MadMax CPPM Meeting

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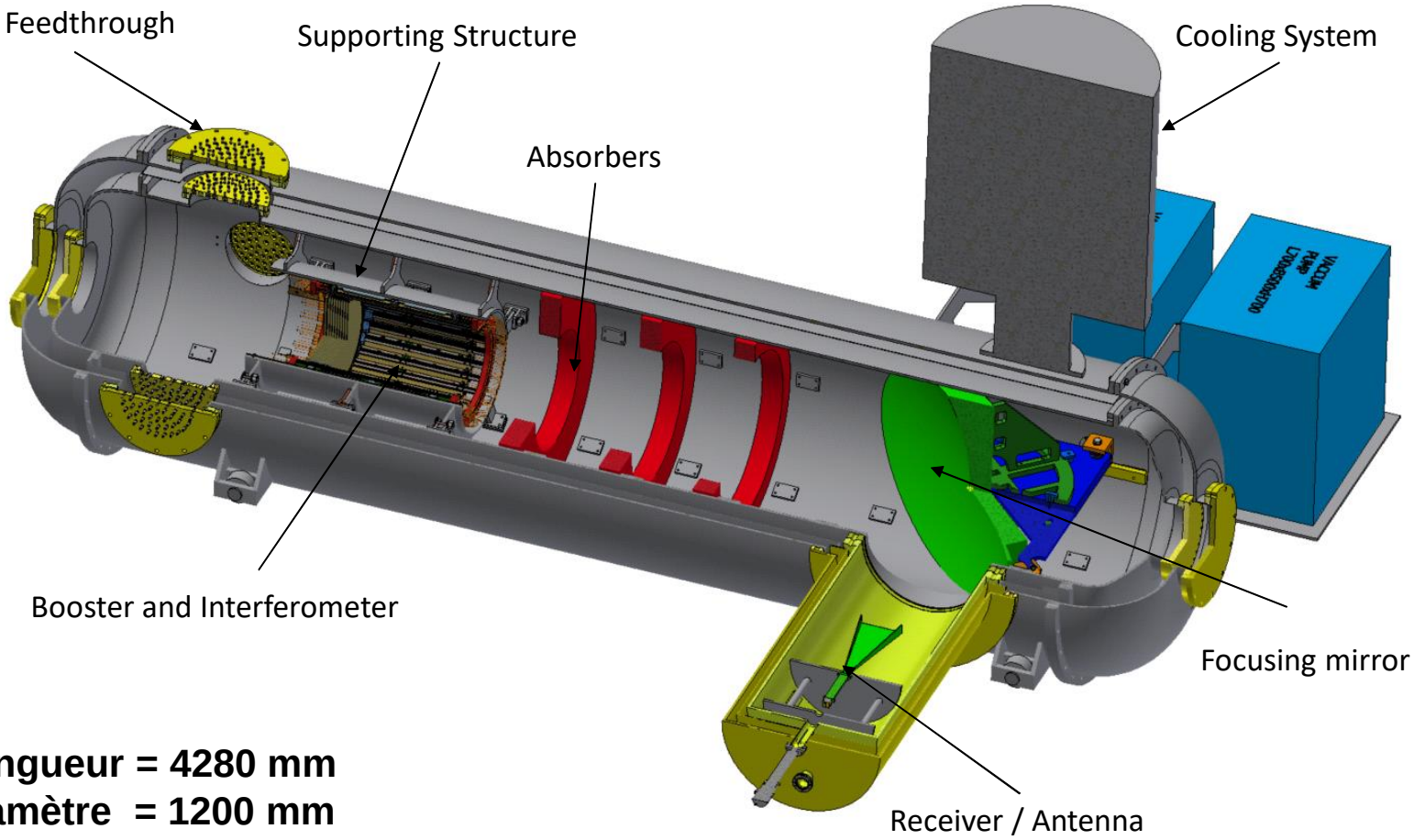
Content

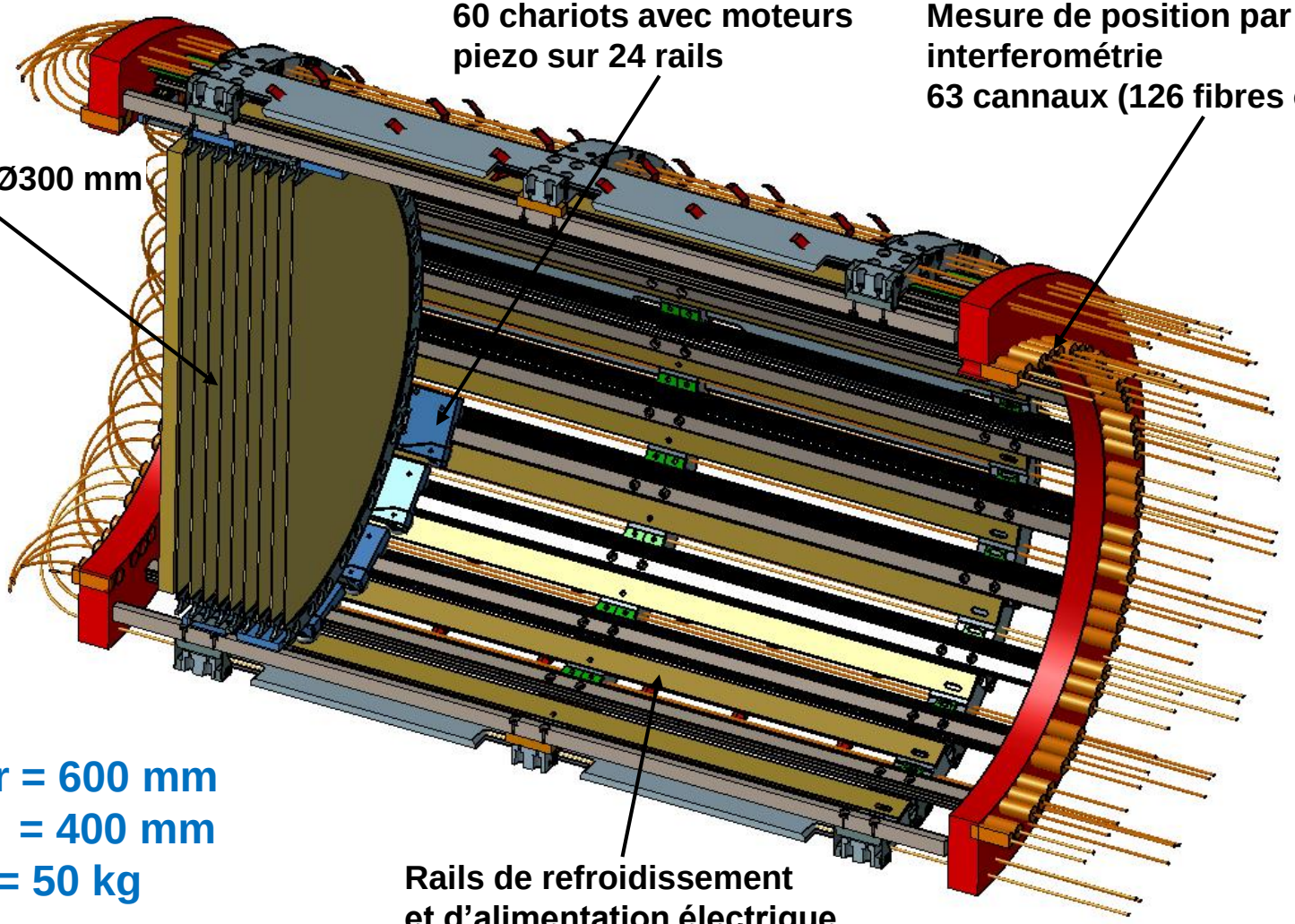
- Technical Coordination
- Disk Ring
- Cryostat Insertion Rails
- Final disk measurement

Overview



Longueur = 4280 mm
Diamètre = 1200 mm
Masse = 5000 kg

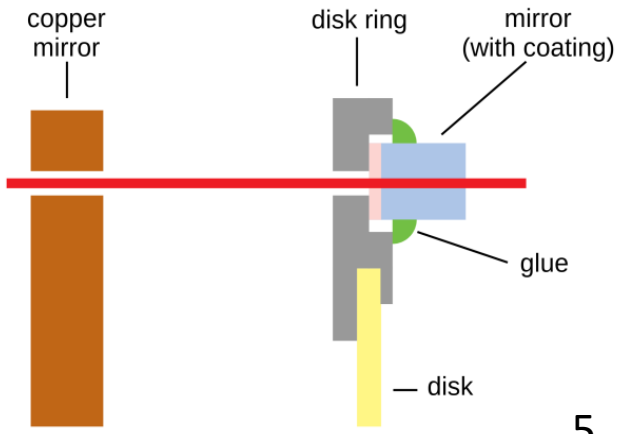
Overview



Longueur = 600 mm
Diamètre = 400 mm
Masse = 50 kg

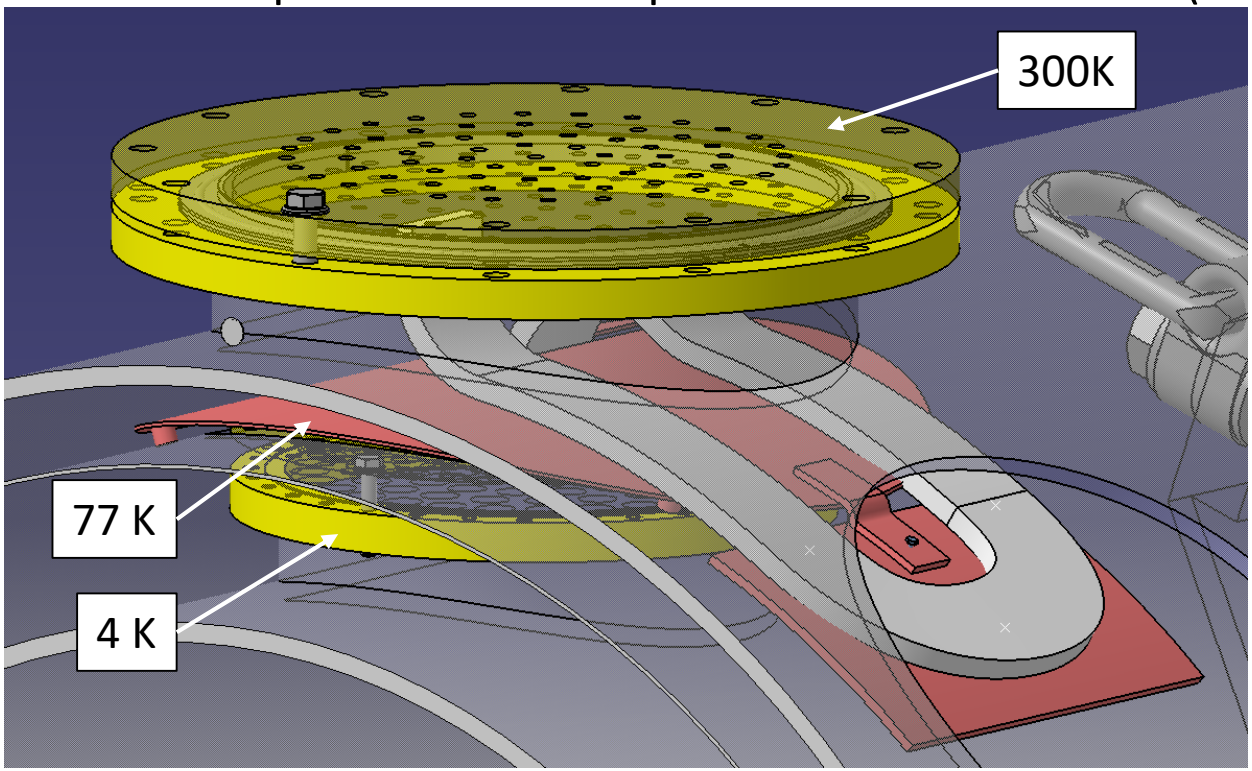
Technical coordination

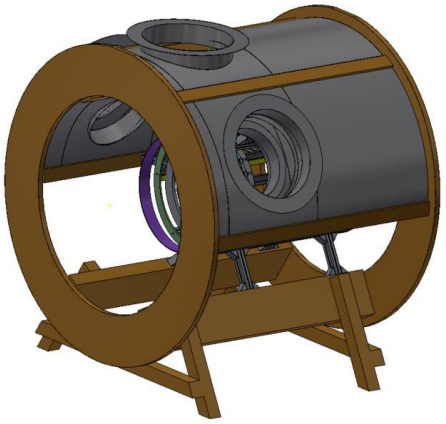
- Booster :
  - Amélioration du processus de fabrication des disques (UHH)
    - Support rectifié (planéité < 5 µm)
    - Atmosphère contrôlée (T° et humidité)
    - Découpe des hexagones
  - Chariot JPE (UHH)
    - Spécification du chariot et du moteur piezo
    - Question sur les performances (vitesse, dissipation thermiques, câblage)
  - Interferomètre (Tubingen)
    - Miroirs => Support de disque
    - Dissipation thermique et les Feedthroughs
    - Calibration et les procédures d'assemblage



Technical coordination

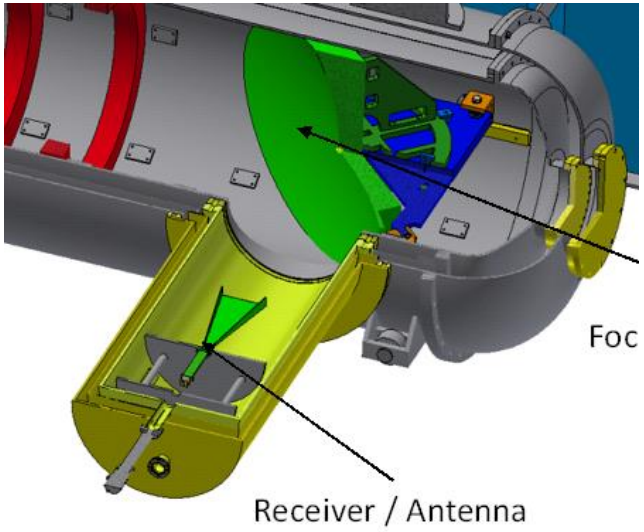
- Cryostat : (UHH + DESY)
  - Document de spécification
  - Plan d'interfaces
  - Feedthroughs => Proposition
  - Maquette des Brides pour traversée étanches (MPI)



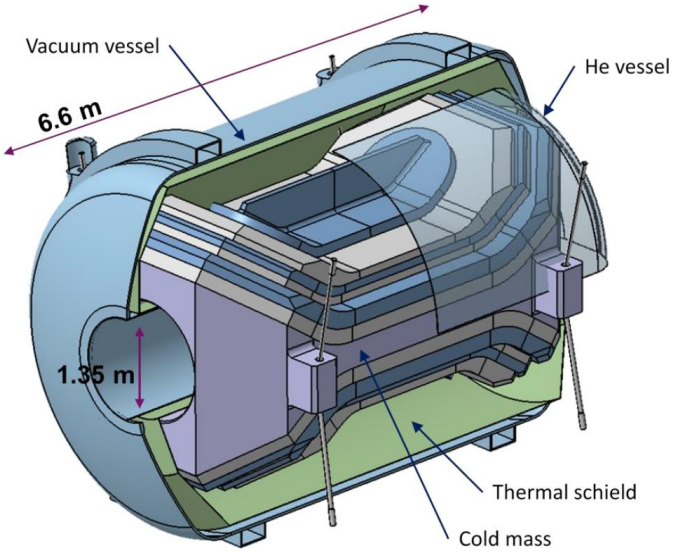


Technical coordination

- Receiver / Antenna (MPI)
  - Interface with Booster Cryostat
  - Mouvement de l'antenne
  - Refroidissement



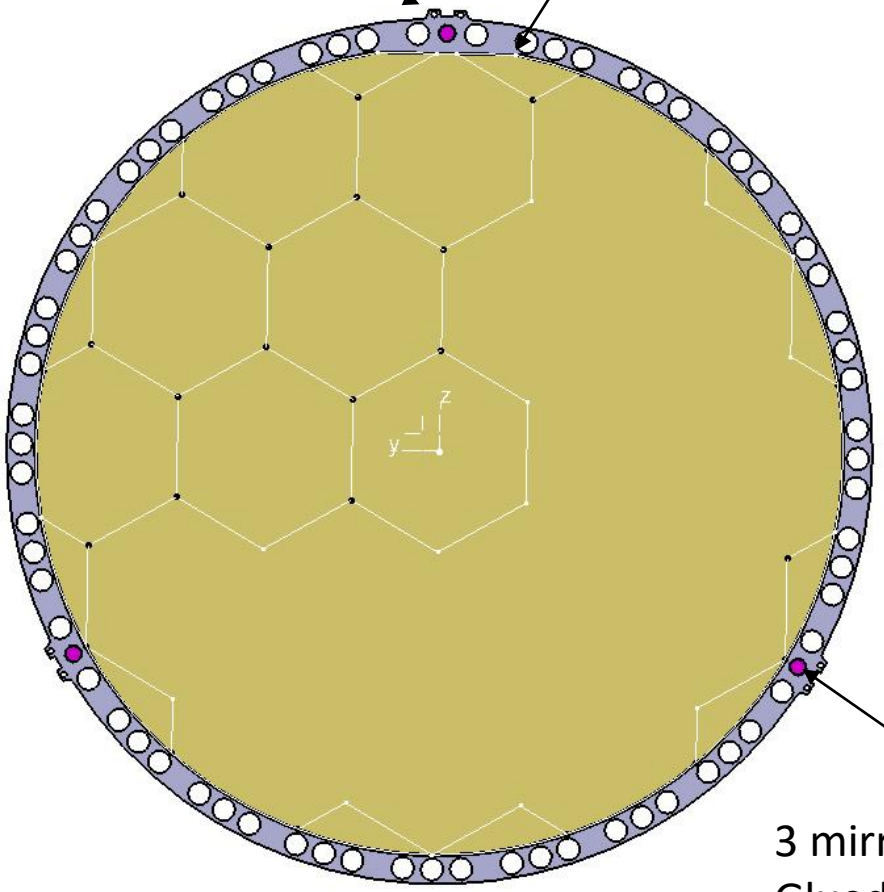
- Aimant (25 M€) : CEA / Noell
  - R&D choix du conducteur => 2020
  - Phase 2 = Aimant intermédiaire => 2025 (Mesure avec Booster Final)
  - Phase 3 = Aimant complet => 2028

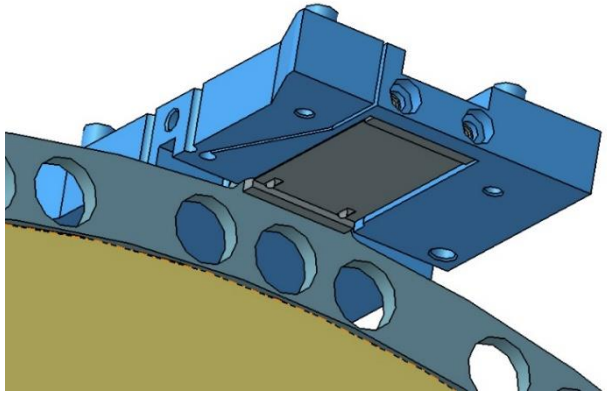


Disk Ring

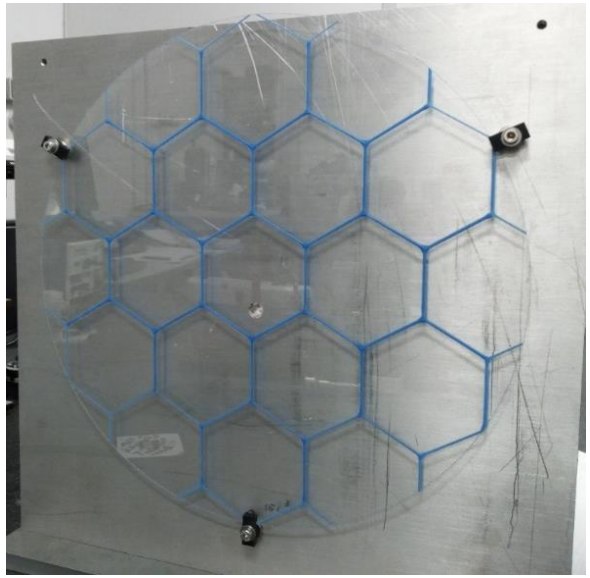
Carriage interface TBD

Orientation of the disk with a straight cut



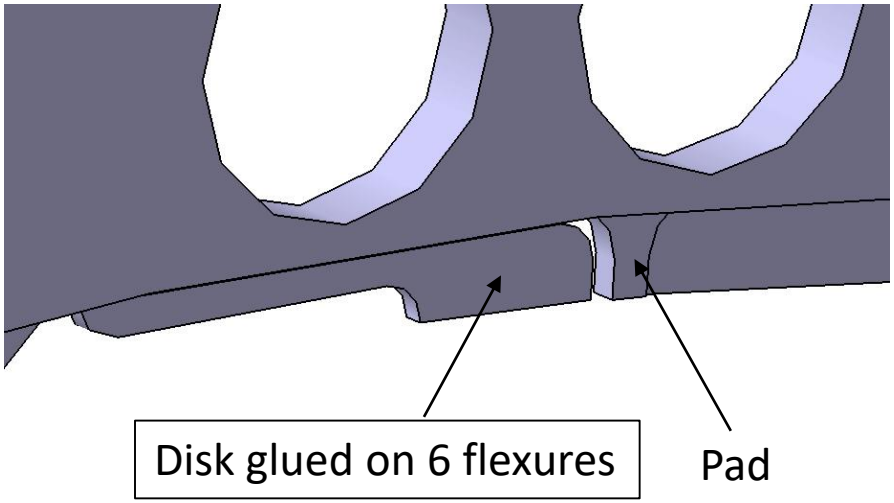


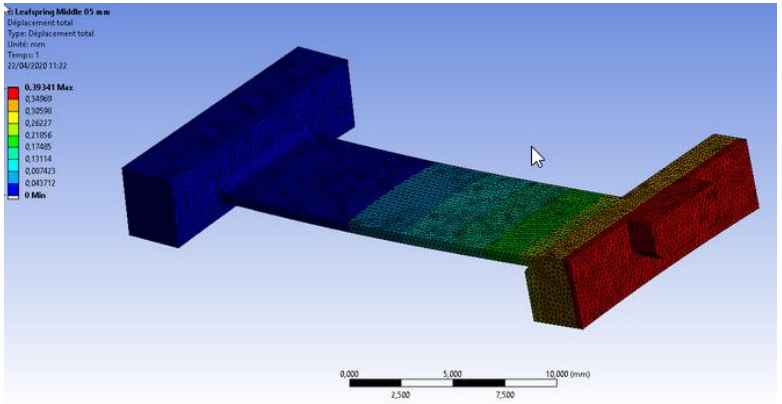
3 mirrors Ø 6.35 mm
Glued on the ring

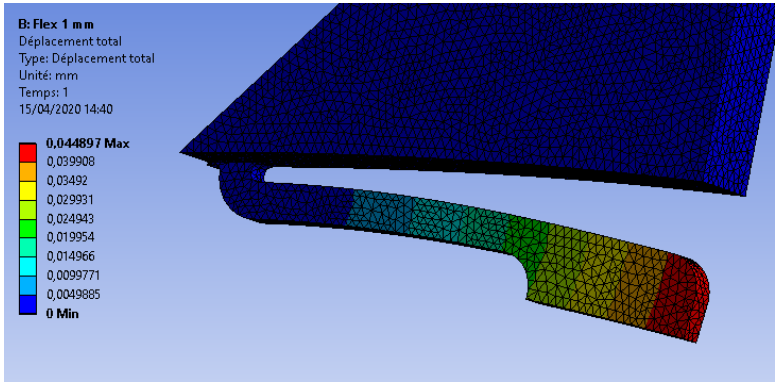


All the rings will be different depending of the position in the stack

Disk Ring



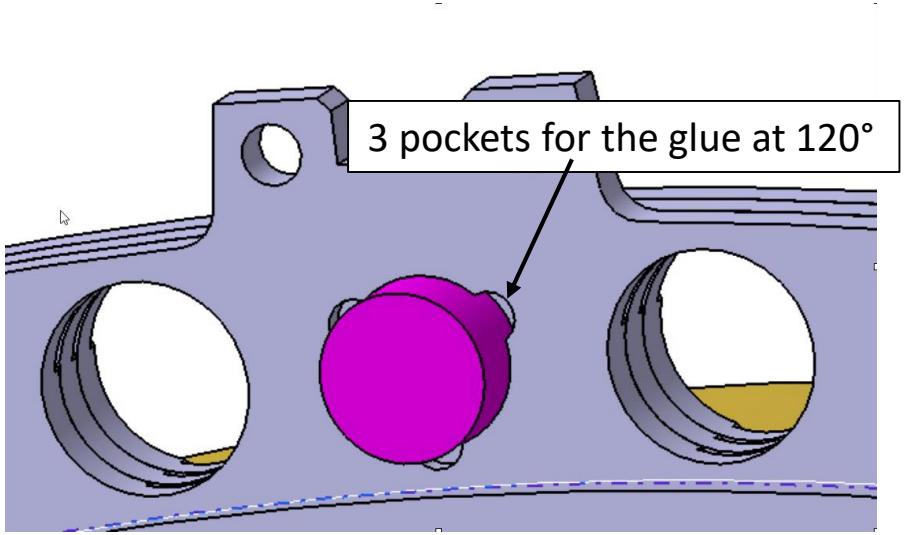


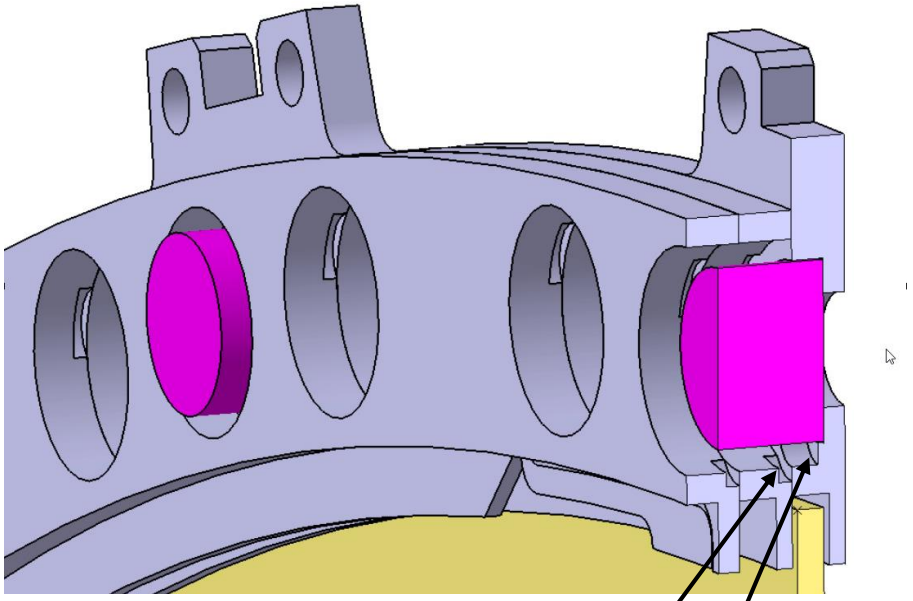


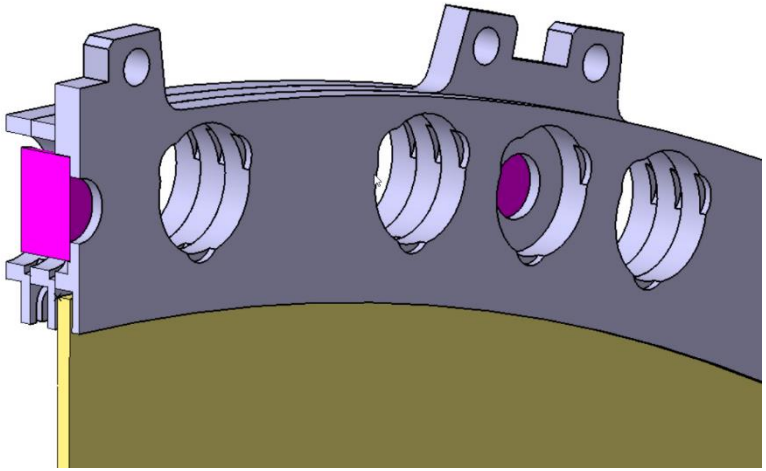
The ring is in contact on 6 pads.
It is glued on 6 flexures.
The thickness of the glue is given by the difference between the pad and the flexure
Current glue thickness = 0.2 mm
Optimum glue thickness to be defined

Linear Expansion Assumption:
LAO = 0.002 mm/mm
Titanium = 0.0017 mm/mm
Diff Shrinkage = 45 µm
σ_{VM} = 45 Mpa (Re = 800 Mpa)
Induced Force = 0.155 N

Disk Ring

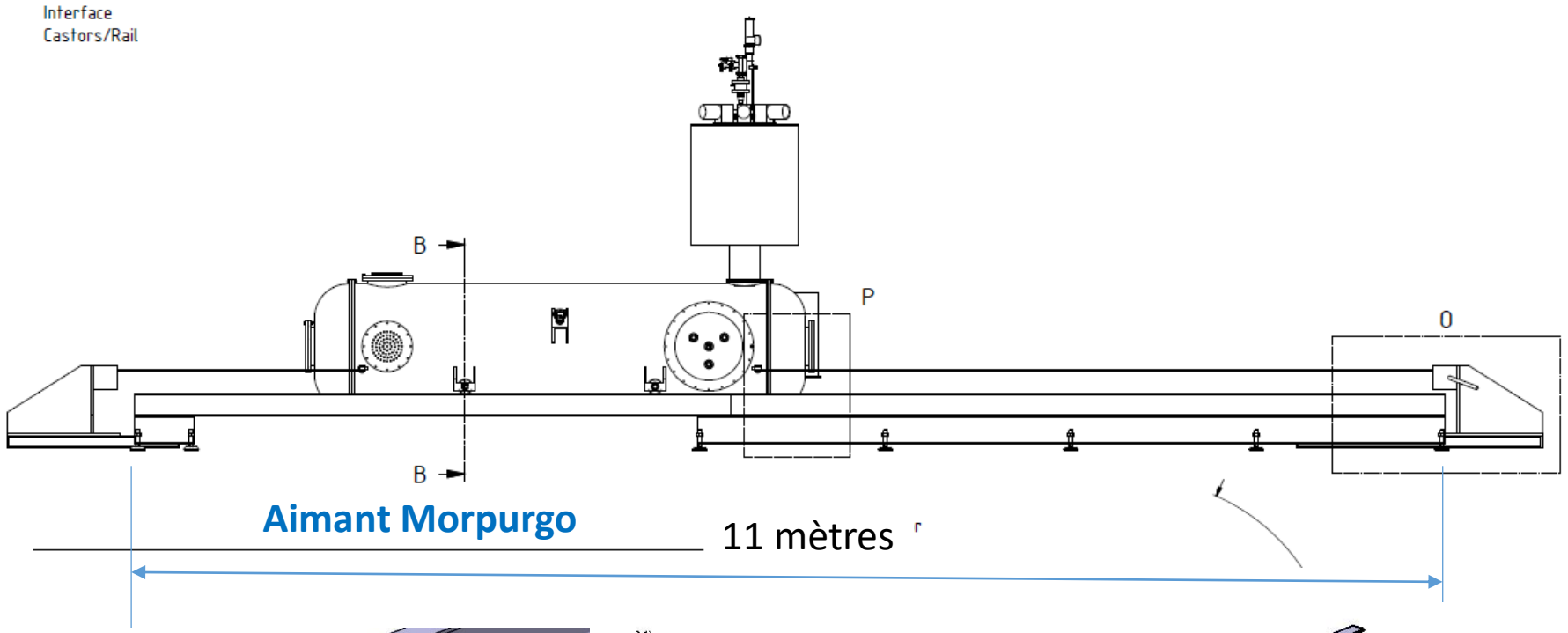


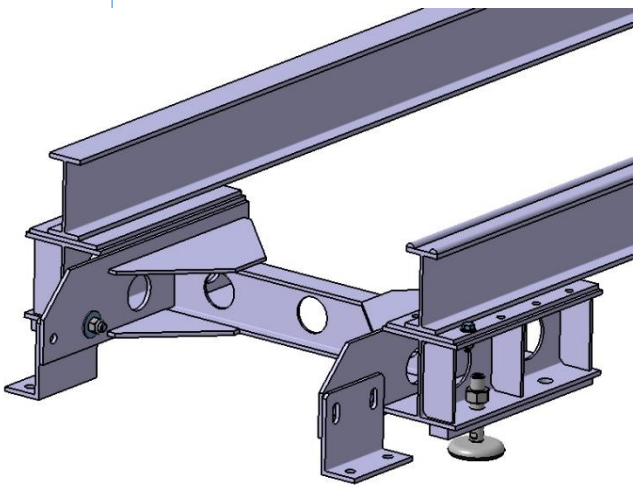


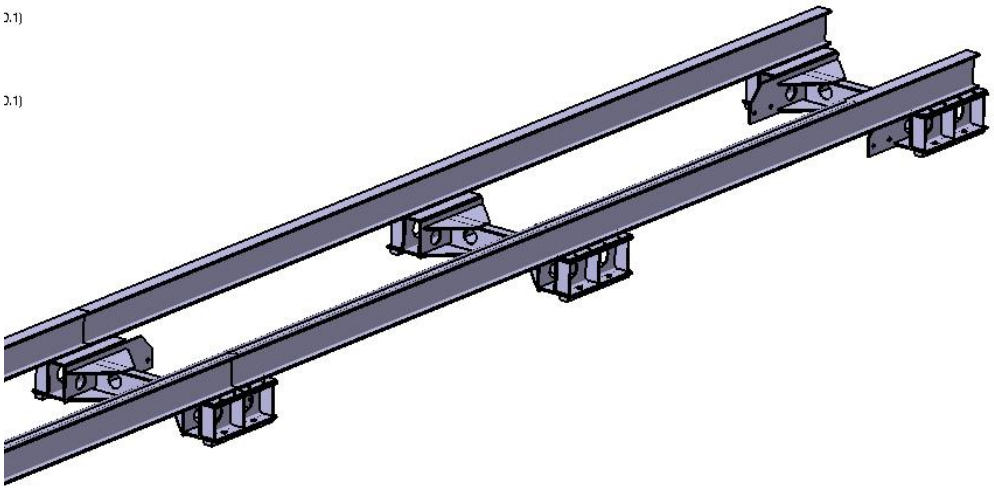


The pockets are filled with glue.
The glue should not extend beyond the surface of the ring, but if it is the case, there is a small clearance in front of each pocket.

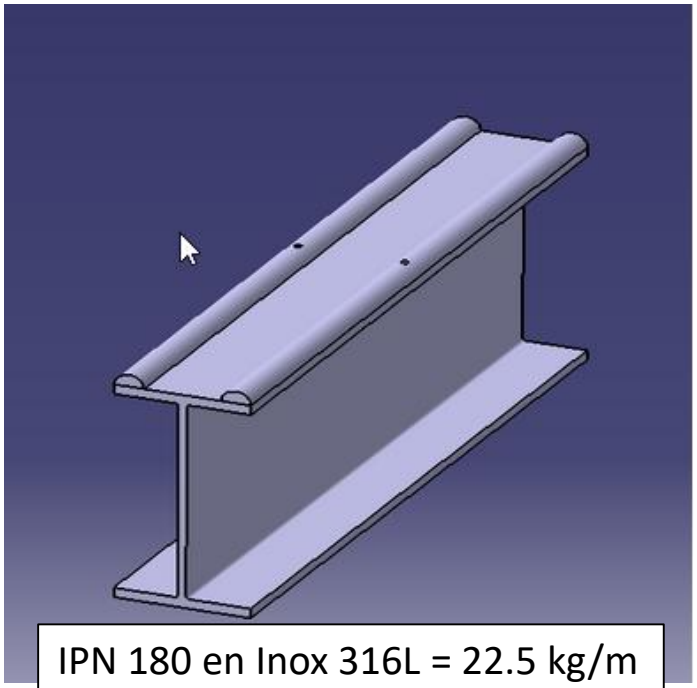
Cryostat Insertion Rails



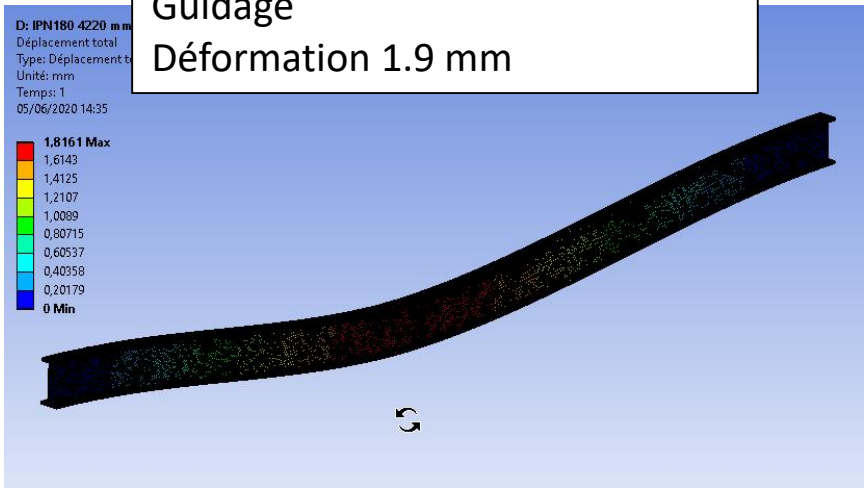


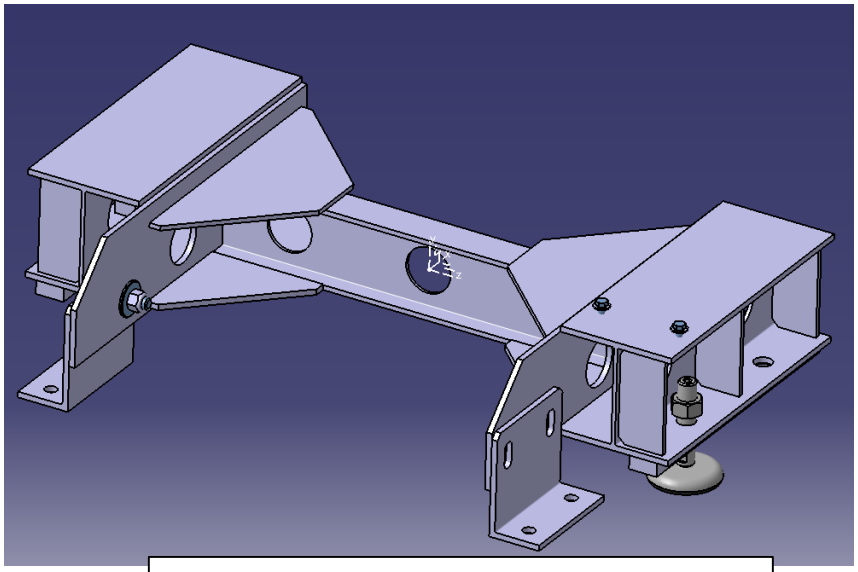


Cryostat Insertion Rails

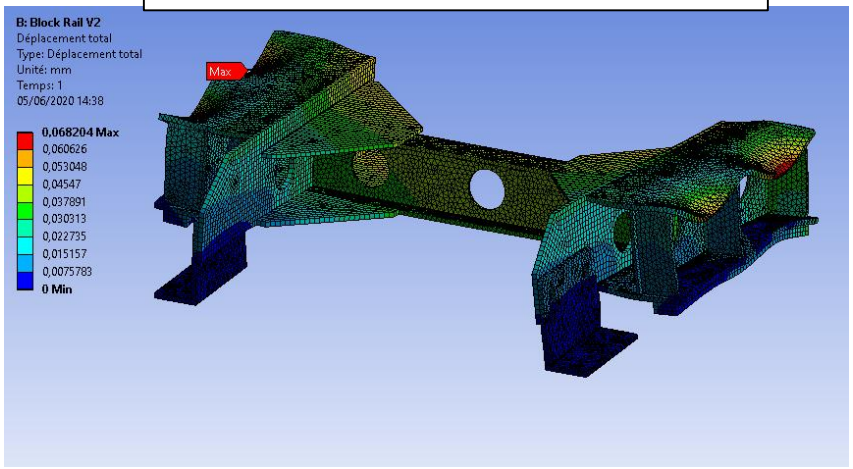


IPN 180 en Inox 316L = 22.5 kg/m
Guidage
Déformation 1.9 mm





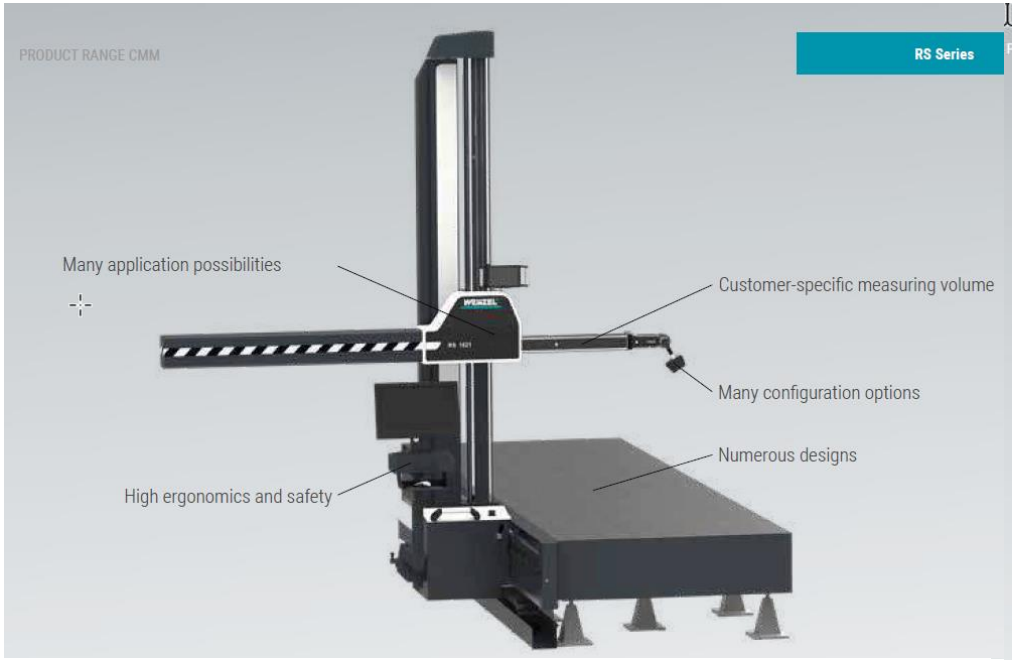
Block support modulaire = 107 kg
Réglable en hauteur
Fixation sur bloc en béton



Mesure des disques 1,15 m

- **Métrologie de disque de 1150 mm de diamètre à la verticale ➔ précision < 10 µm**
  - **Machine à mesurer tridimensionnelle**
  - **Machines spéciales ➔ recherche de composants (rails linéaires + sondes optiques)**
  - **Prestations extérieures de conception de machines**
  - **Prestations extérieures de réalisation de mesures**
  - **…**

Mesure des disques 1,15 m



Measuring volume X-axis	**Custom**
Measuring volume Y-axis	**up to 2100; Duplex up to 4000 mm**
Measuring volume Z-axis	**up to 3000 mm**
Measurement uncertainty	**$E_{L,\ MPE}$ from 15+L/45 ≤ 50 (µm)***

MEASURING ACCURACY

Type	Measuring ranges X x Y x Z (mm)	Volumetric length measuring uncertainty $E_{L,\ MPE}$ (µm) Premium Select
LH 1515	1500 x 2000/3000/4000 x 1500	2,5 + L / 450
LH 2015	2000 x 3000/4000/5000 x 1500	2,8 + L / 450
LH 2317	2300 x 4000/5000/6000 x 1750	3,1 + L / 450

Prochaine étapes

- Disk Ring :
  - Validation du design pour le collage du miroir
  - Fabrication d'un proto de collage du miroir
  - Validation complète du Ring
  - Fabrication d'un Ring complet
  - Test de collage d'un disk + métrologie
- Mesure des disques => Suivant reprise UHH
- Insertion Rail :
  - Design du rail à compléter (ensemble, treuil, butées)
  - Revues de conception (Collaboration et CERN)
  - Consultation Fabrication
- Mesures disque 1.15 m
  - Consultation prix Machines et contraintes d'installation
  - Consultation des capteurs de mesure
  - Brain storming manipulation et support des disques