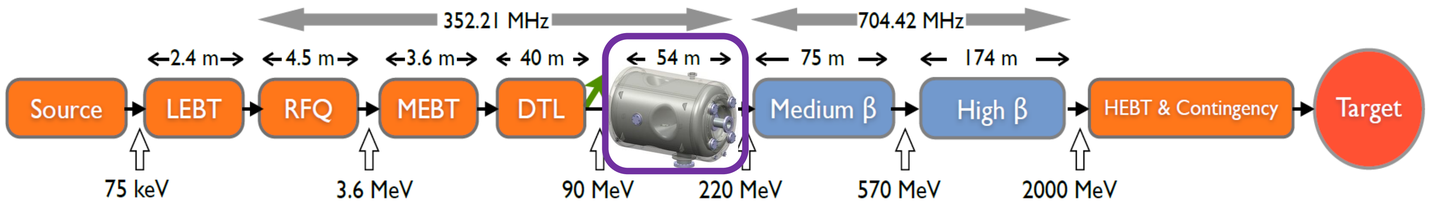
ESS CRYOMODULE FOR SPOKE CAVITIES

IPN Orsay, UMR CNRS-IN2P3 Université Paris-Sud – Accelerators Division - 15, rue G. Clémenceau, 91406 ORSAY Cedex
S. BOUSSON, S. BRAULT, P. DUCHESNE, P. DUTHIL, N. GANDOLFO, G. OLRY, D. OUDIN, E. RAMPNOUX, D. REYNET*
ESS LUND: C. DARVE
***Tel. 33-169158141 @Mail : reynet@ipno.in2p3.fr**

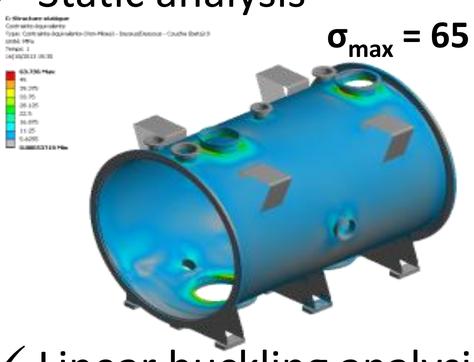


The prototype Spoke cryomodule holds two cavities and their RF power couplers and integrates all the interfaces necessary to be operational within the linac machine. It is now being fabricated and its assembly will be performed with dedicated tooling and procedures in and out of the clean room. This prototype will be tested by the end of 2015 at IPNO site and then at full power at FREIA (Uppsala university) test stand.
A valve box has thus been designed to take into account the specific features of this prototype cryomodule and of the cryogenic environments of both test sites. This valve box is also considered as a prototype of the cryogenic distribution of the linac Spoke section.

Design, delivery, control, and first assembly tests:

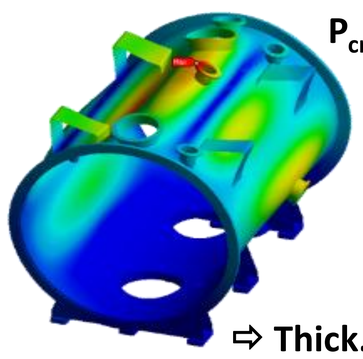
✓ Static analysis

σ_{max} = 65 MPa



✓ Linear buckling analysis

P_{crit} = 1.2 MPa

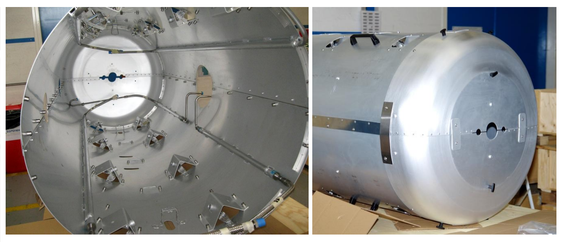


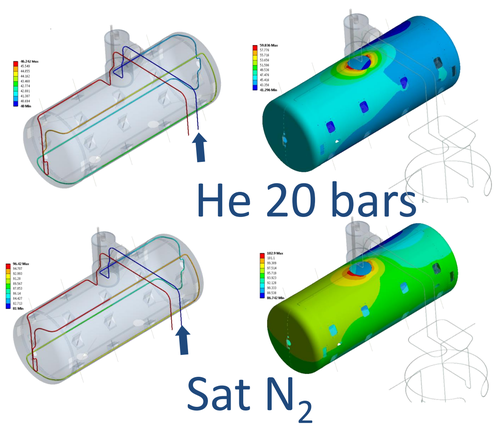
⇨ Thick. = 8 mm

Vacuum Vessel (VV) on support frame

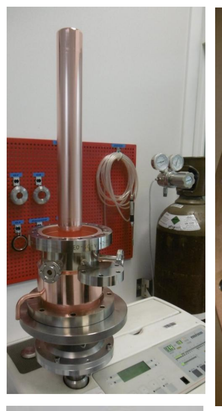
Length=2.86m Ø1.3m 304L - Weight: 1.2 T

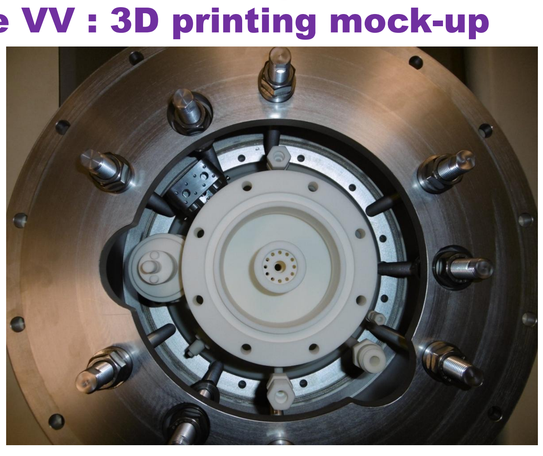
Thermal shield Al 6082 Weight : 60 kg





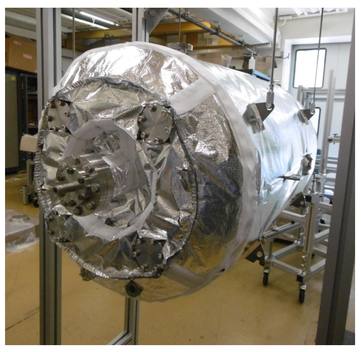
Power coupler assembly - Interface with the VV : 3D printing mock-up



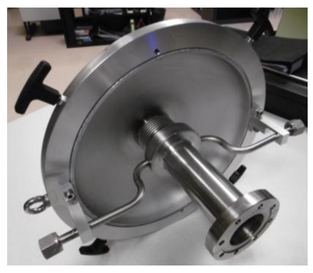


Cavity

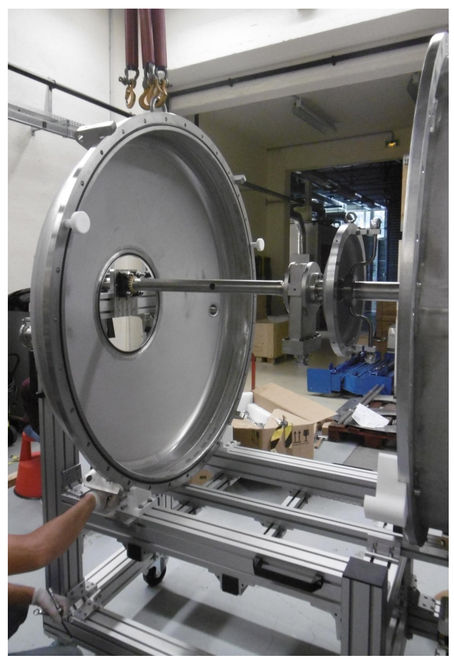
MLI



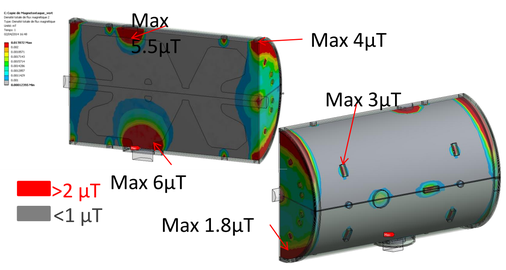
Cold/Warm Transition

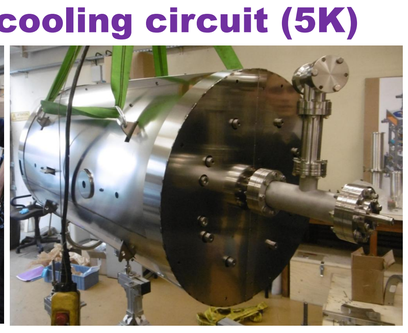


End dishes and beam valve assembly Stand



Magnetic shielding Cryophy® with cooling circuit (5K)



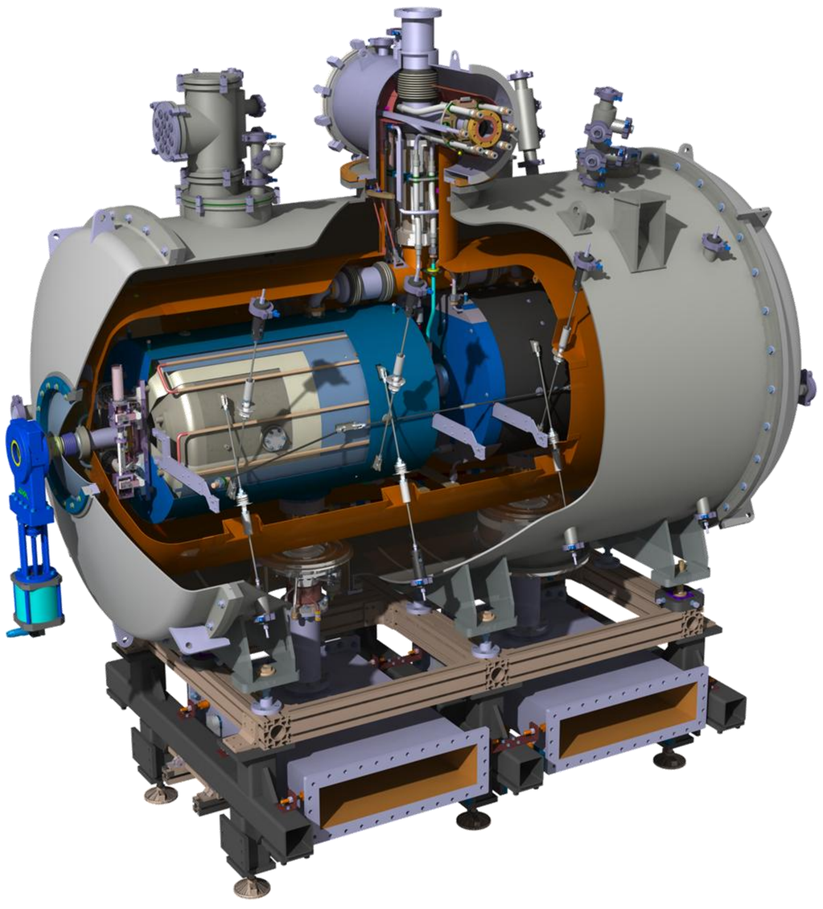


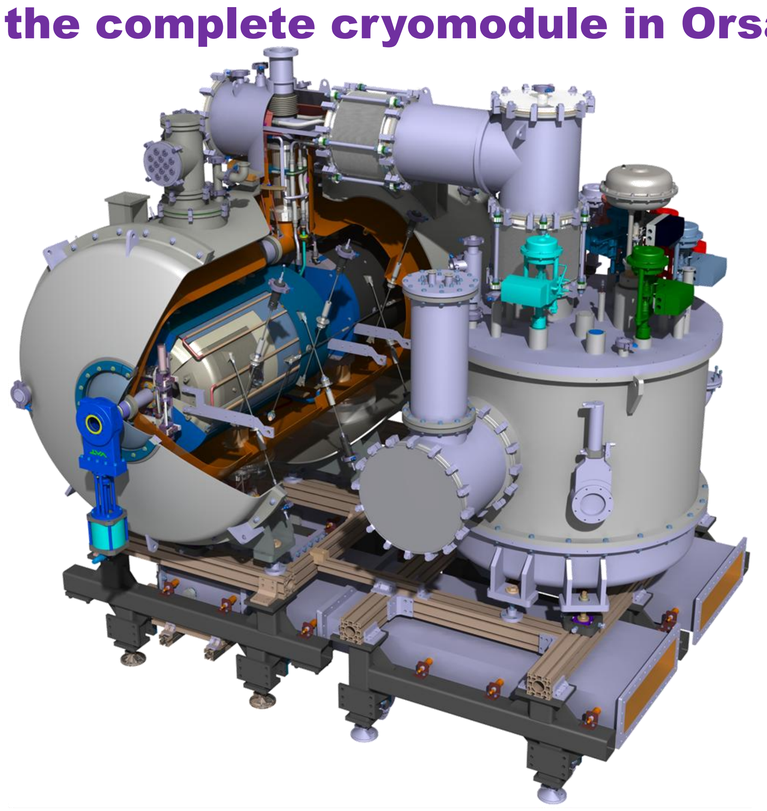
⇒ validation of the components, interfaces and tooling

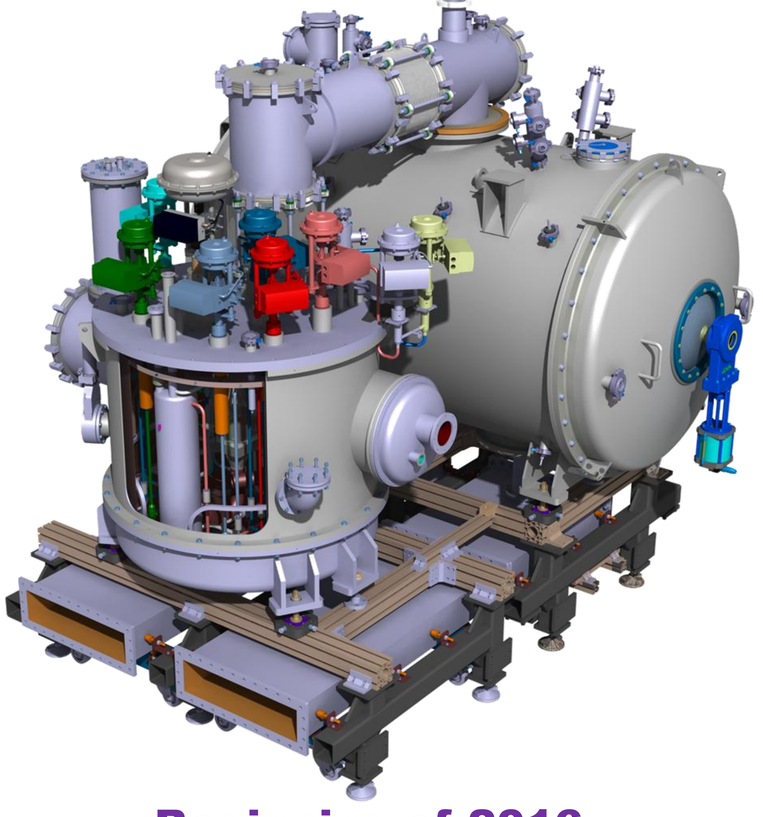
Goals for 2015

Procurement of the Valve box
Test at low RF power and 2K
of the complete cryomodule in Orsay

Cryomodule Assembly







Beginning of 2016:
delivery of the Spoke cryomodule and valve box in Uppsala (Sweden) for the full RF power test