Status of the WEST TWA Design and Results from the High Power Mock-up

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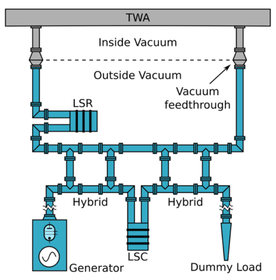
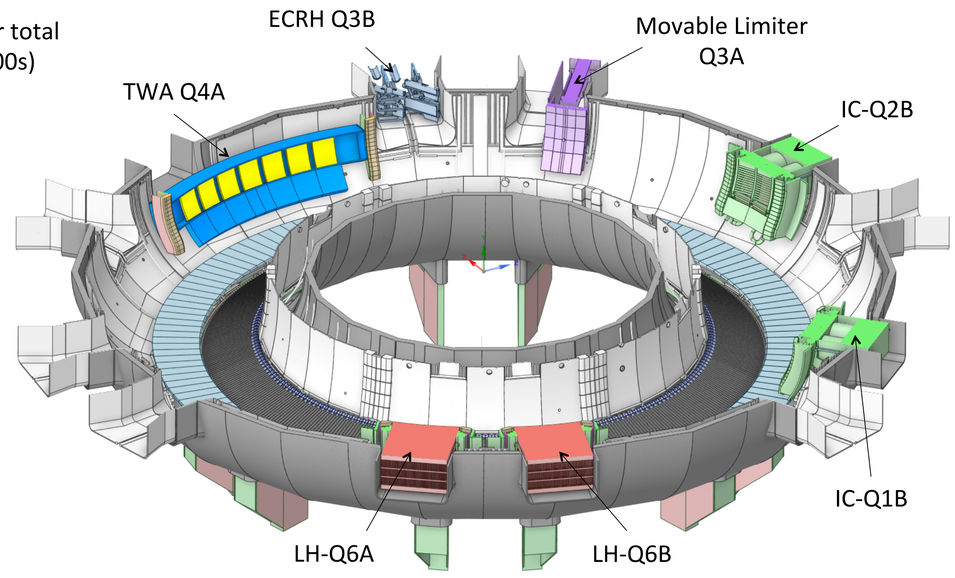
WEST System Layout

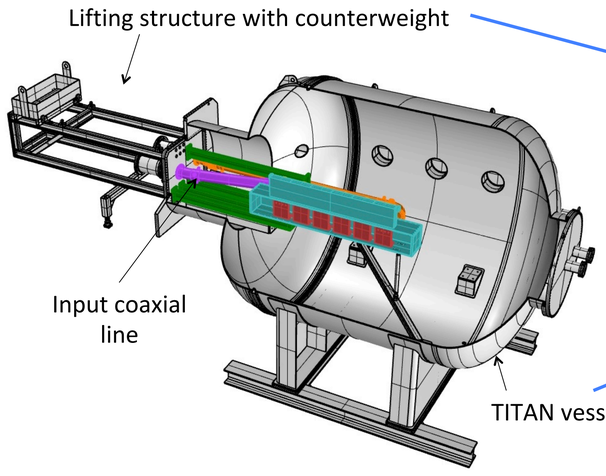
Two poloidal sections for total 3MW and 1MW CW (1000s)

Each section:
- 7 straps
- 1.5MW-30s
- 0.5MW-1000s
- resonant ring feeding

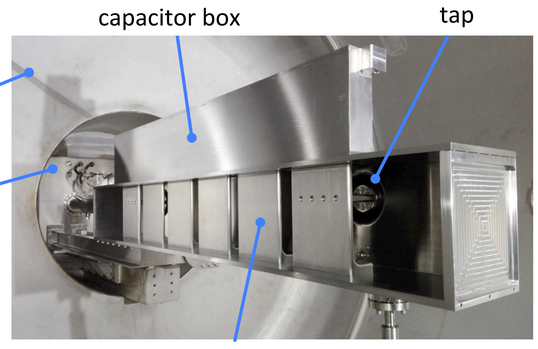


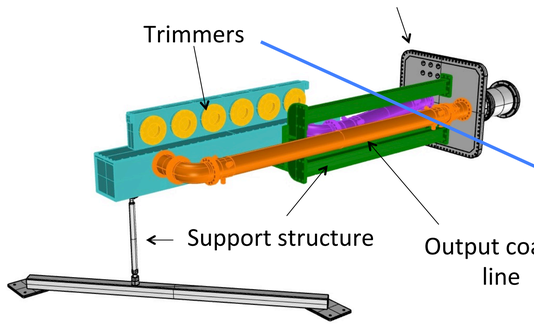


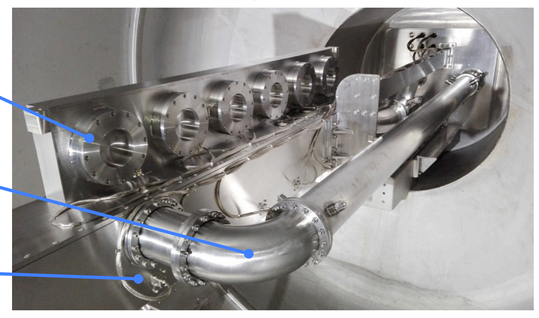
Mock up



Installation – March 2021



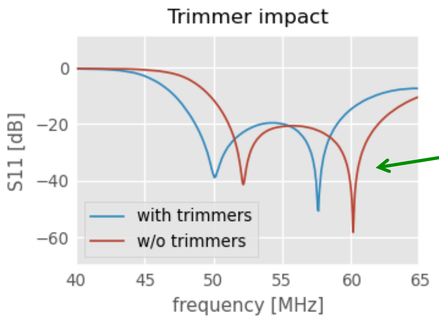




Main characteristics:
- 6 straps
- 2 MW
- "flat" antenna
- Stainless steel
- No cooling

Designed to test the RF response in a controlled environment and the sensitivity to:
- thermo-mechanical deformation
- manufacturing tolerances

Trimmers and RF response measurements

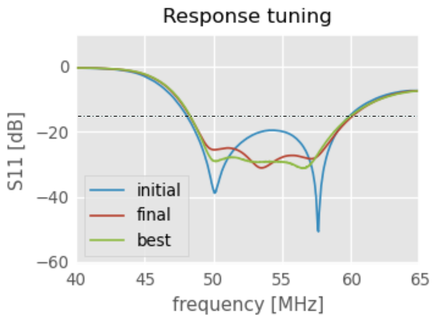


Movable trimmers are used to fine-tune the antenna response

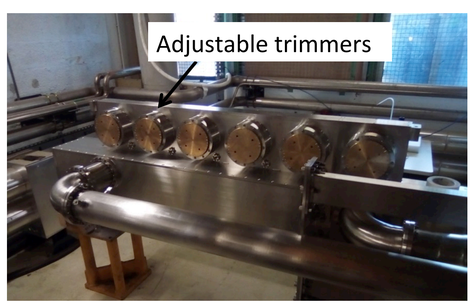
Removing the trimmers shifts the band to higher frequencies => reduced capacitance on the strap/resonator

The final configuration is a compromise between a good response and the smallest deviation of the trimmers

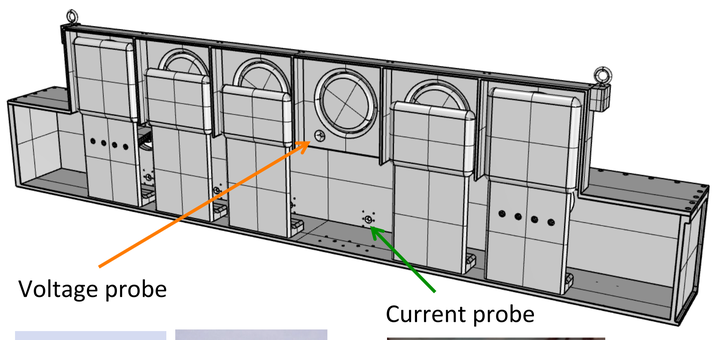
Fixed trimmers are machined to the new dimension and reinstalled

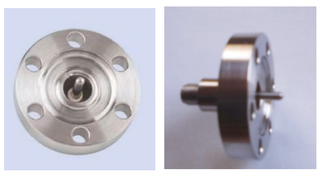


SWR 1.5:1

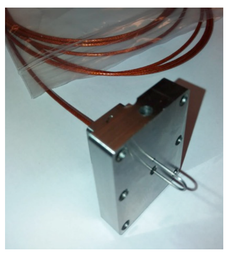


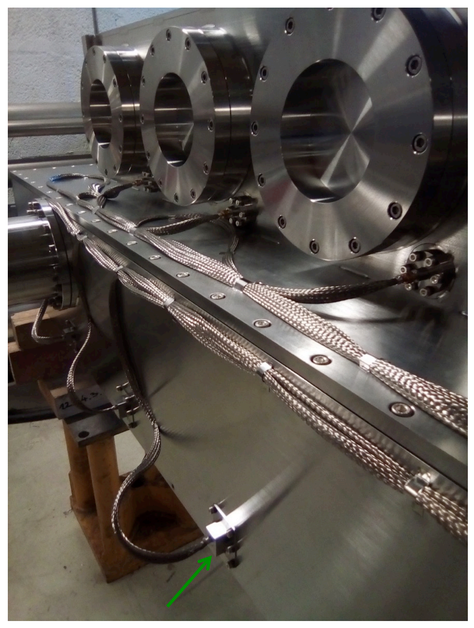
Installed Diagnostics

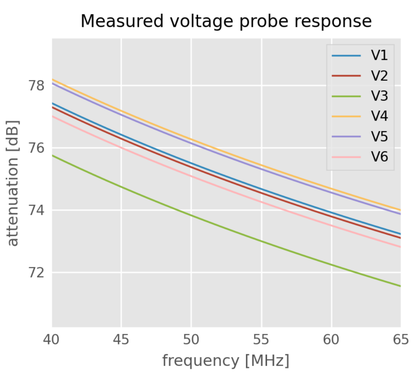


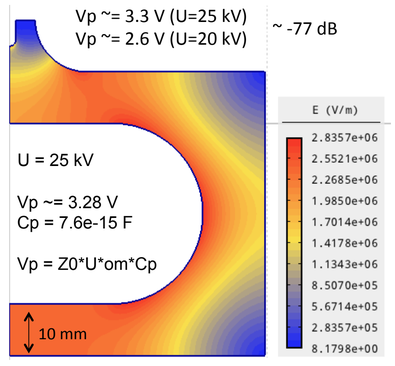


Vacuum feedthrough, SMA - pin







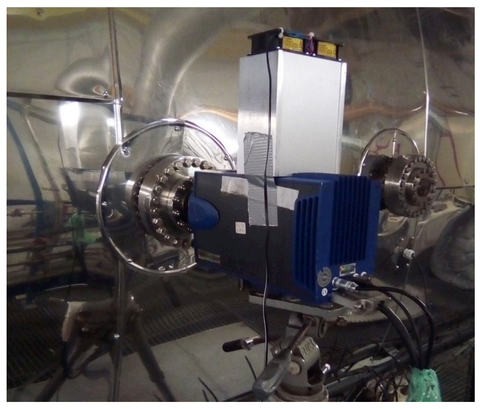


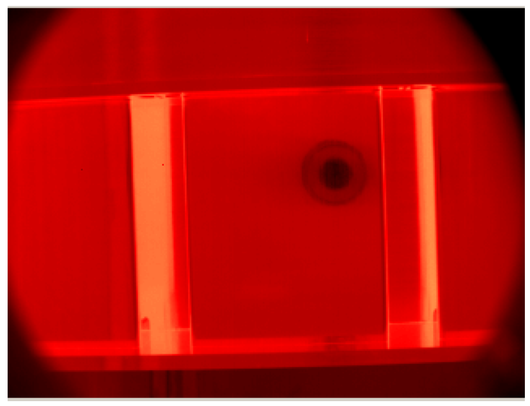
Data conditioning based on the:
- AD8310 log amplifier connected to the voltage probes
- AD8302 gain/phase detector connected to the current probes and to the input/output lines

Data acquisition based on National Instruments DAQ integrated in the TITAN CODAC

3 thermocouples installed
(on strap #1, #3 and on the input coaxial line)

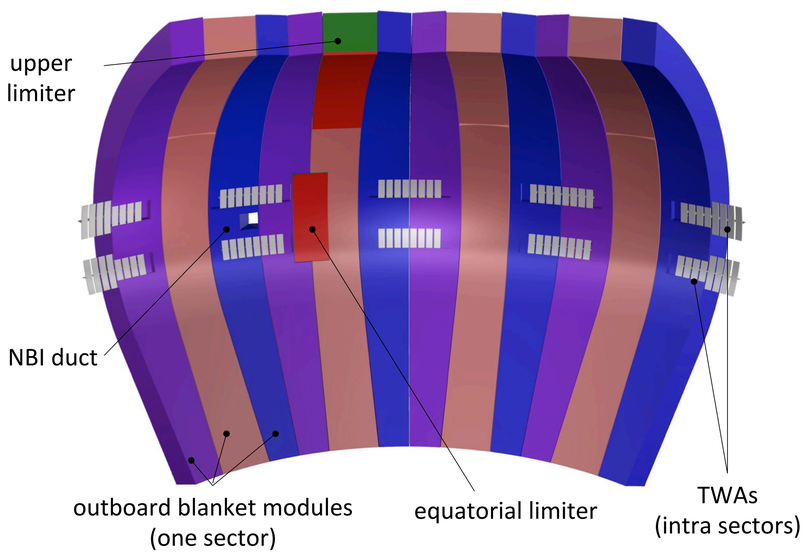
IR camera to monitor the high power tests



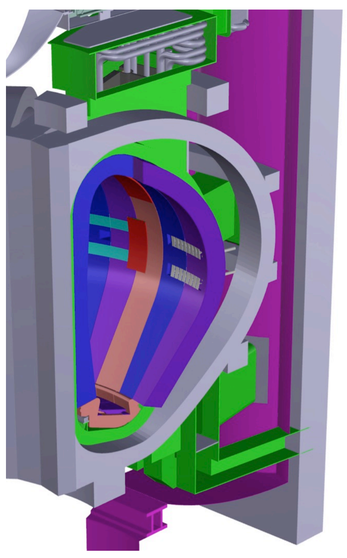


DEMO TWA Outlook

TWA ICRH system in DEMO
32 arrays, 50 MW, integrated in the blanket



DEMO 2019



Powered By scikit-rf Object Oriented RF Engineering

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