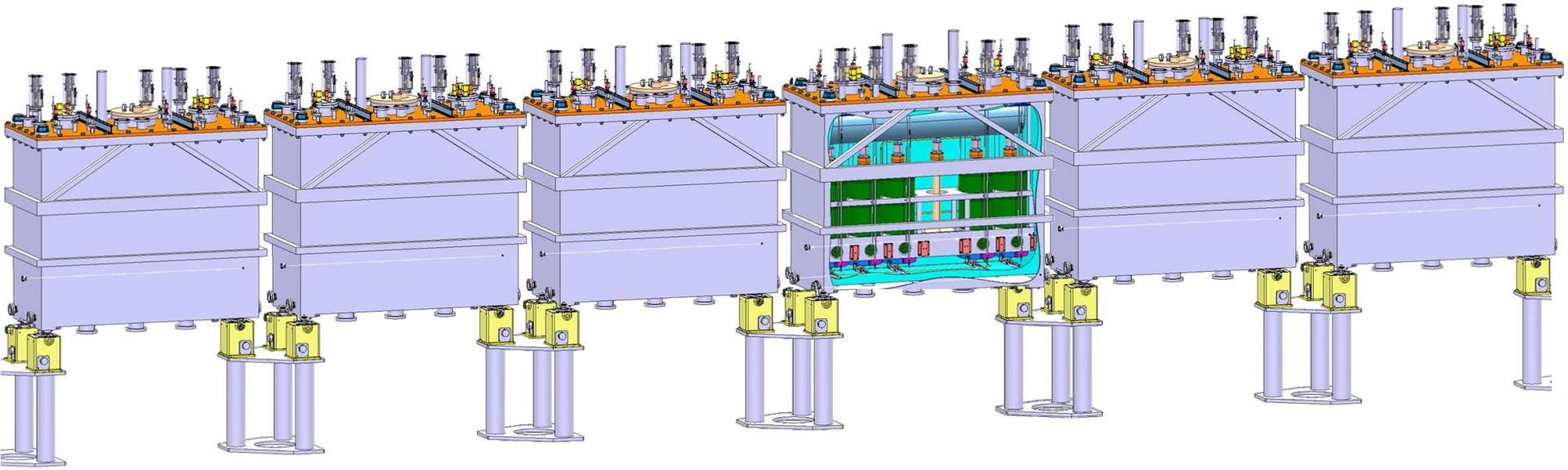
HIE-Isolde Cryomodule

Overview & Status

YL-19 July 2011

TE-MSC-CMI

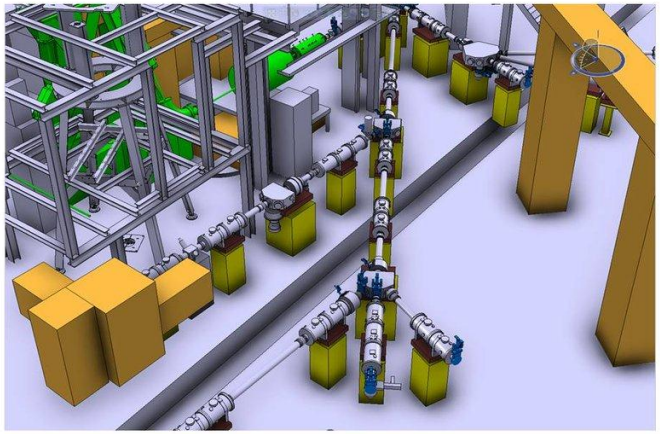


HIE Isolde Cryomodule's Team :

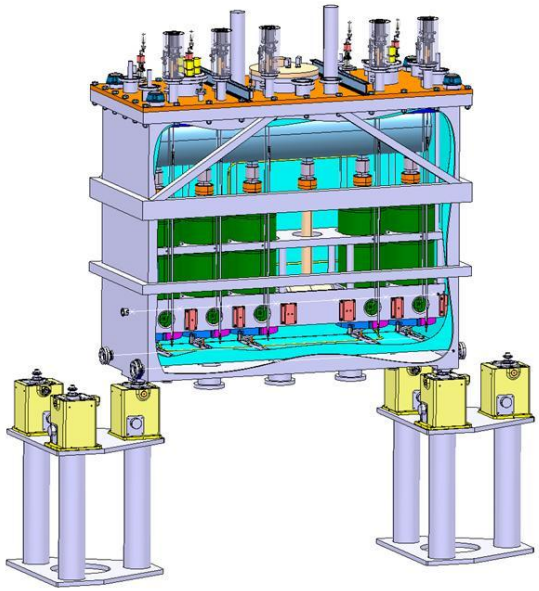
- Arnaud Bouzoud
- Jean-Philippe Tock
- Yann Leclercq
- Lloyd Williams
- CMI section
- ...

Outline

- **HIE-Isolde Project**
  - Technology
  - Location
  - Integration
  - Installation
- **Cryomodule**
  - Description
  - Structures
  - Alignment
  - Cryogenics
  - Vacuum

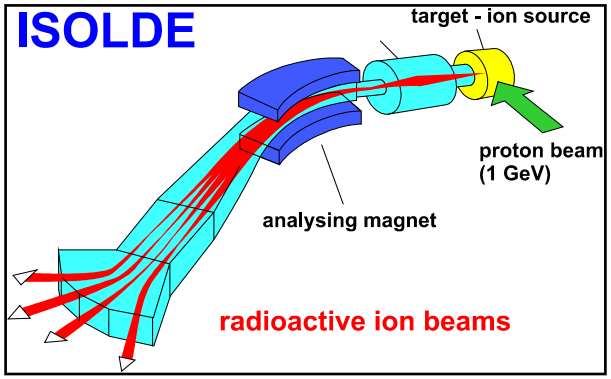


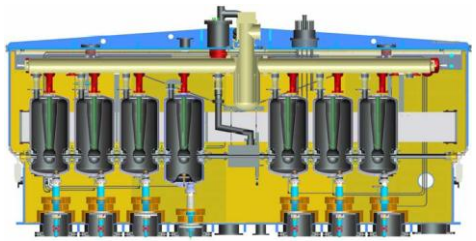
Isolde Facility from Erwin Siesling

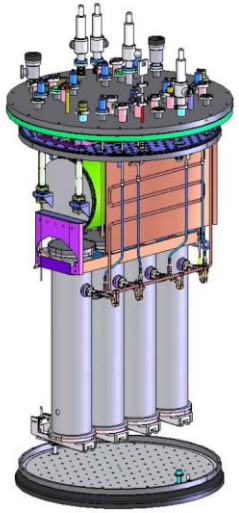


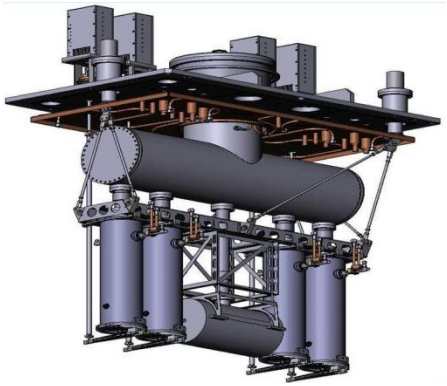
HIE-Isolde Project : Technology

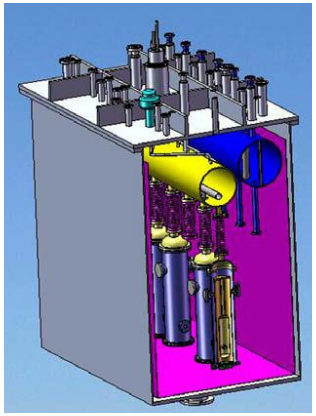
- Isolde
  - Isotope Separation On-Line
  - Radioactive Ion Beam (RIB)
- SC Linac
  - Quarter Wave Resonator
  - Argonne, Spiral2, ALPI, ISACII, IUAC









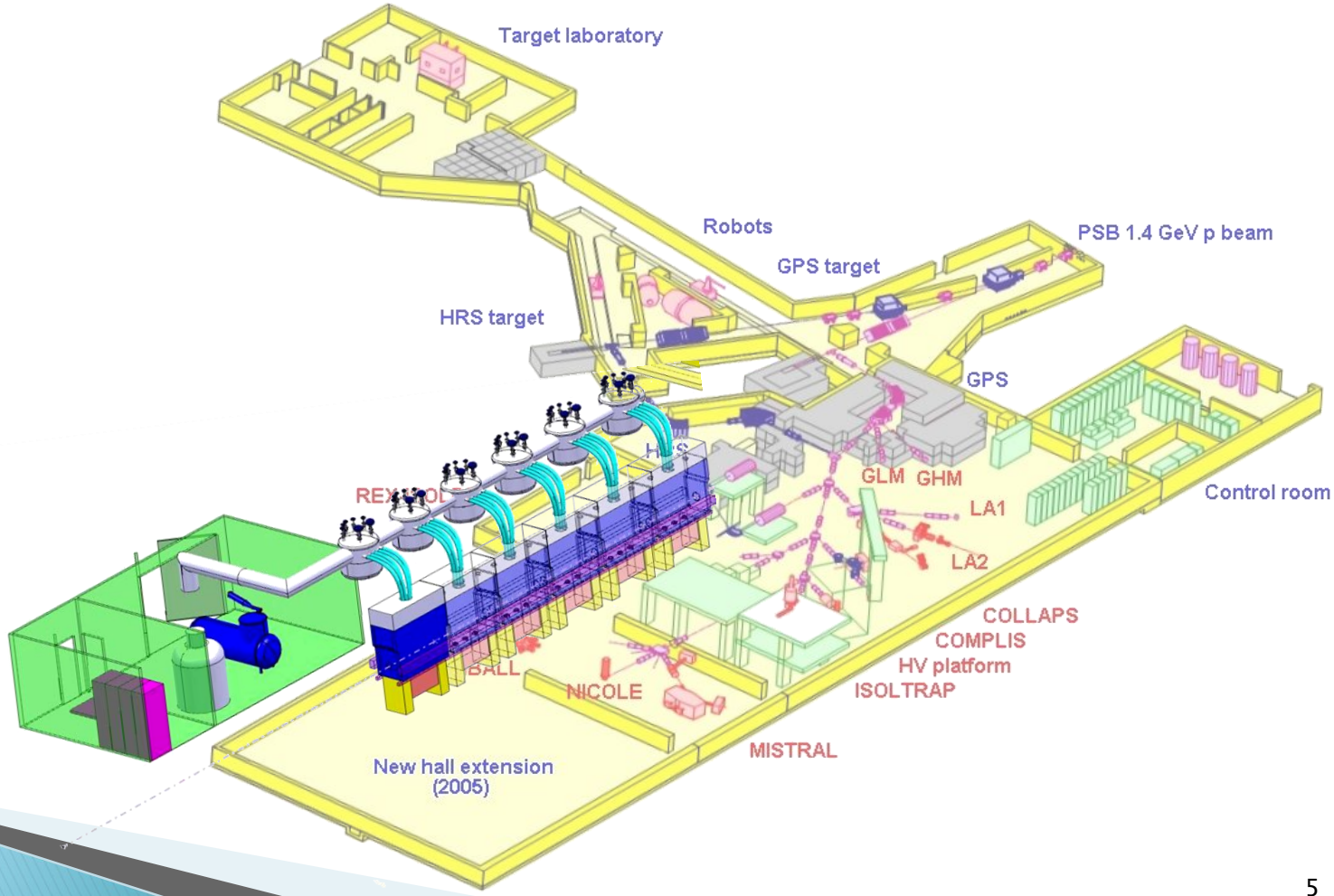


HIE-Isolde Project : Location

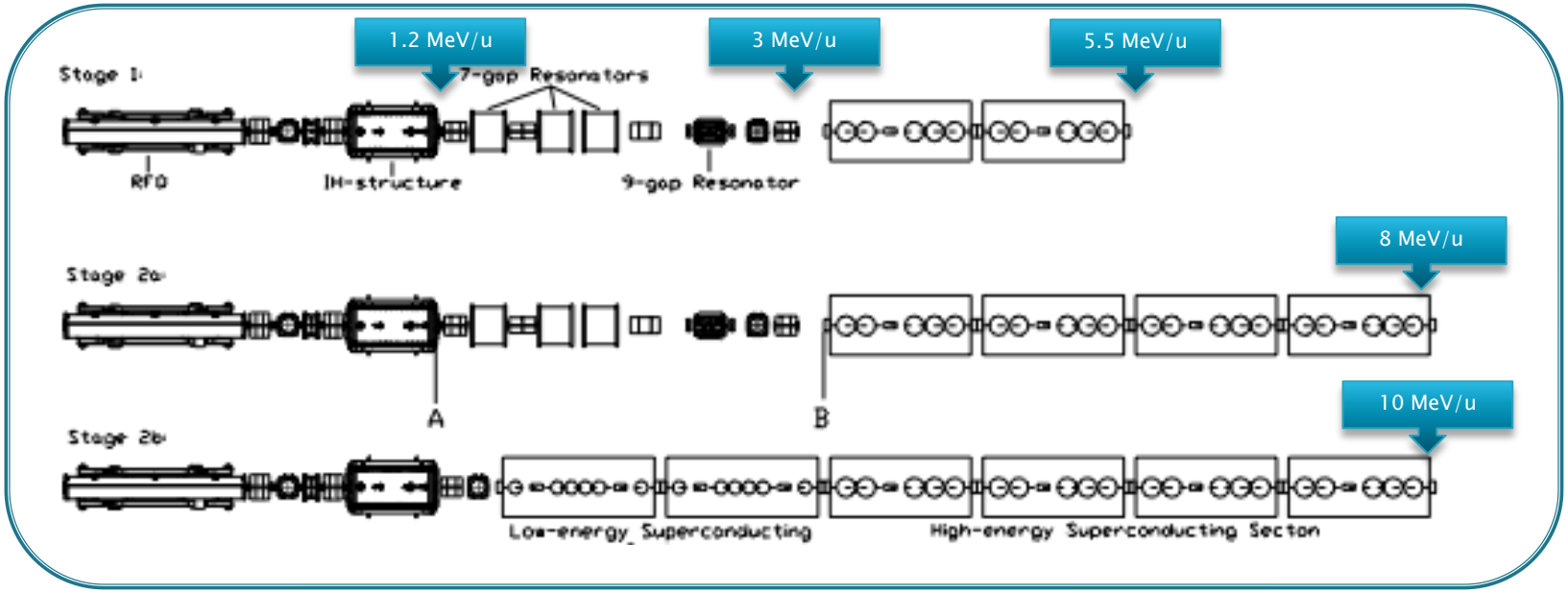
- Upgrade of Isolde Building 170

From Erwin Siesling

HIE Isolde Project : Integration

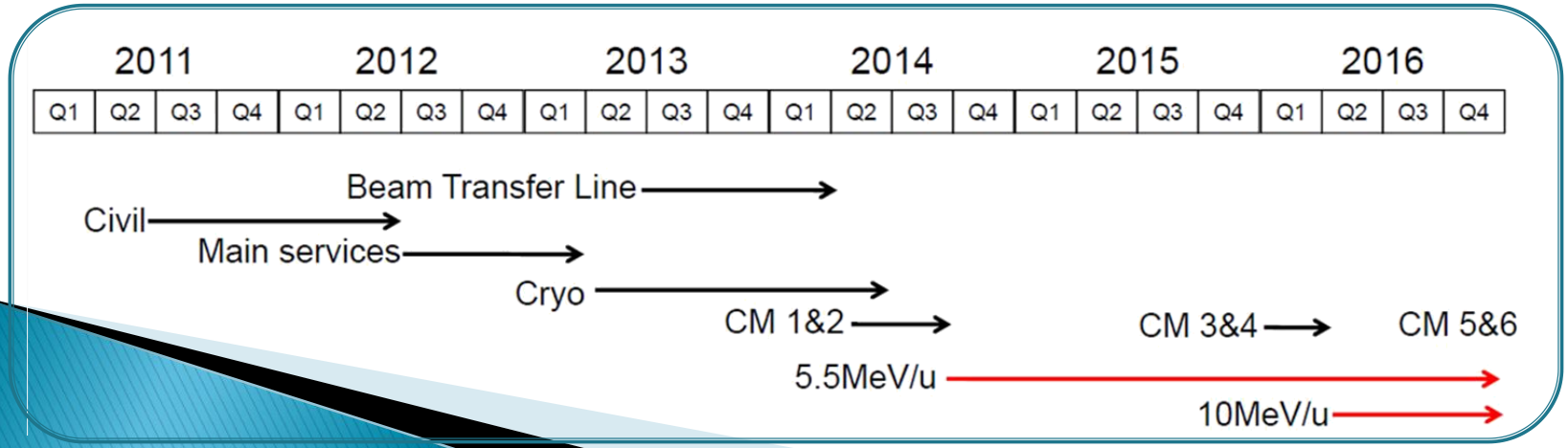


HIE-Isolde Project : Installation



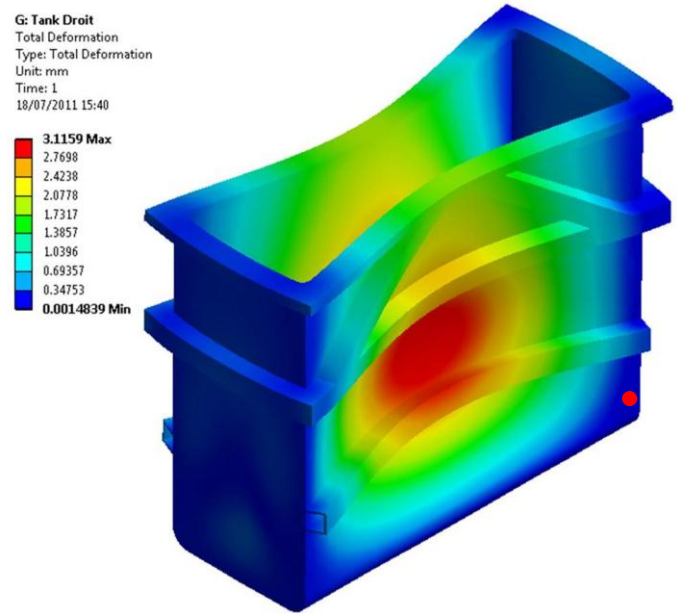
From Matteo Pasini

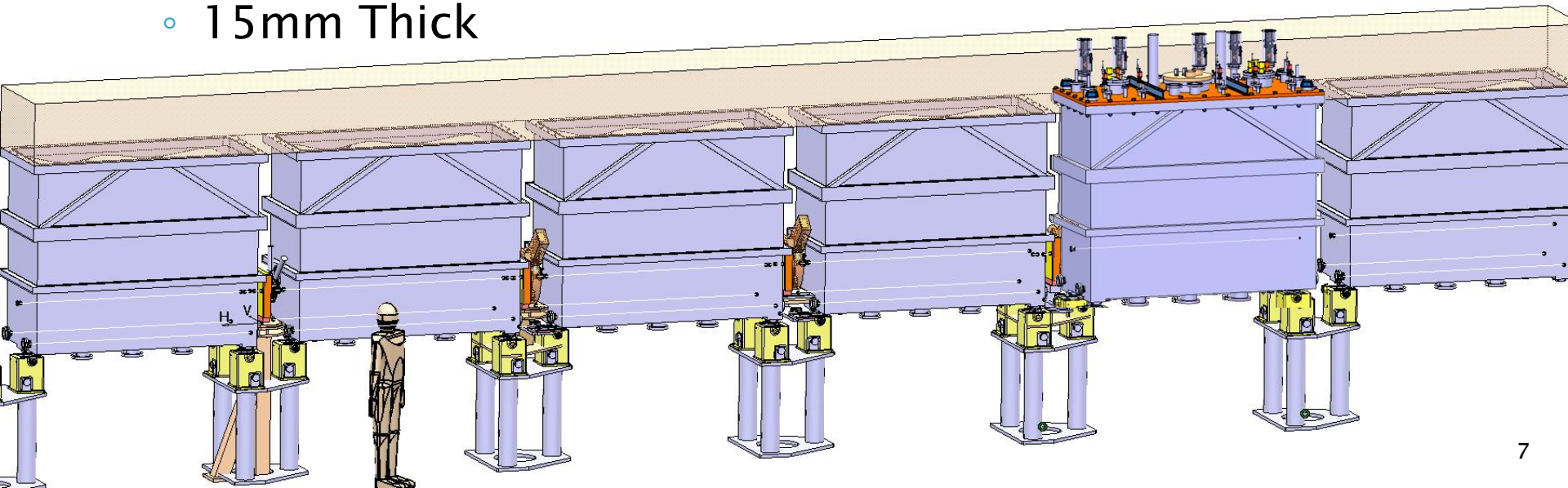
From Yacine Kadi 04/2011



Cryomodule : Overview

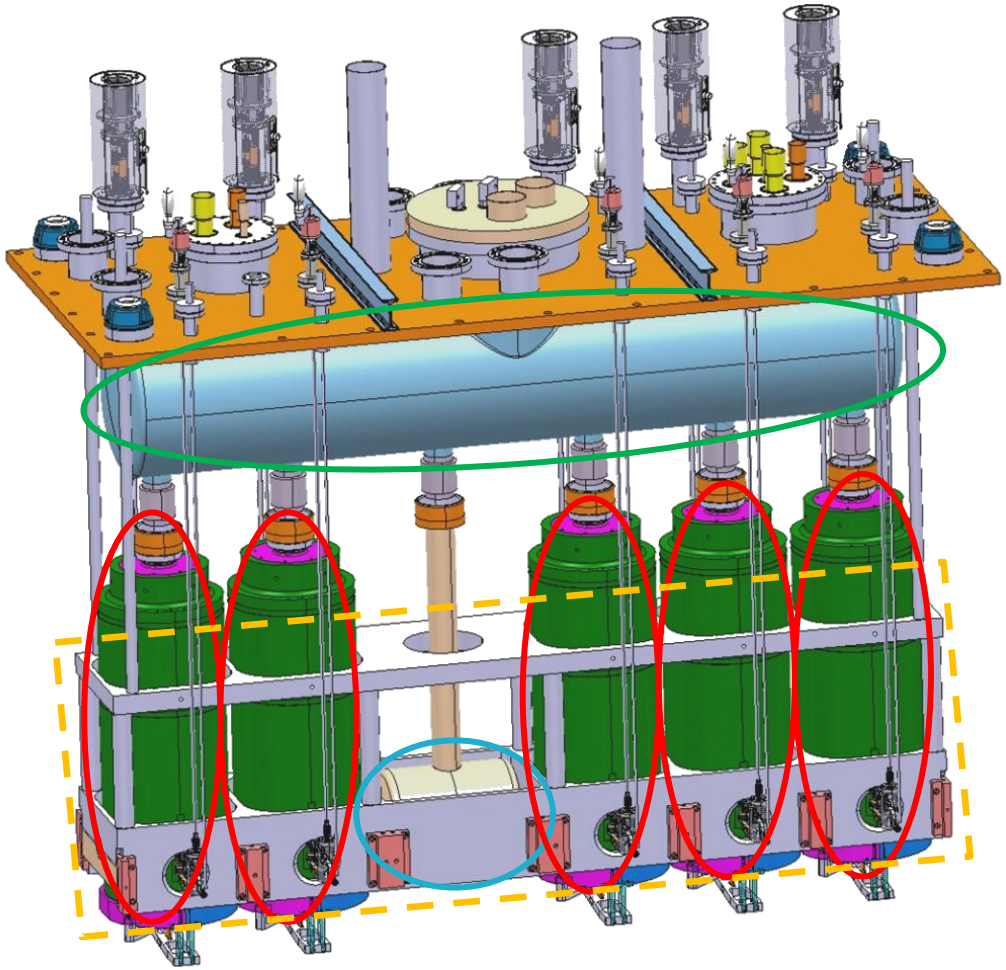
- 6 Cryomodules : 16m
  - 4 highB + 2 lowB
- Schedule
  - 1st unit for mid-2013
  - 2nd unit for beginning of 2014
- Vacuum Vessel :
  - 2.6m x 1.1m x 2m
  - Suspended Design
  - 15mm Thick





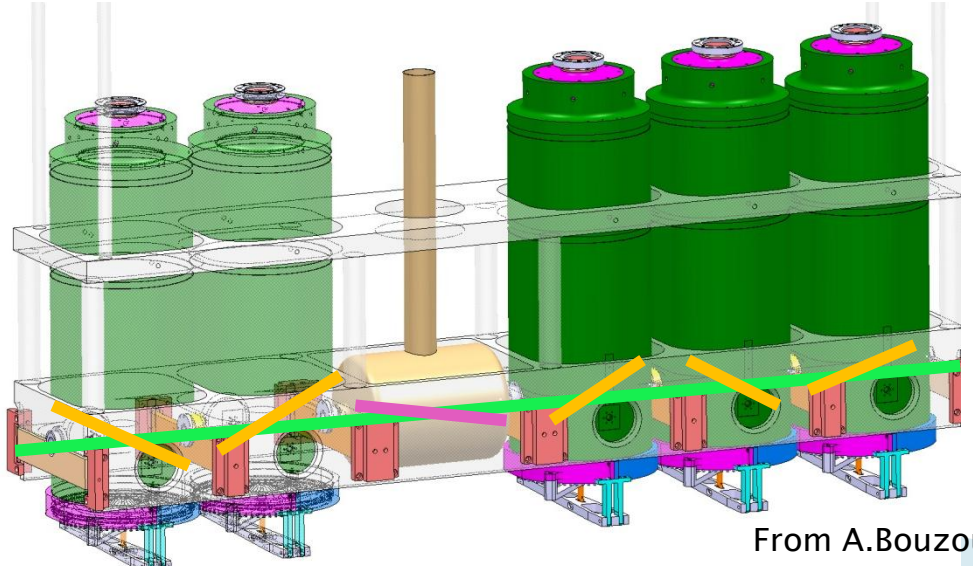
Cryomodule : Internal Parts

- Main Components
  - 5 RF cavities —
  - SC Solenoid —
    - Up to 600A
    - Nb3Sn
  - LHe reservoir —
    - ≈250 l
  - Thermal Shield
    - 50-75 K GHe
  - Supporting Frame - -

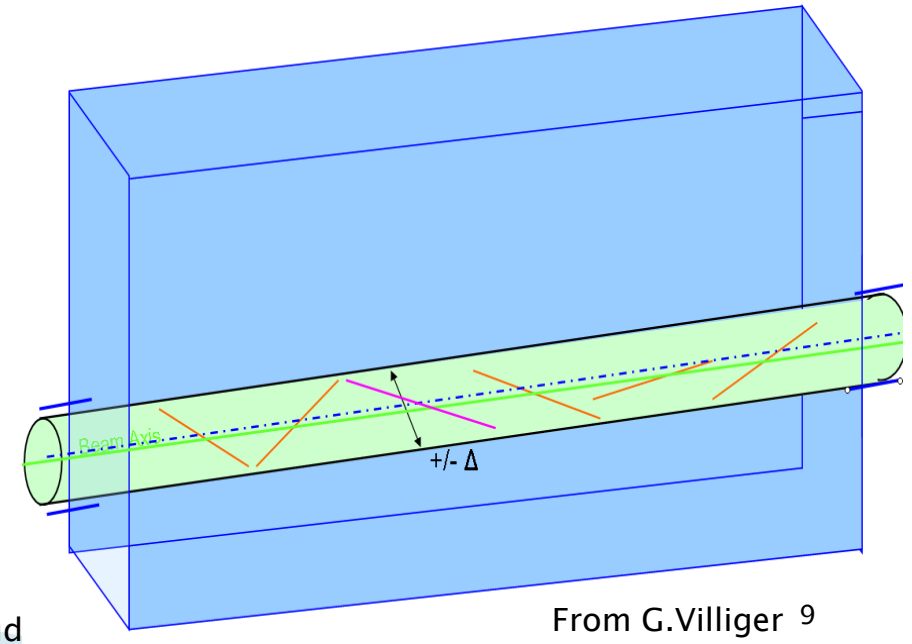


Cryomodule : Specifications

- Alignment
  - Cavities ——— ; ◎ beam & cavities axes: 0.3mm
  - Solenoid ——— ; ◎ beam & solenoid axes: 0.15mm
- Vacuum Level
  - At warm 5.10^{-6} mbar
  - At cold 5.10^{-8} mbar
  - Common vacuum



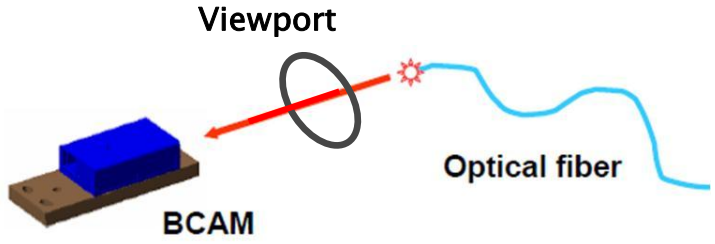
From A.Bouzoud

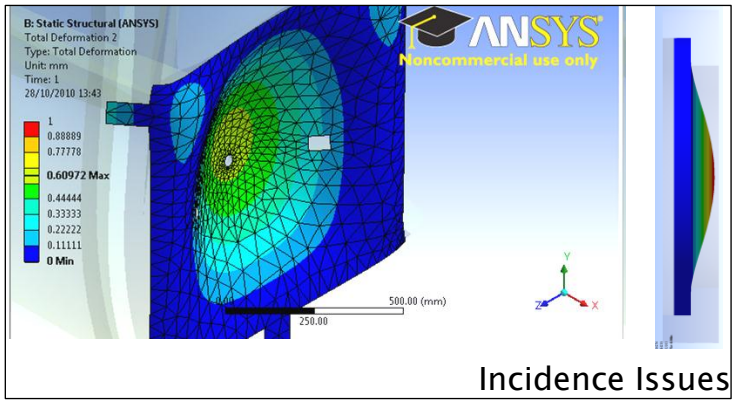


From G.Villiger

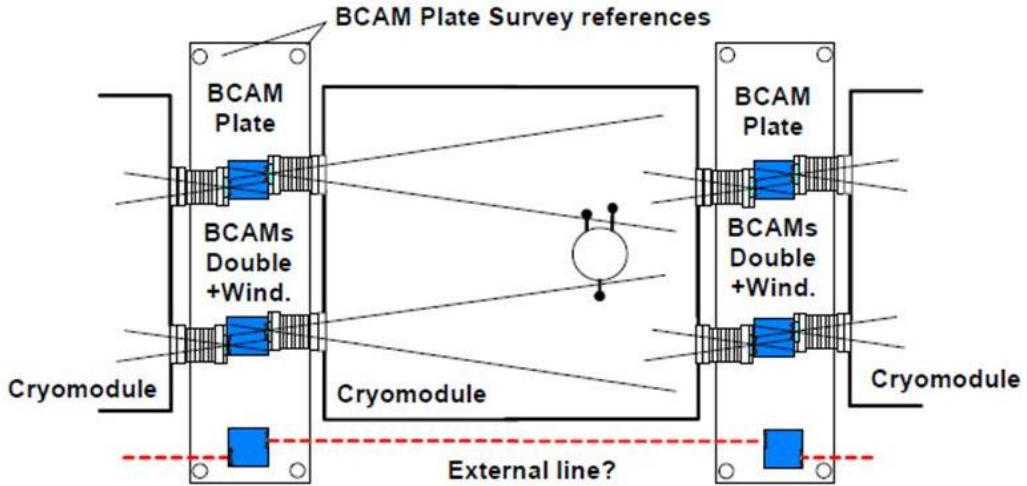
Cryomodule : Survey

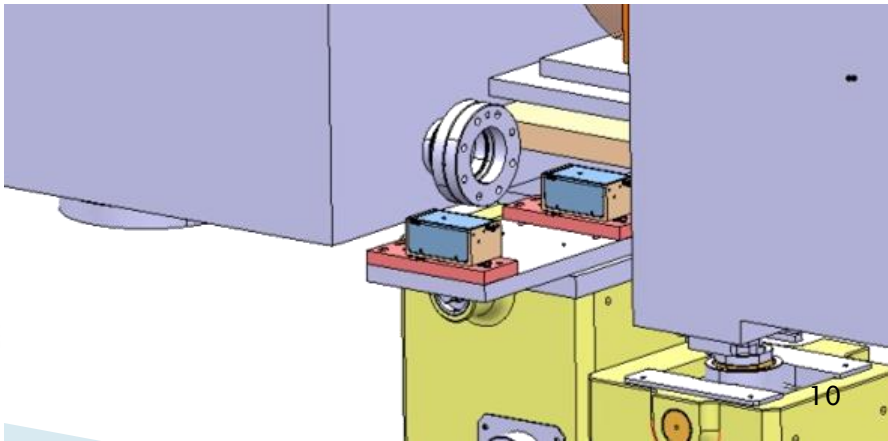
- Elements
  - Viewports
  - BCAM device
  - Targets
- Monitoring of position
  - Shoot
  - Reconstruction Algorithm





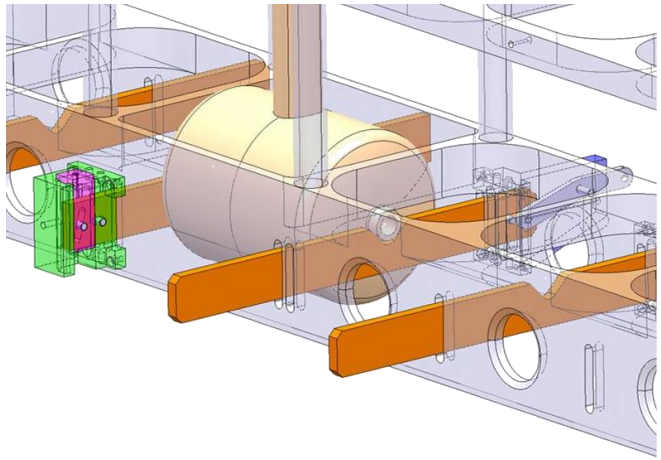
Incidence Issues

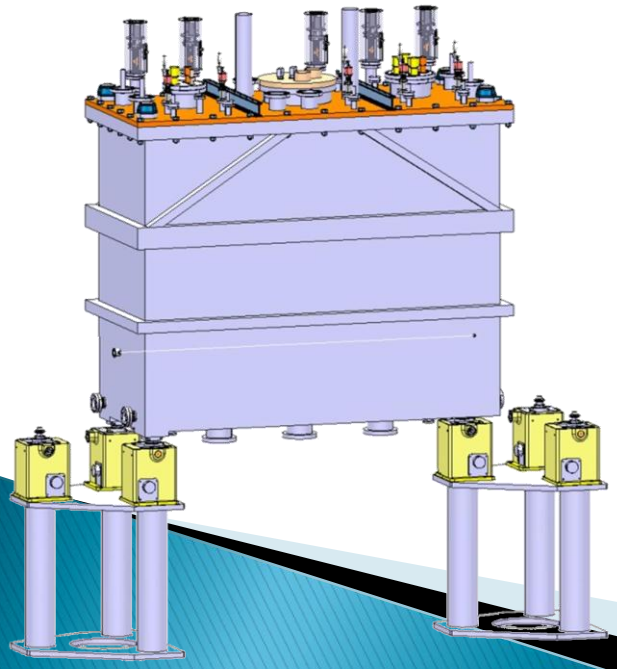


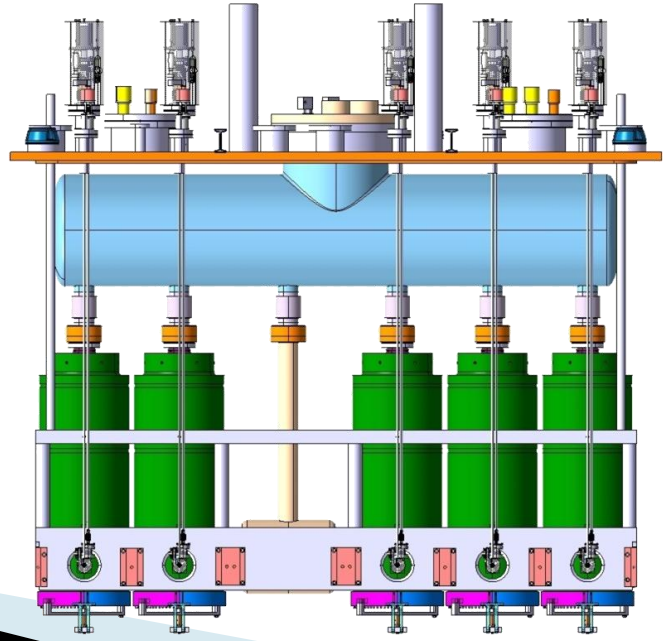


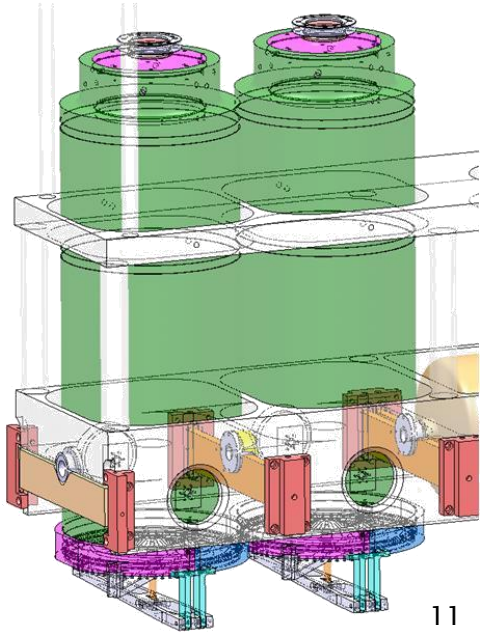
Cryomodule : Supports & Adjustments

- Vacuum Vessel
- Frame
- Cavities
- Solenoid

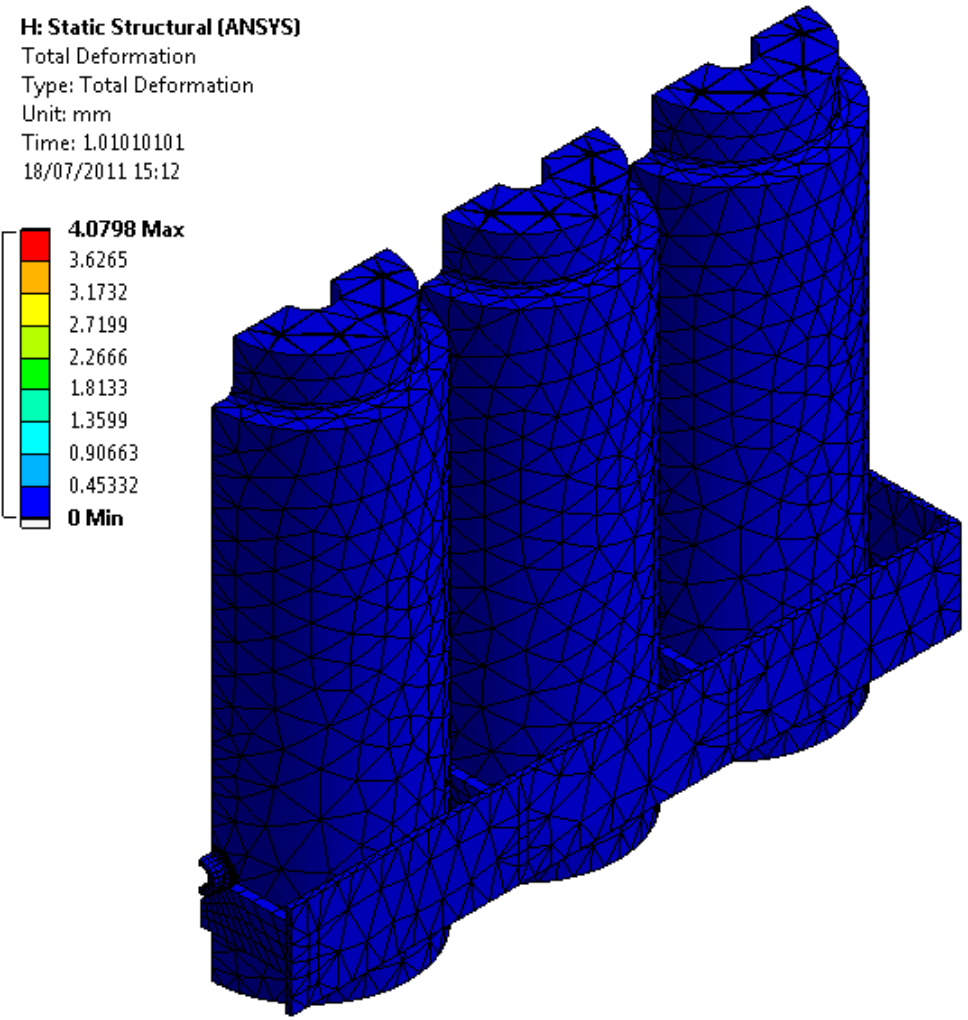


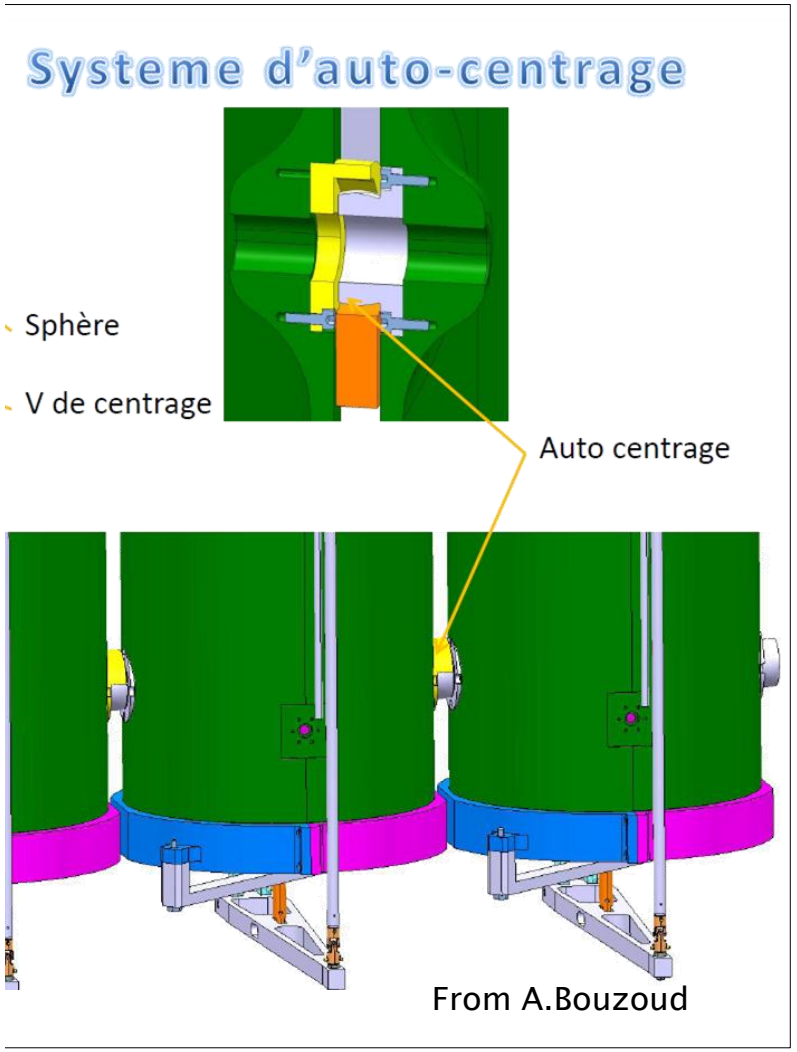






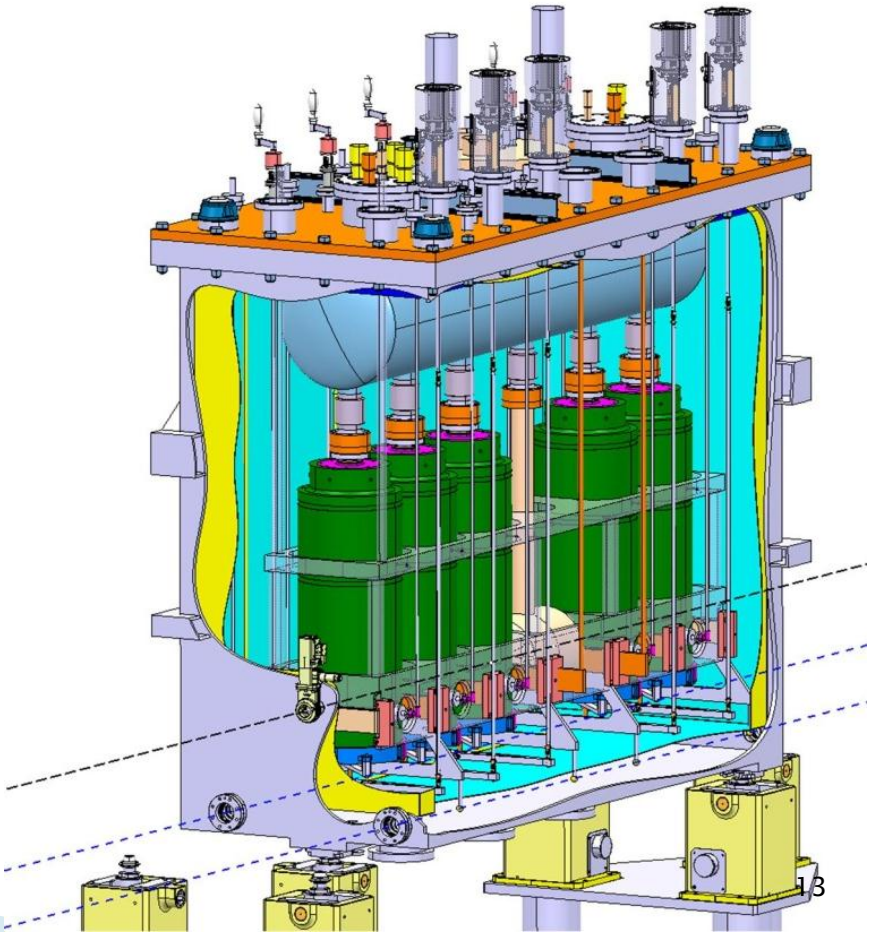
Cryomodule : Cavities Interfaces





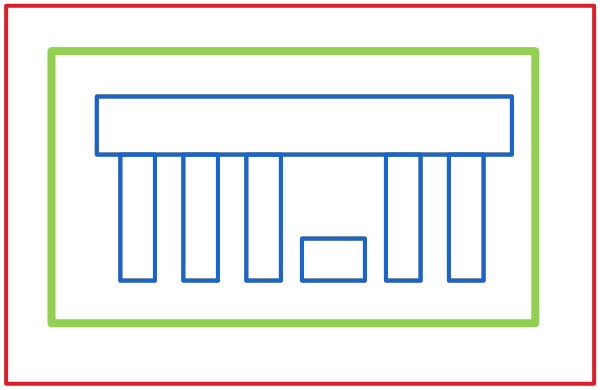
Cryomodule : Alignment Procedure

- Clean Room
  - 5 Cavities + Solenoid into the frame
  - Frame under the top cover
- Tunnel
  - Vacuum Vessel
  - Pump & Cool down
  - Frame Adjustment
  - Solenoid Adjustment

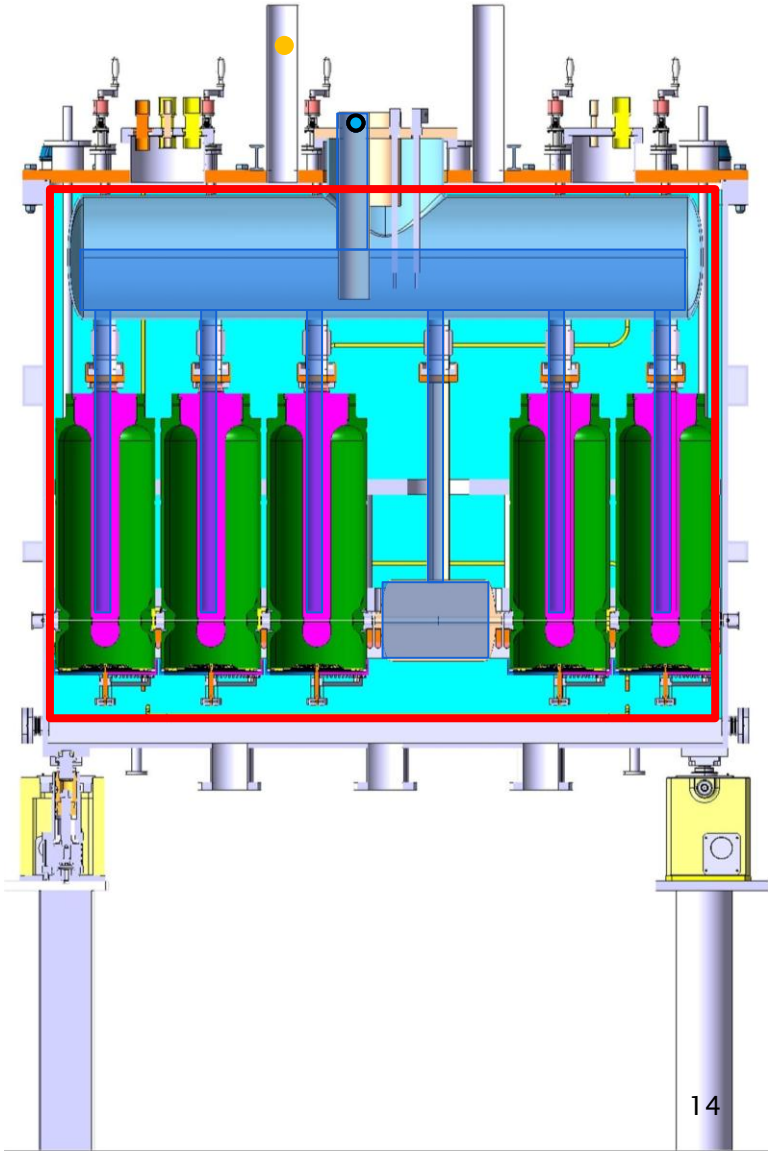


Cryomodule : Cryogenics

- 2 Helium Circuits
  - 50-75 K
  - 4.5 K
- Cooling Procedure

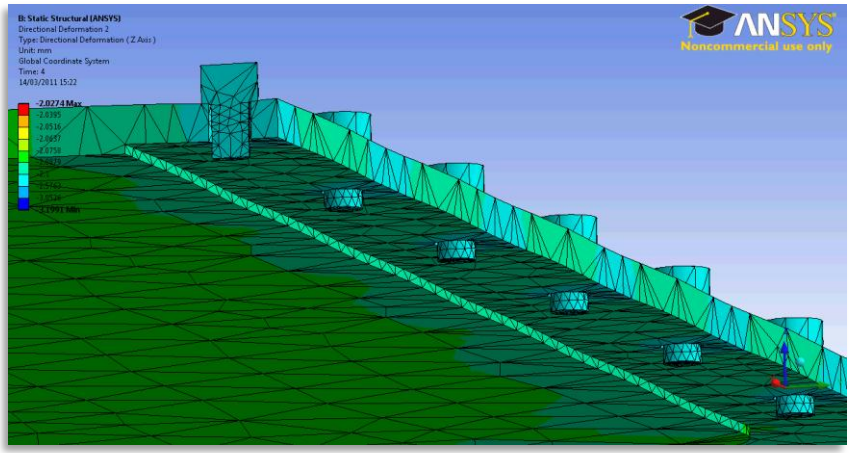


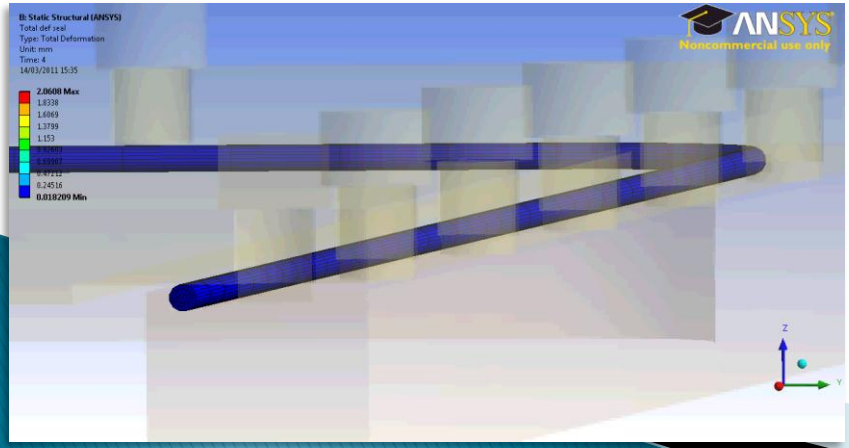
CM at 4.5K

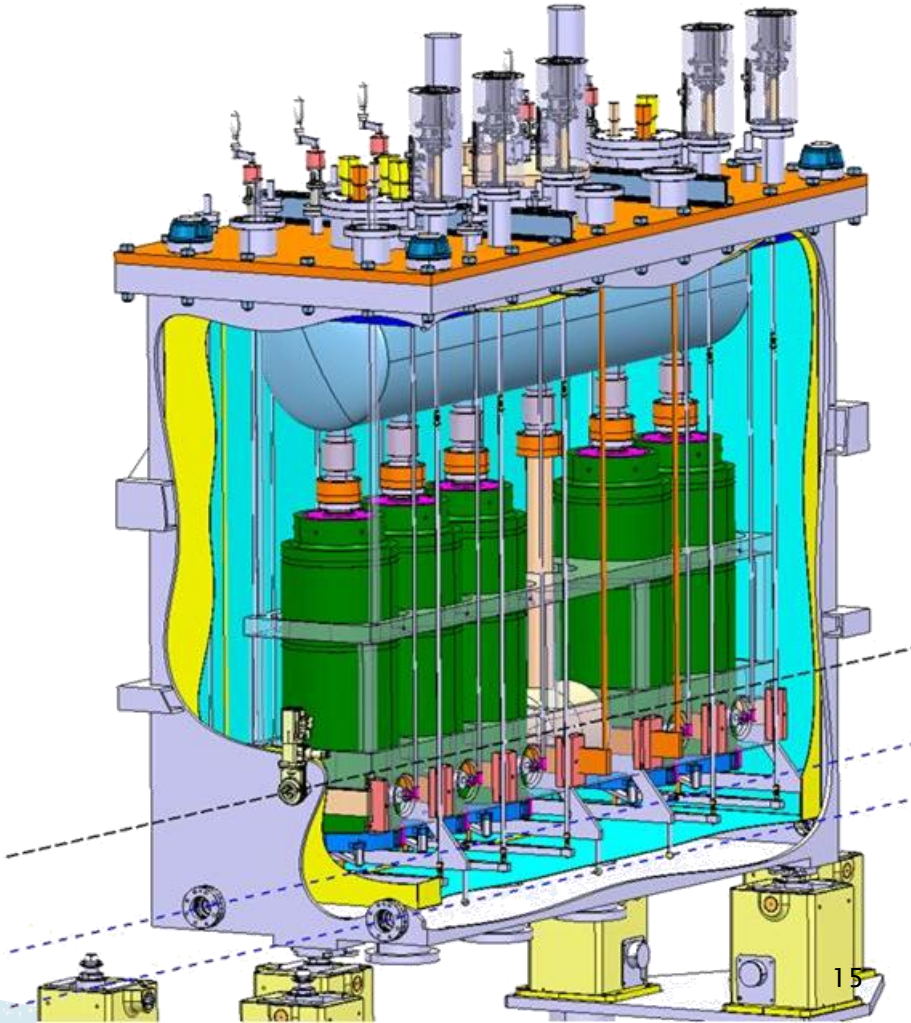


Cryomodule : Vacuum

- Quality Issues
- Top Seal in Elastomer

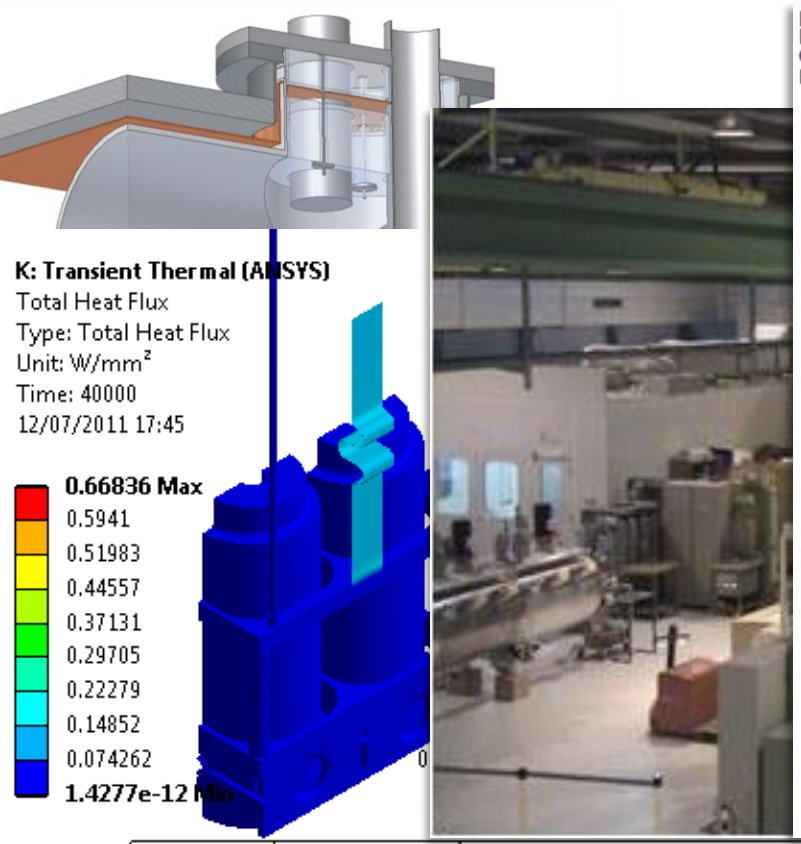


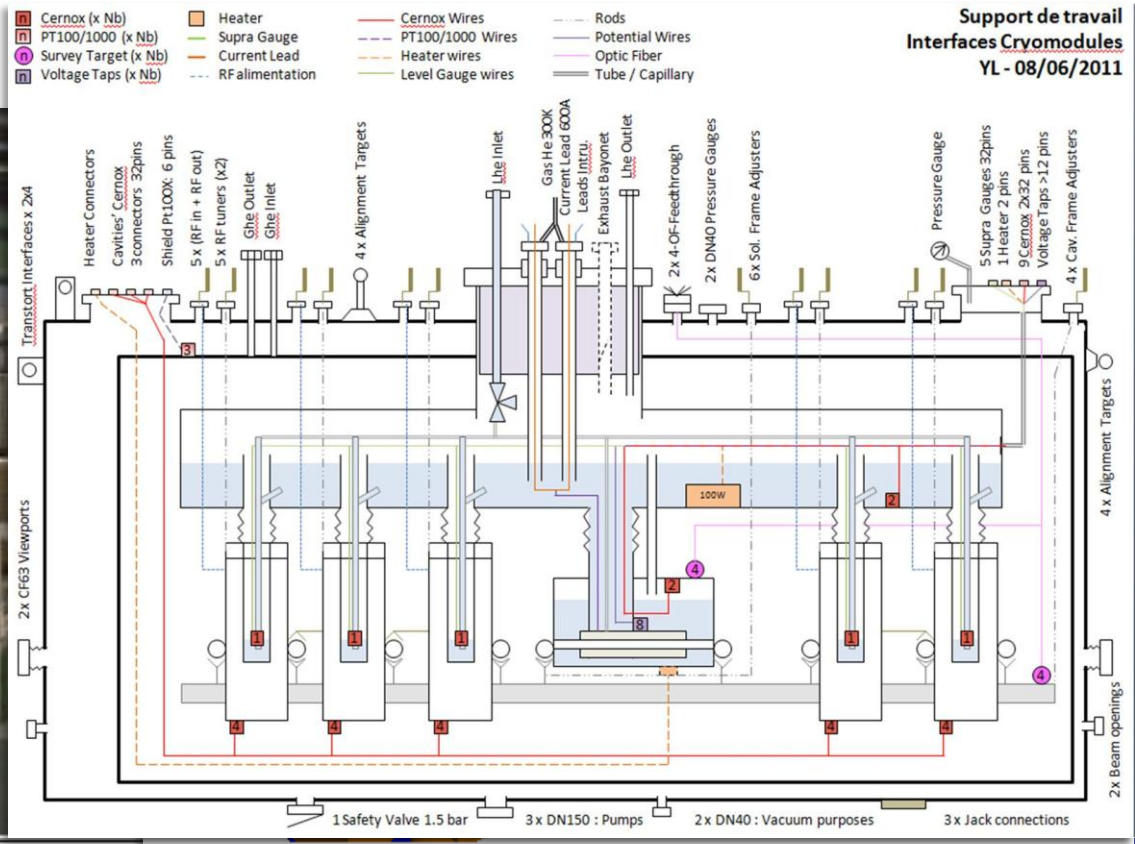




Status : In Progress

- TS thermal distribution
- Chimney Design
- Homogeneous Cool Down





Conclusions

- Concepts are well-advanced
- Need Confirmation
- Start detailed design
- Presence at IPAC2011