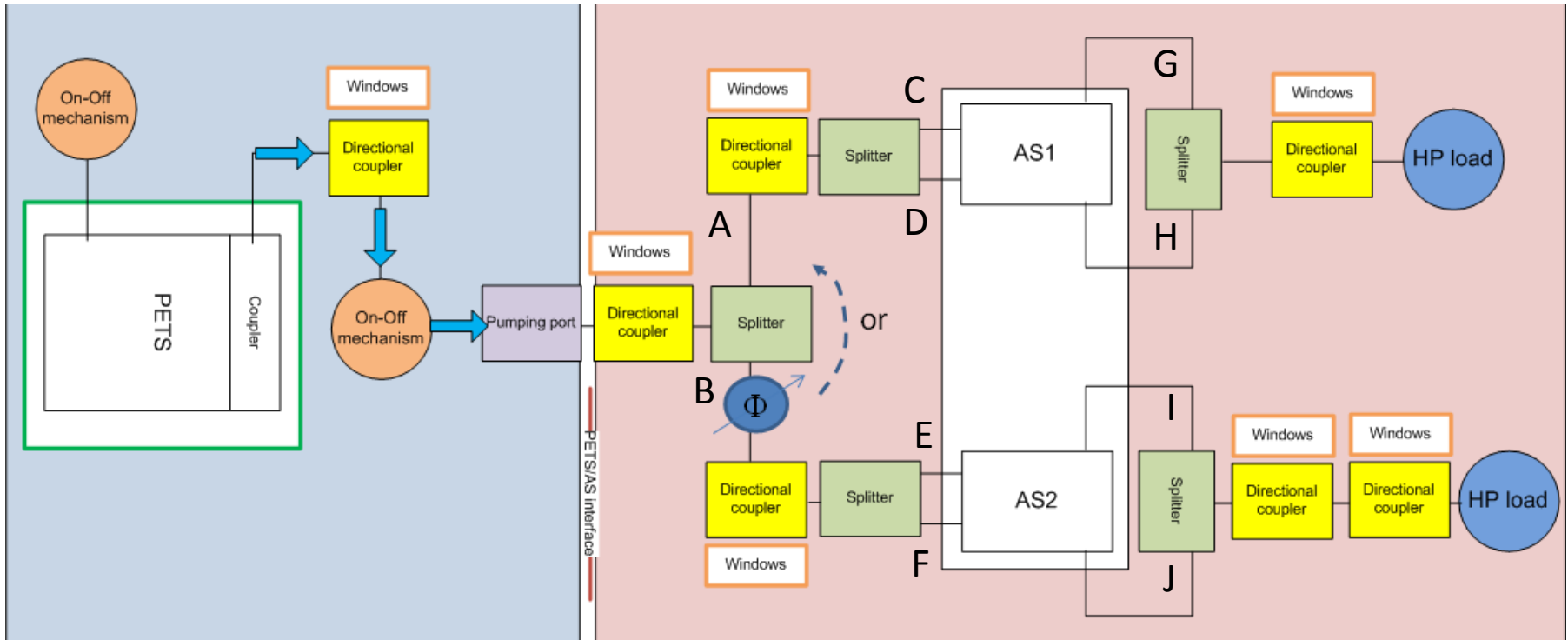
## Updated layout of **phase 2.3** (**2AS**+PETS+**On-off Mechanism**)



several iterations in between these two layouts

Guided wavelength at 11.994 GHz in WR90:  $\lambda_g = 29.85 \text{ mm}$

Based on the updated layout:

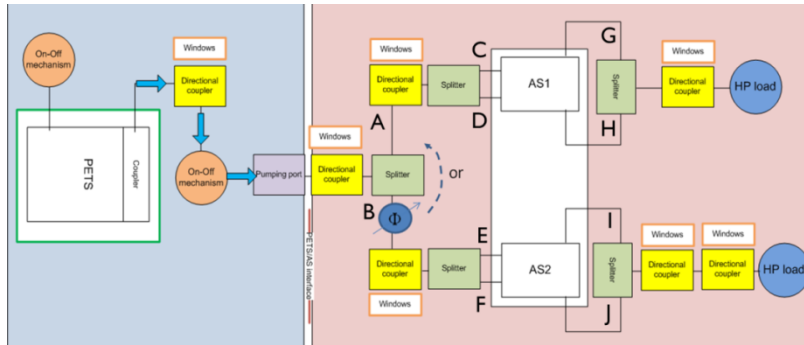


- A = B modulo  $\lambda_g$  or/and **Variable Phase Shifter**
- C = D modulo  $\lambda_g$
- E = F modulo  $\lambda_g$
- G = H modulo  $\lambda_g$
- I = J modulo  $\lambda_g$

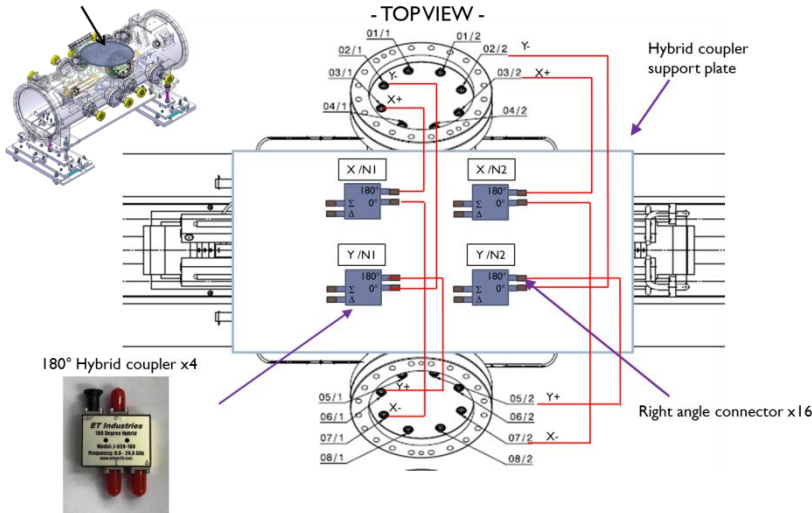
Much more convenient in operation

**F. Peauger, February 2012**

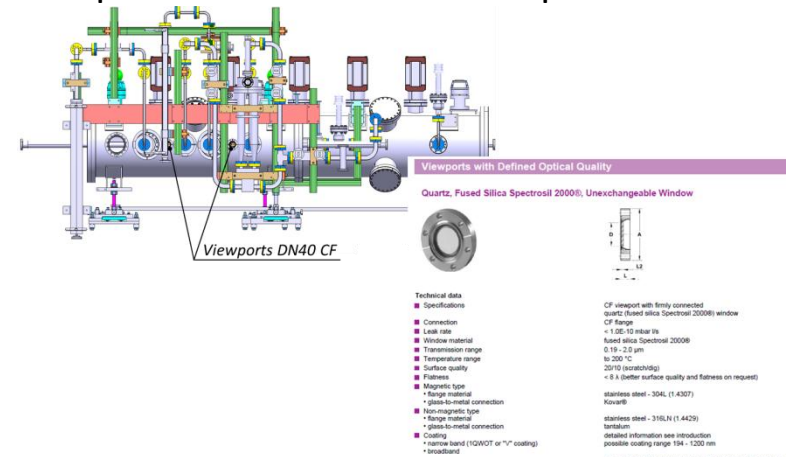
## 1. Update the layout of **phase 2.3** (**2AS+PETS+On-off Mechanism**)



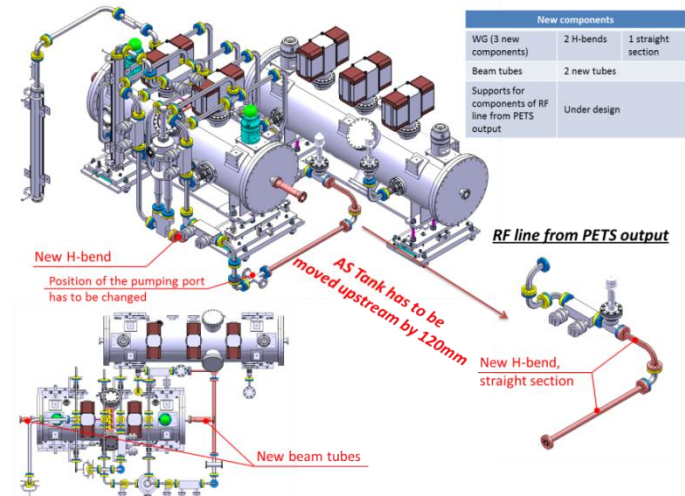
## 2. Add a mechanical support on the tank to attach four 180° hybrid splitters (to recombine opposite ports of TM modes)



## 3. Implementation of two viewports

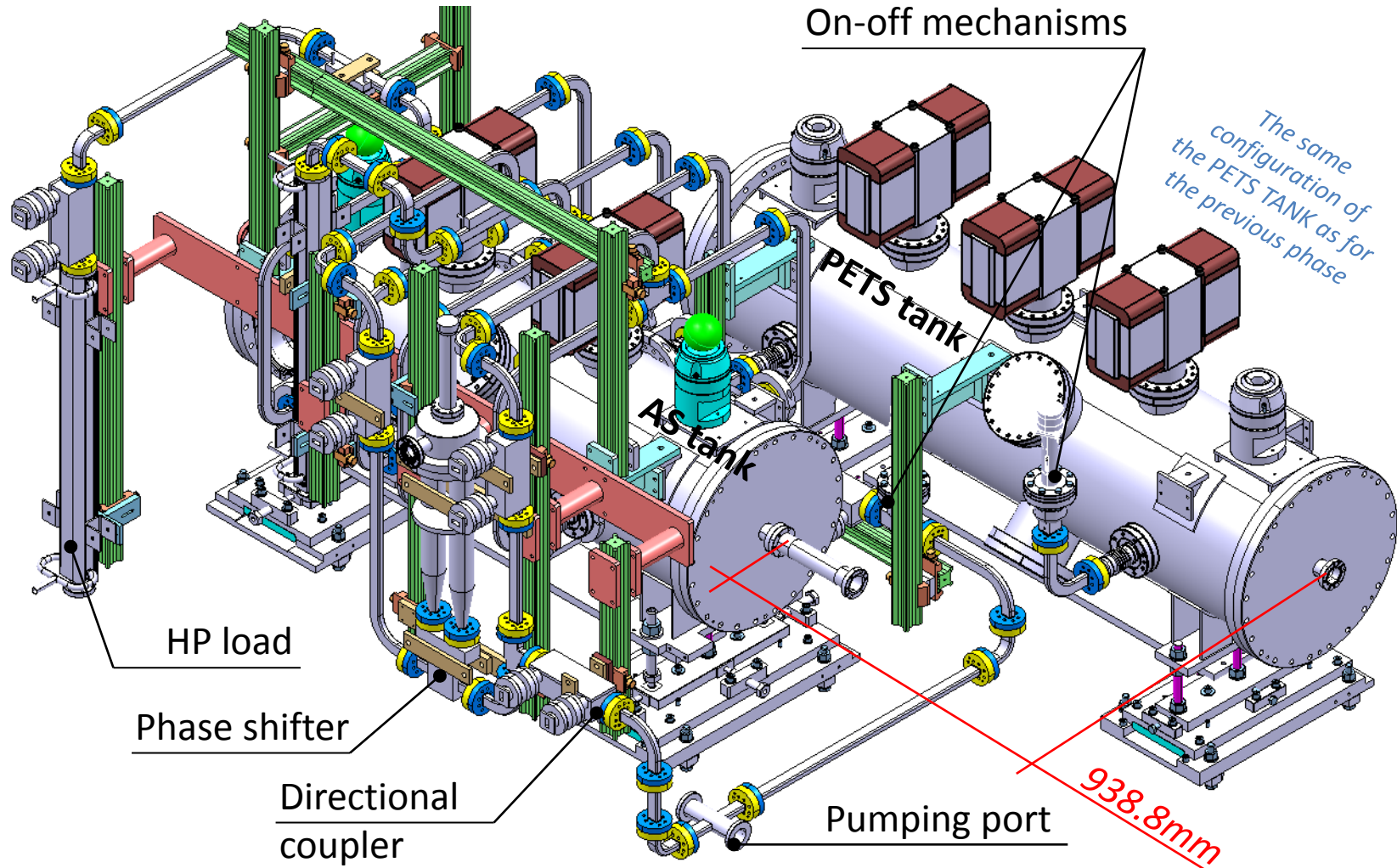


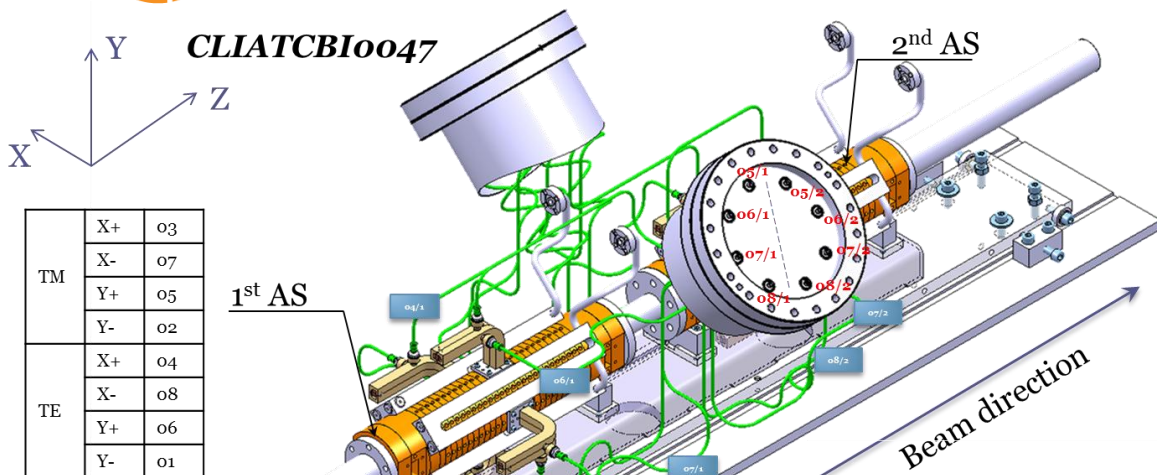
## 4. Possibility to move tank upstream only, and not downstream as originally foreseen



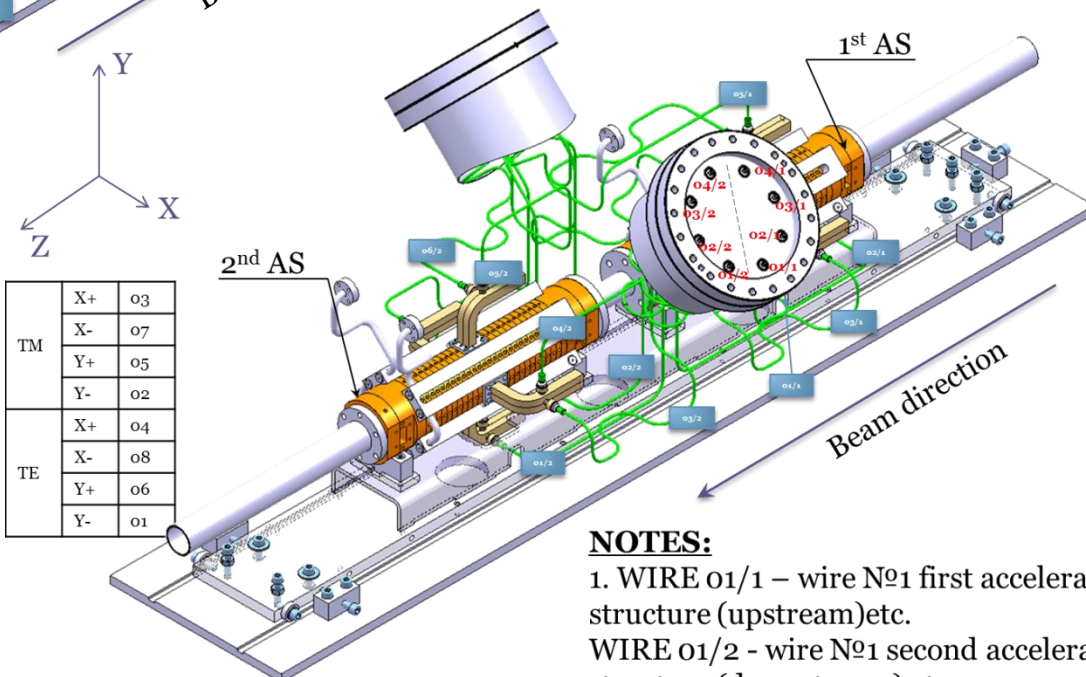
[EDMS #1063052](#) – AS drawings

[EDMS #1154563](#) – COBHAM Couplers [N61626](#), [N61718](#)





TM	X+	03
	X-	07
	Y+	05
	Y-	02
TE	X+	04
	X-	08
	Y+	06
	Y-	01



TM	X+	03
	X-	07
	Y+	05
	Y-	02
TE	X+	04
	X-	08
	Y+	06
	Y-	01

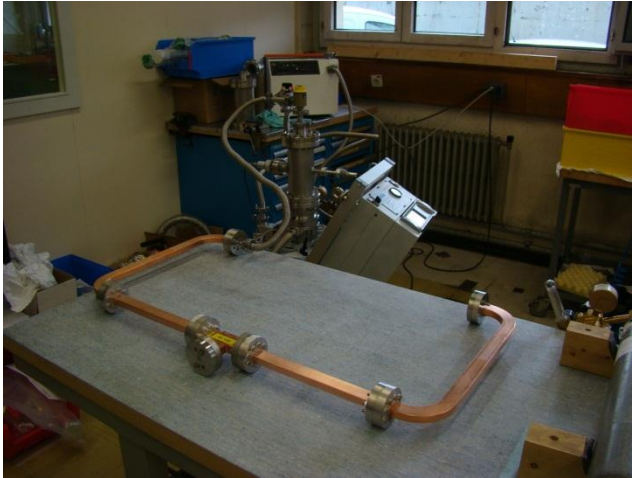
[EDMS #1054967](#)

**NOTES:**

1. WIRE 01/1 – wire N°1 first accelerating structure (upstream) etc.  
WIRE 01/2 - wire N°1 second accelerating structure (downstream) etc.



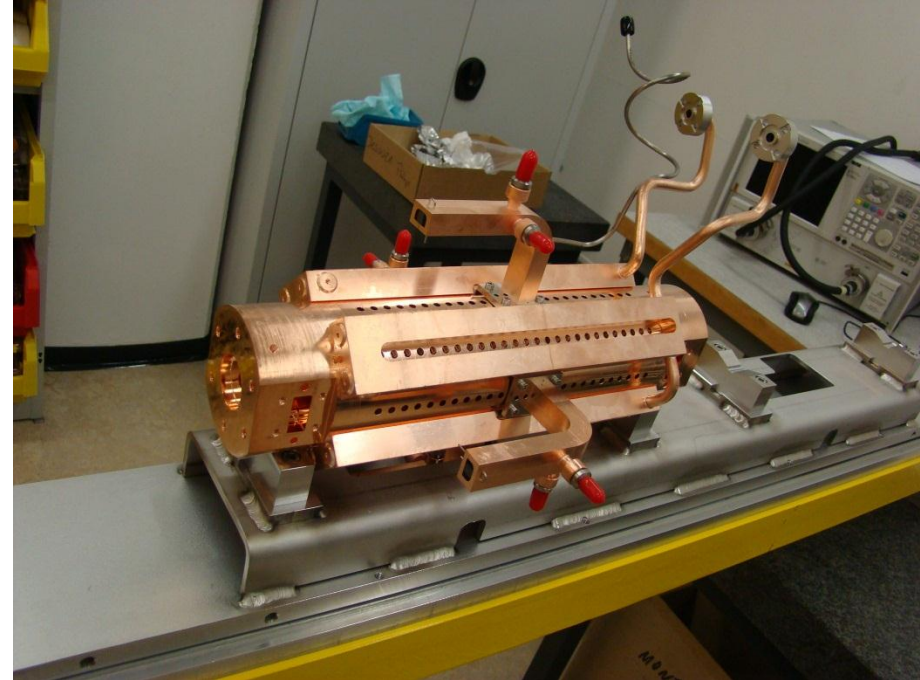
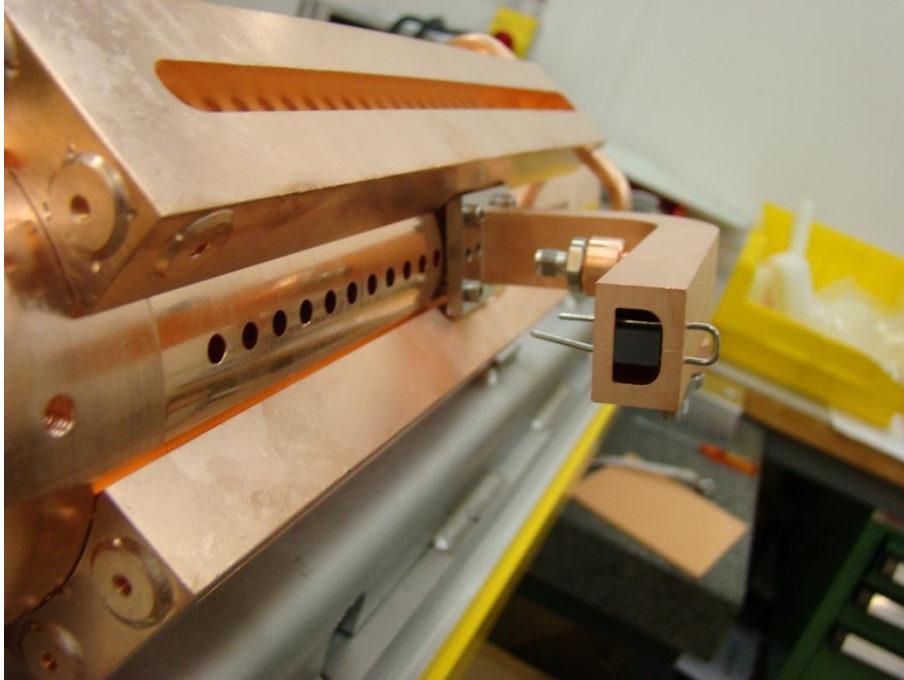
1. Assembly and leak tightness test of the RF network.



2. Calibration of RF network [EDMS #1235257](#).



3. Assembly of 2AS (TD24 WFM [CLIATCAS0027](#)) on the support.



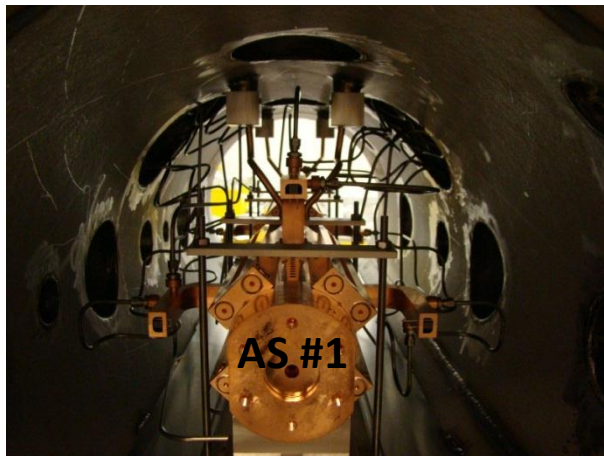
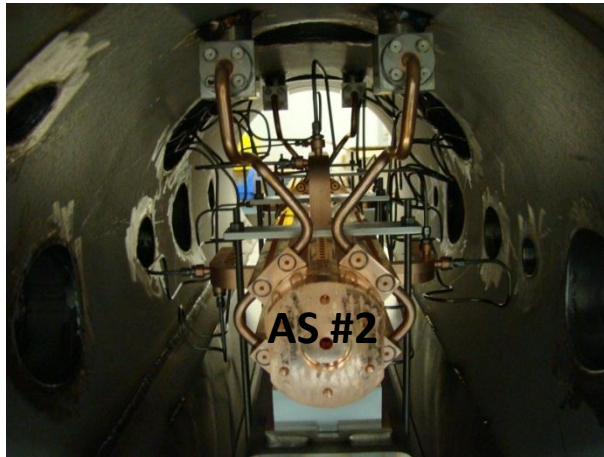
4. Leak test of the cooling system, a report is under preparation by Esa Paju (TE/VSC).

Circuit 1: at  $2.0E-09$  mbar, with no leaks.

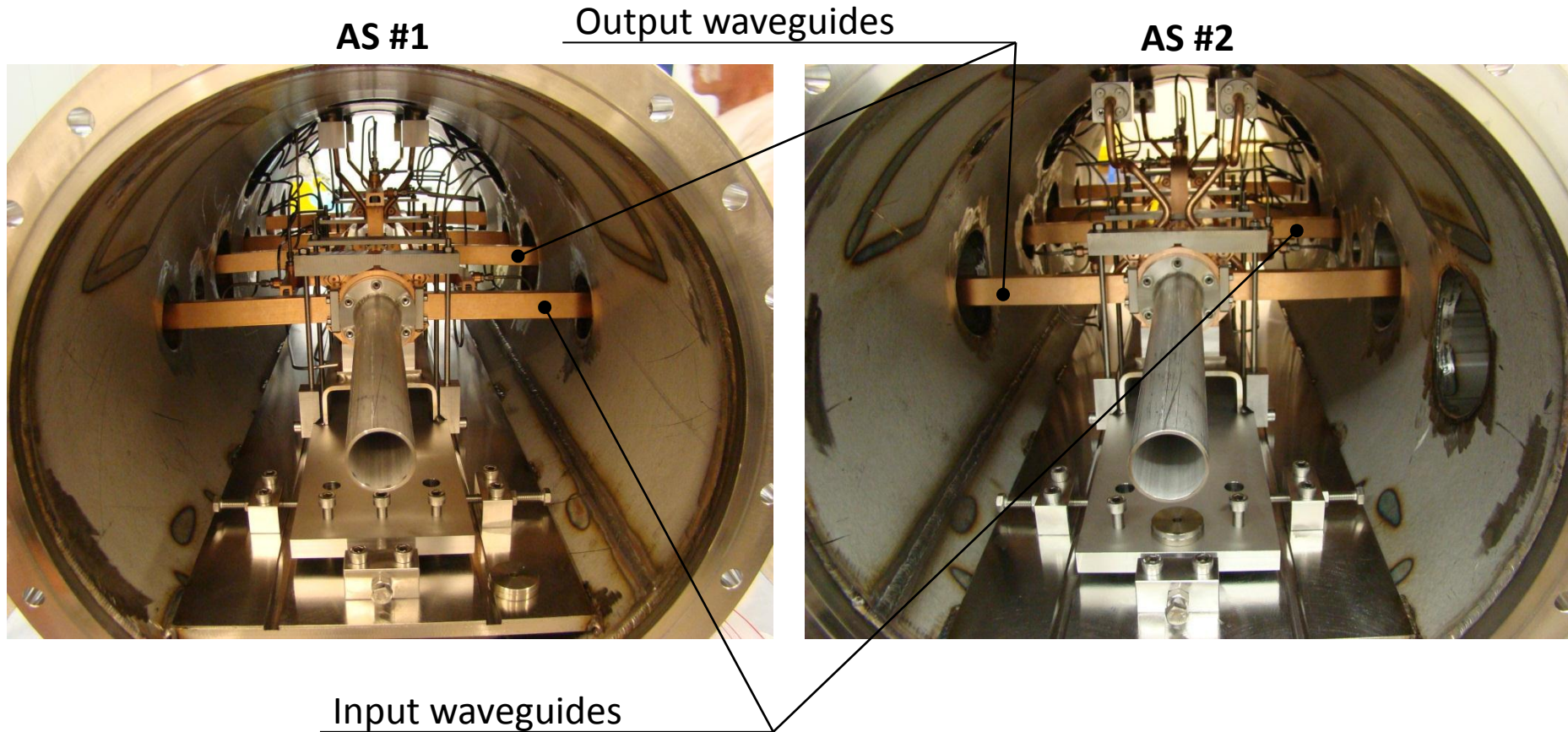
Circuit 2: at  $1.0E-10$  mbar, with no leaks.

## 5. Installation of RF cables

- Centering of cables made by EN/MME
- RF calibration of WFM waveguides and vacuum cables [EDMS#1230238](#) (F. Peauger, CEA/Saclay)



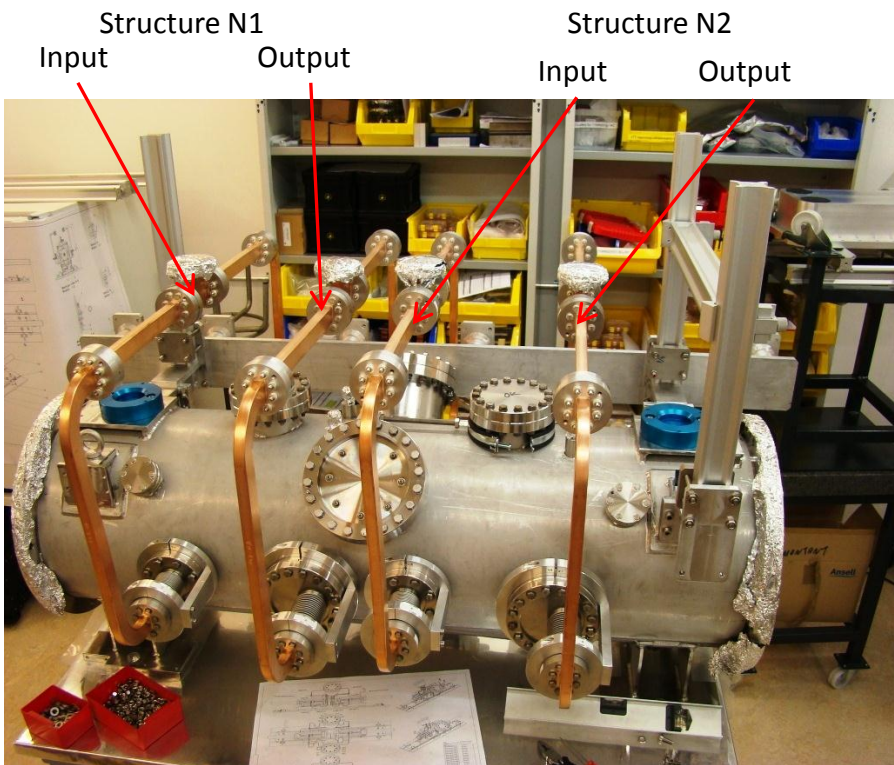
- 6. Installation of Input and Output waveguides.
- 7. Fiducialisation of the tank 19/07/2012 (*T. Dobers, BE/ABP*).



- 8. Assembly of the tank and RF network.
- 9. RF test of two AS [EDMS #1235257](#).

*After installing the structures on the tank, we have the same S parameters of the structures than after tuning. It means that the calibration of the input and output waveguides and installing the structures is OK.*

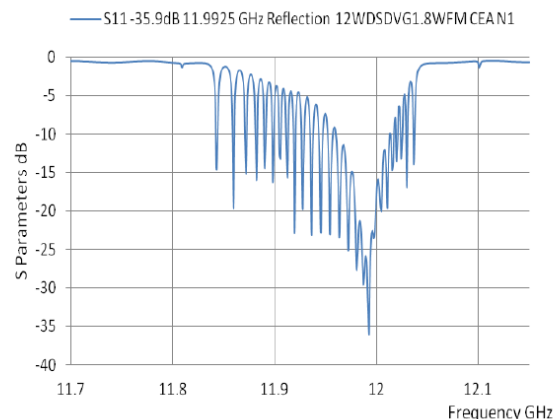
- 10. RF test of cables (F. Peauger, CEA/Saclay).



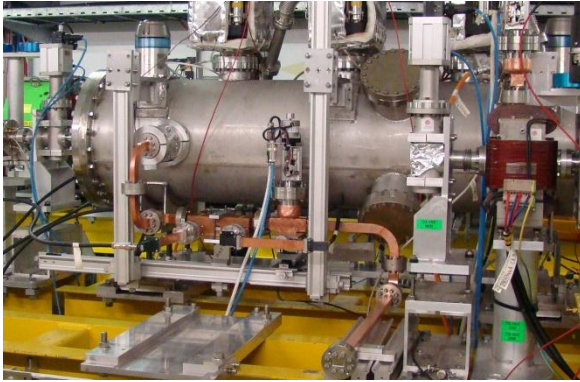
- 11. Leak test of the assembled tank.



S parameters of the structure N1 after installation on the tank

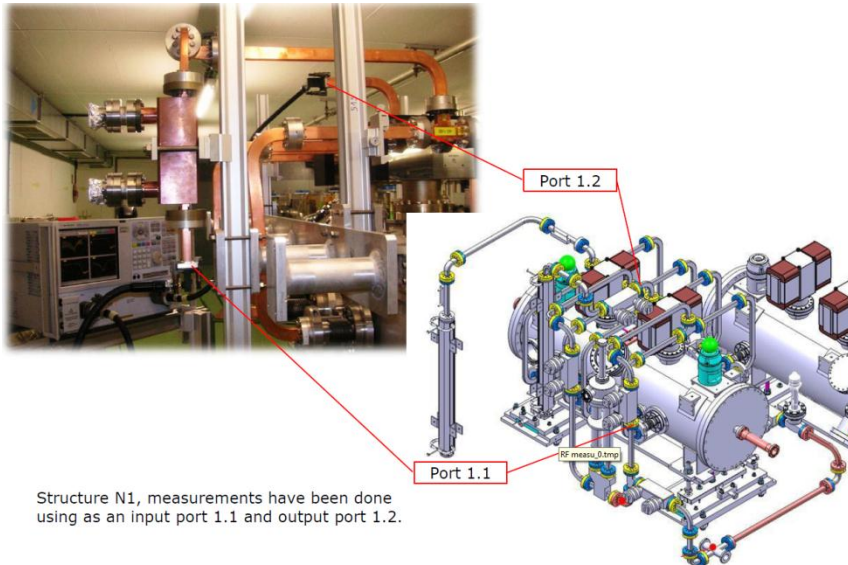


12. Modification of the RF line, connecting the PETS tank and the AS tanks.

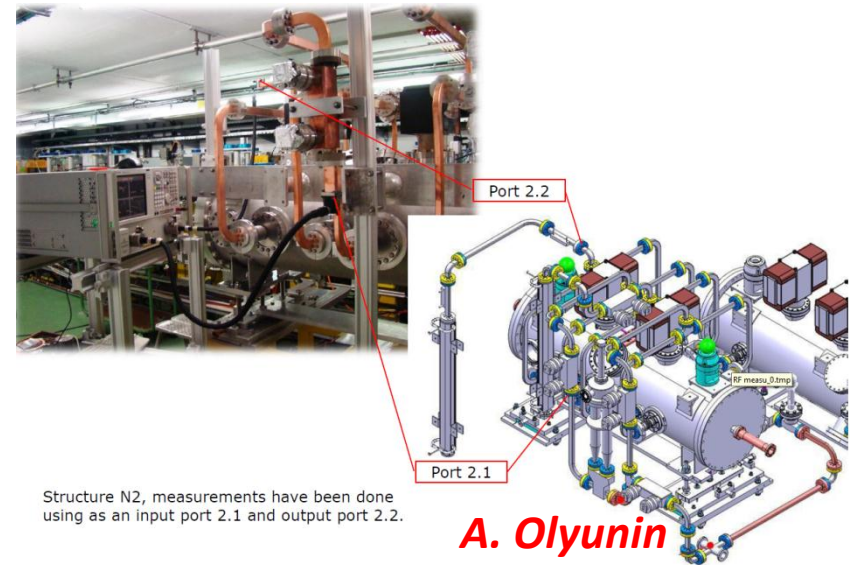


13. Transport the new AS tank in CLEX.

14. RF measurement results of 12WDSVDVG1.8WFM CEA N1&2 after installation waveguides on the tank ([EDMS #1237574](#)).



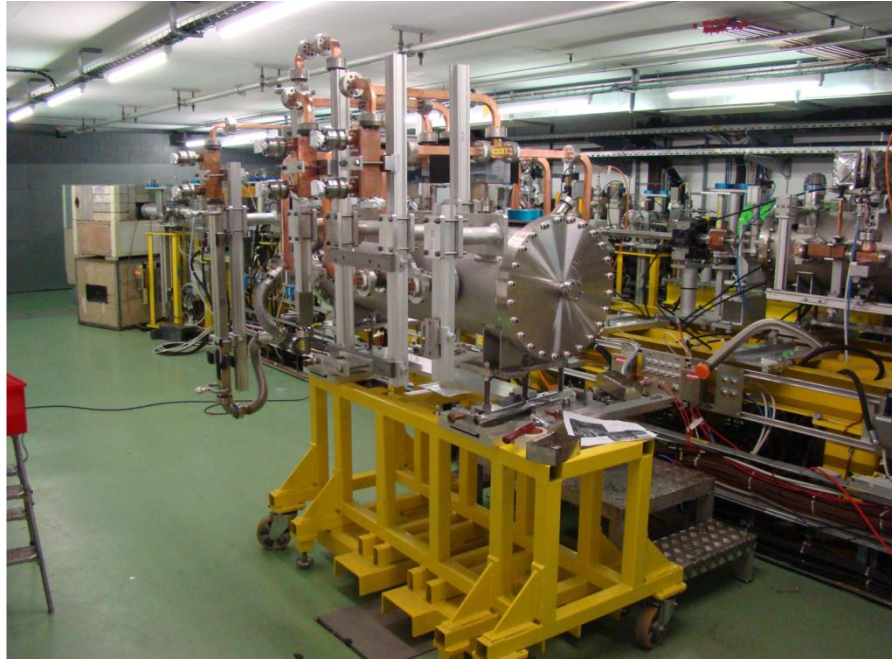
Structure N1, measurements have been done using as an input port 1.1 and output port 1.2.



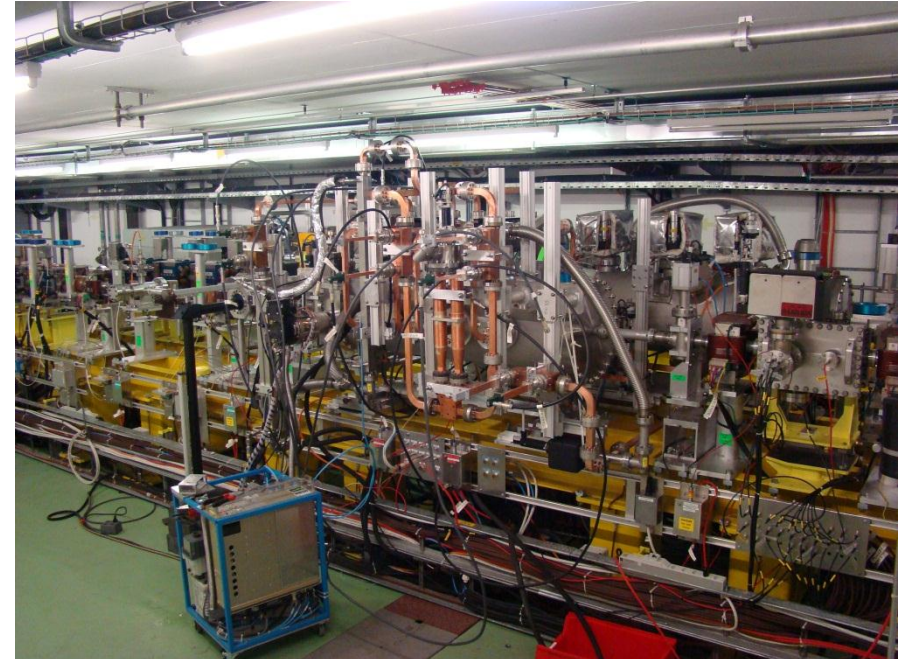
Structure N2, measurements have been done using as an input port 2.1 and output port 2.2.

**A. Olyunin**

15. Final assembly of the AS vacuum tank.



16. Installation of the new tank on the CLEX girder.



17. Leak test.

18. Pumping of the installation.

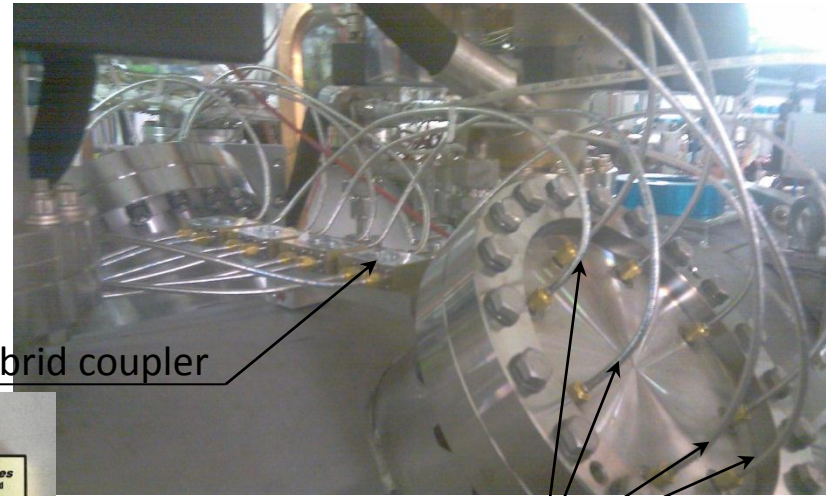
19. Installation of external RF cables from feedthroughs, welded to the AS tank flange, see next slide (*A. Andersson*).

20. Calibration of directional couplers (*L. Timeo, S. Rey, R. Ruber*).

18. Installation of external RF cables from feedthroughs, welded to the AS tank flange (A. Andersson).

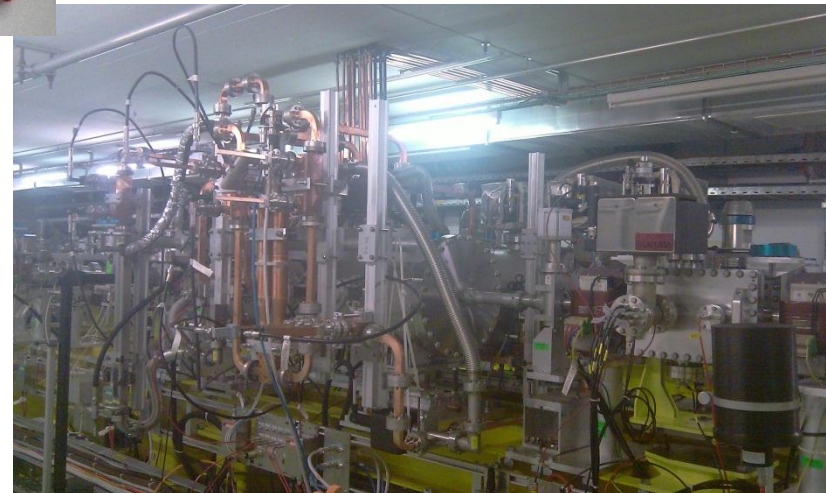


Feedthrough



180° Hybrid coupler

RF cables







- TBTS phase 2.3 tank has been installed, including vacuum and cooling connections.
- Leak tightness test done, and it is successful (29/08/2012).
- Ready for CTF3 test.