

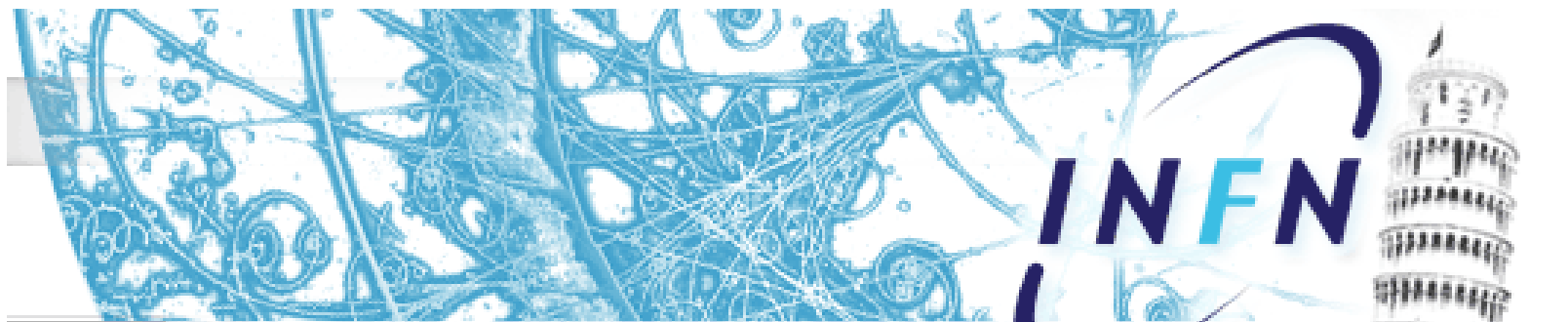


I.R. Assembly Quick Demounting

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on behalf of the SuperB SVT Group





Outline



- I.R. Assembly components
- Motivation for Quick Demounting operation
- Description of Q.D.
- Conclusion

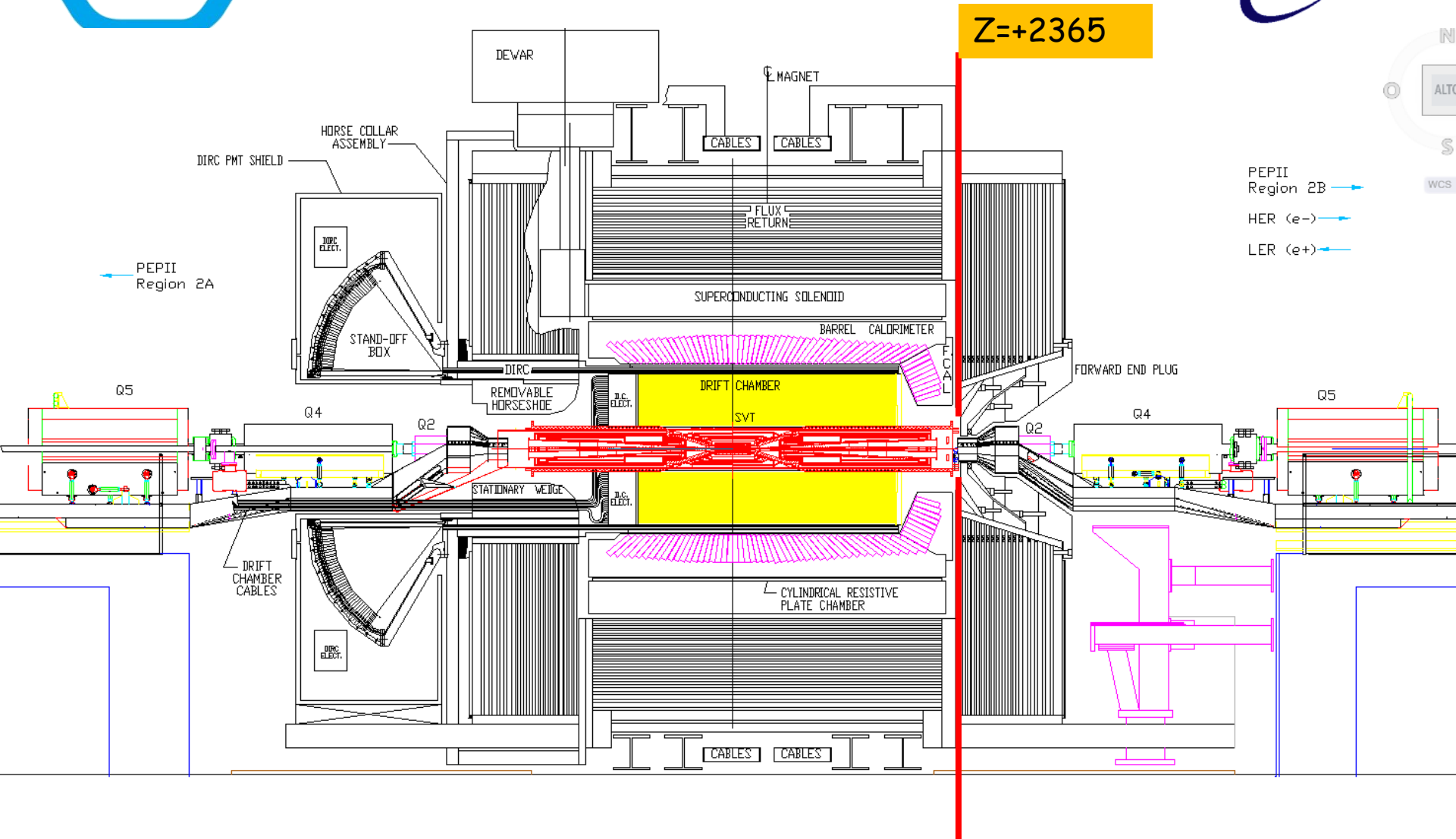


I.R. Assembly Quick Demounting



- Quick Demounting is an operation that allows to approach the SVT detector at the internal of SuperB experiment in a short time, in the case LO is damaged and has to be repaired or changed.
- Time for this operation has to be shorter with respect to the BaBar experiment
- The components involved in this operation are :
cryostat forw/back +SVT + LO + Be pipe + Shield forw/back
- In this hypotesis we assume that:
 - Cylindrical shields back/forw are separated bodies from the Conical shield forw/back
 - The Cylindrical shields back/forw are fixed on to the calorimeter and aligned along Z direction .

These components have to be moved to the forward direction until FCAL region ($Z=+2365$ mm) for a stroke of about 3200 mm because in that region is possible to operate on SVT.





I.R. Assembly Quick Demounting



-From a mechanical point of view the superb I.R. configuration is such that there are 2 very rigid systems, positioned in the forward and backward sides.

Each system consists of Cryostat + Conical shield + External Tube , joined through the gimbal rings constraint at the SVT detector.

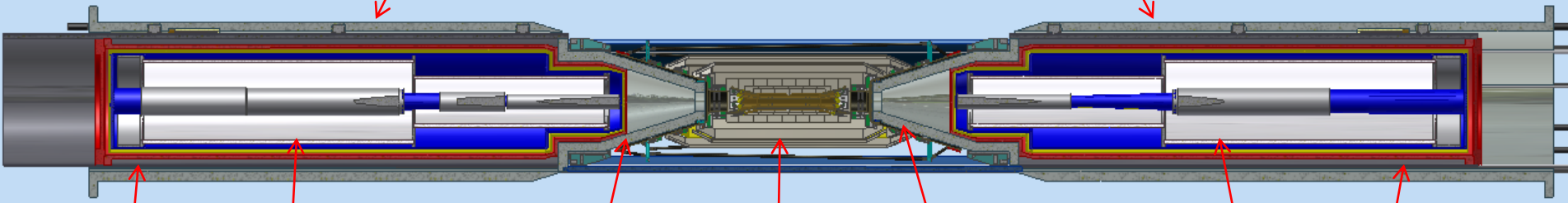
The Be beam-pipe is joined to the Criostat beam-pipe through the bellow/flanges system.

- In a different way from the BaBar experiment, where the SVT region was stiffened by the support-tube, in the SuperB experiment, is not possible to profit of any stiffening structure !

-Therefore it is necessary to design a temporary/removable structural support (Temporary Cage) that fixes the 2 conical shields and absorbs all the mechanical stress that could be present at the moment of the I.R. assembly.

Cylindrical Shield
backw

Cylindrical Shield
forw



External tube

Conical Shield

Cryostat

SVT+LO+Be pipe

Conical Shield

Cryostat

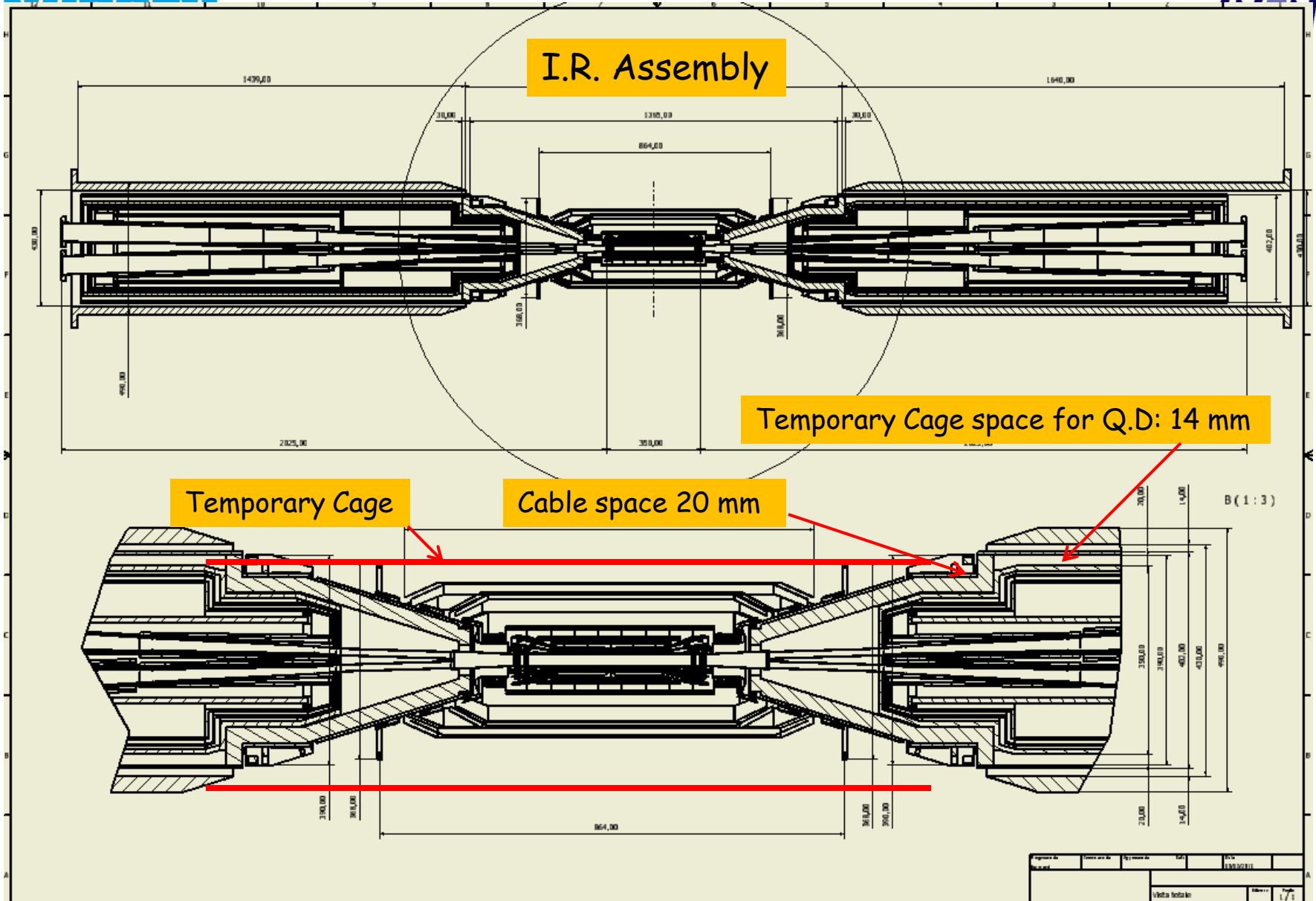
External tube

The SVT/LO cables run over the cryostat vessel, confined in the External tube

The External Tube :

- joints mechanically the cryostat to the Conical shield
- brings the rails to slide I.R. assembly with respect to the recirculating spheres on the Cylindrical shield

Quick demounting





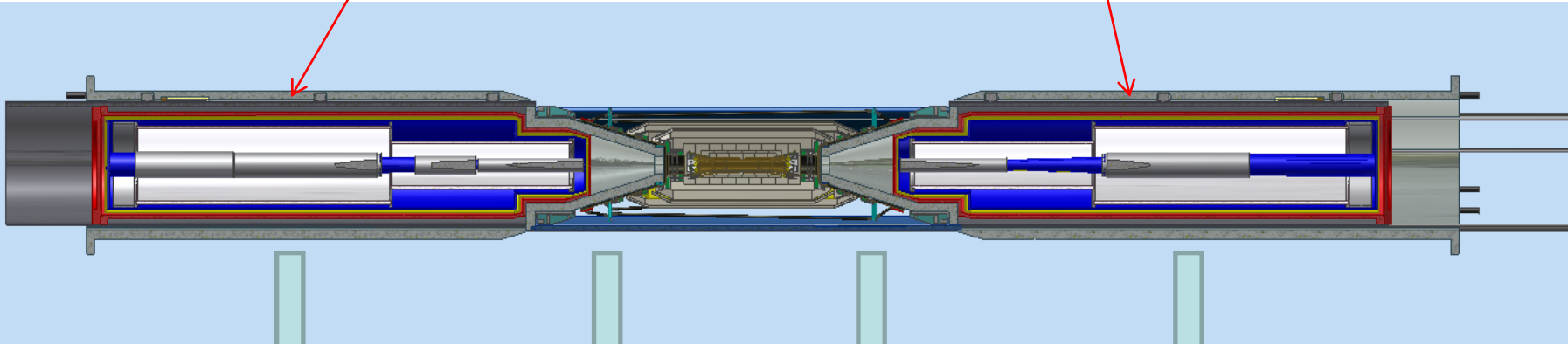
I.R. Assembly Quick Demounting



- When the Temporary Cage is mounted blocking the 2 opposite conical shields, we can consider the I.R. assembly (forw side + back side + SVT central region), as a one rigid body moving that toward the FCAL .
This system is supported by recirculating holding spheres positioned in apposite locations on the Cylindrical shields forw/back.
- On the Cylindrical shields there is also a mechanical system able to rigidly block the I.R. Assembly at the position $Z=0$.
- The blocking is acted by longitudinal bars that push on mechanical conical device embedded in the Cylindrical Shield, able to block radially the External Tube.
This operation fixes the position of I.R.Assembly with respect to the experiment .
- The stroke that is necessary to work on the SVT demounted in front of the FCAL region, is about 3200 mm.

Cylindrical
Shielding 1300 Kg

Cylindrical
Shielding 1300 Kg



$250\text{Kg} + 150\text{Kg} + 50\text{Kg} = 450\text{Kg}$
Cryostate+External
tube+Cables

200 Kg
Conical
Shielding

200 Kg
Conical
Shielding

$250\text{ Kg} + 125\text{ Kg} + 50\text{Kg} = 450\text{Kg}$
Cryostate+External tube+Cables

$50\text{ Kg} + 50\text{ Kg} = 100\text{Kg}$
SVT + Temporary Cage

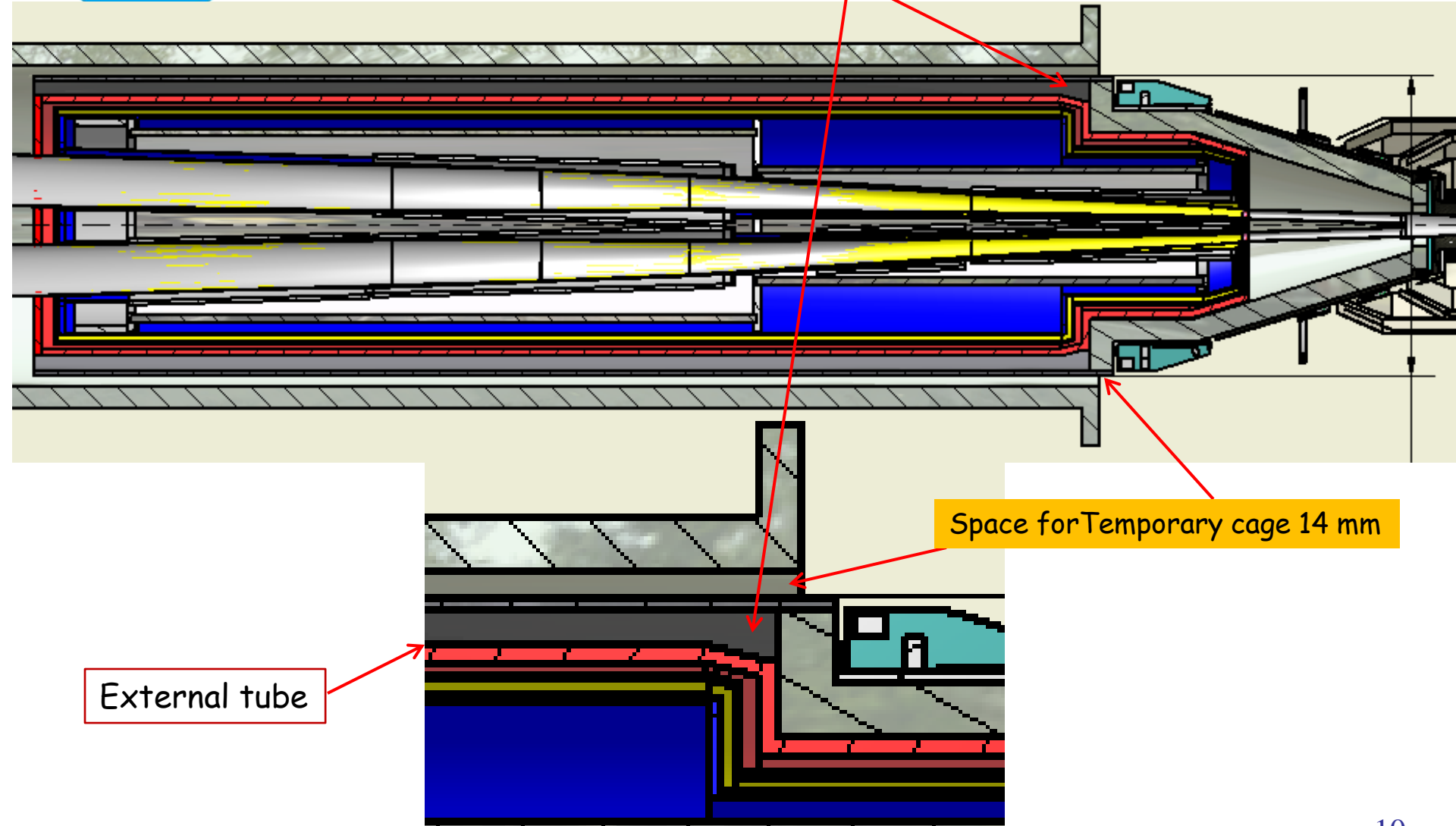
Total weight to move for quick demounting $\approx 1400\text{ Kg}$

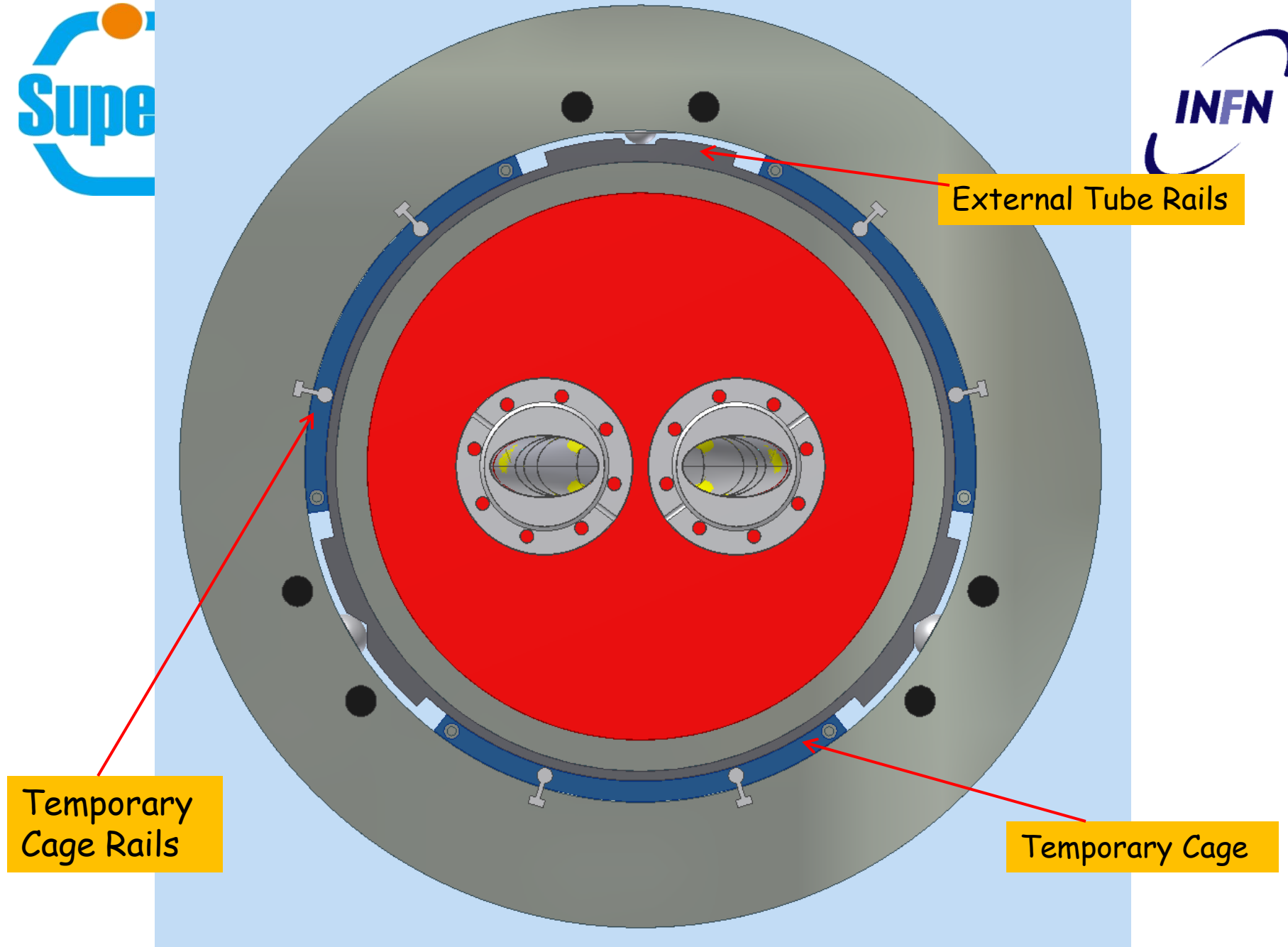
Quick demounting

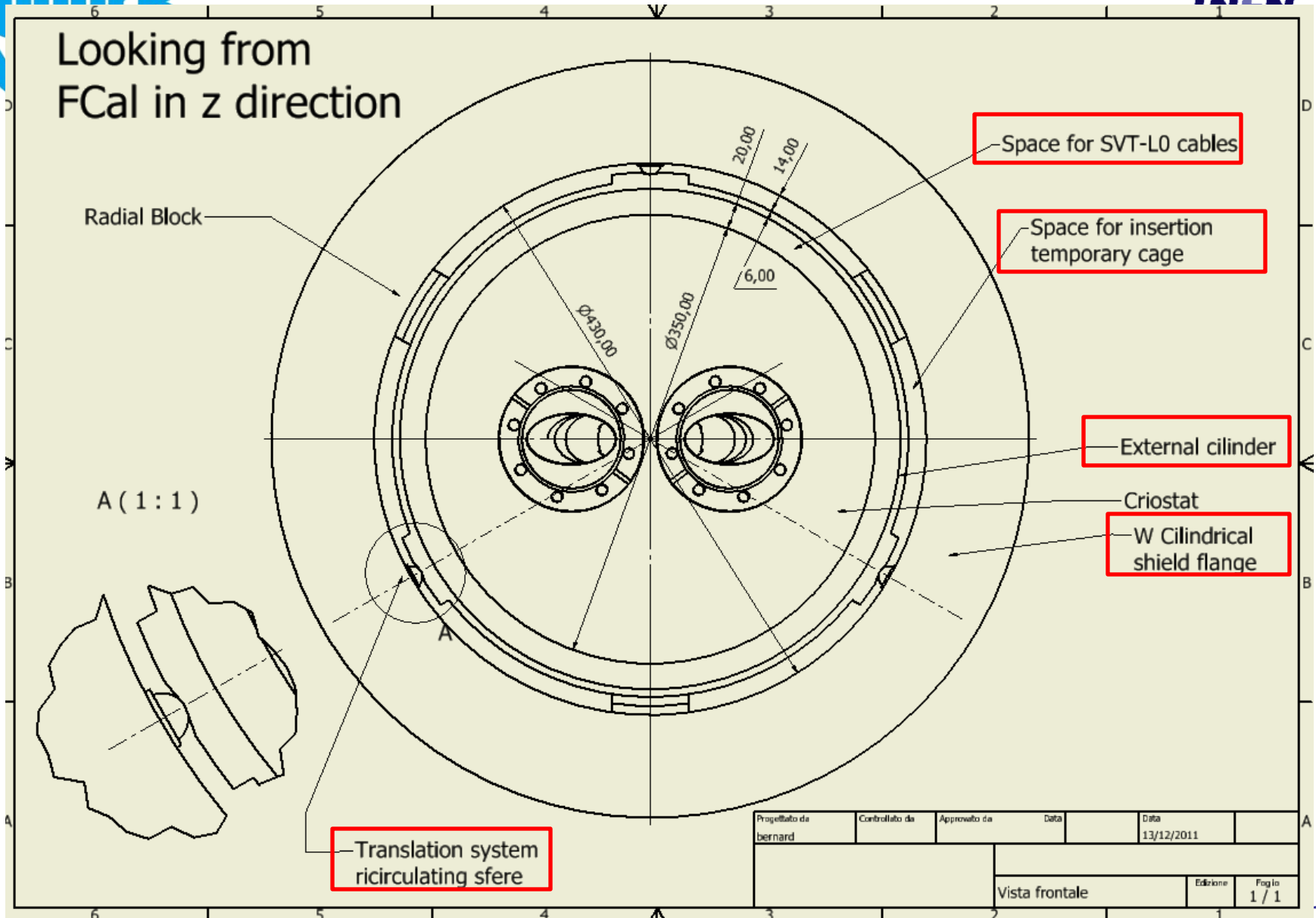
SVT cable space 20 mm

Space for Temporary cage 14 mm

External tube

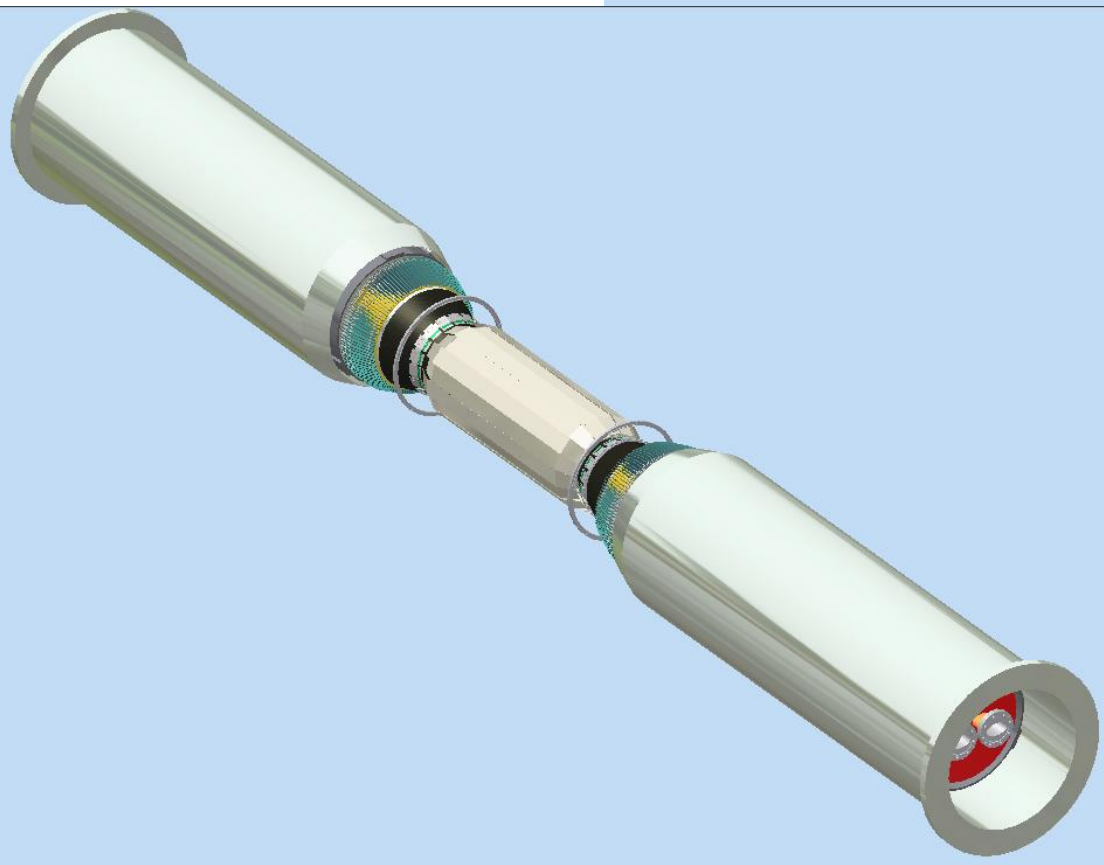
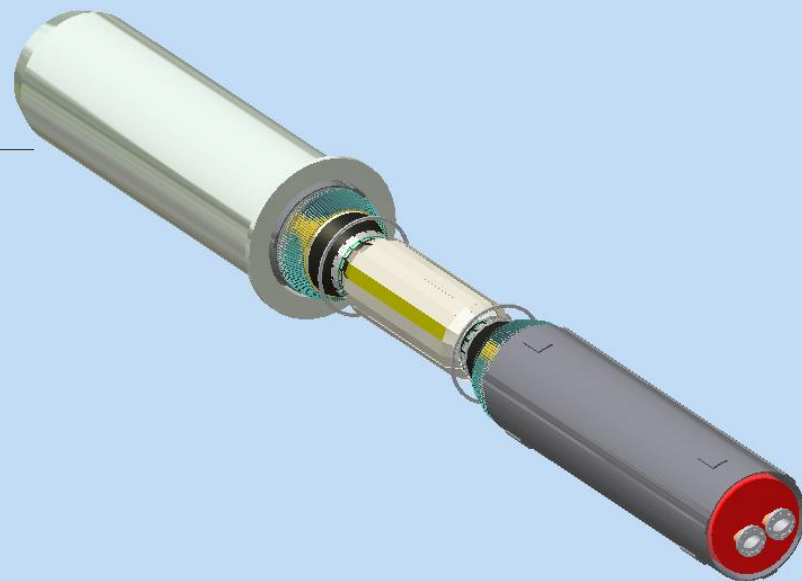
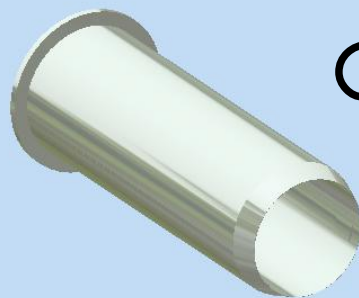






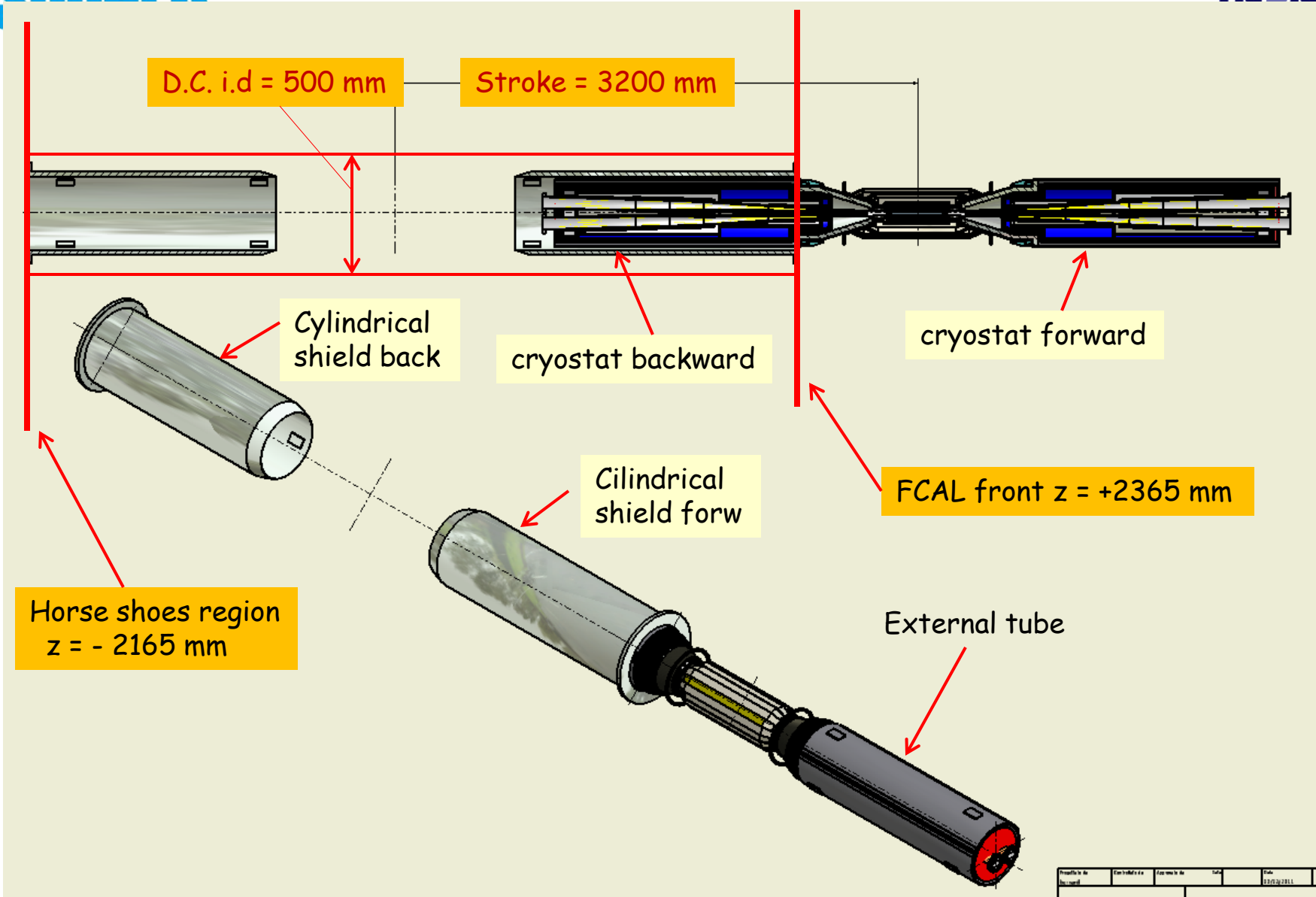


Quick demounting



SVT

- 1) In running condition
- 2) In removal condition at the end of the stroke



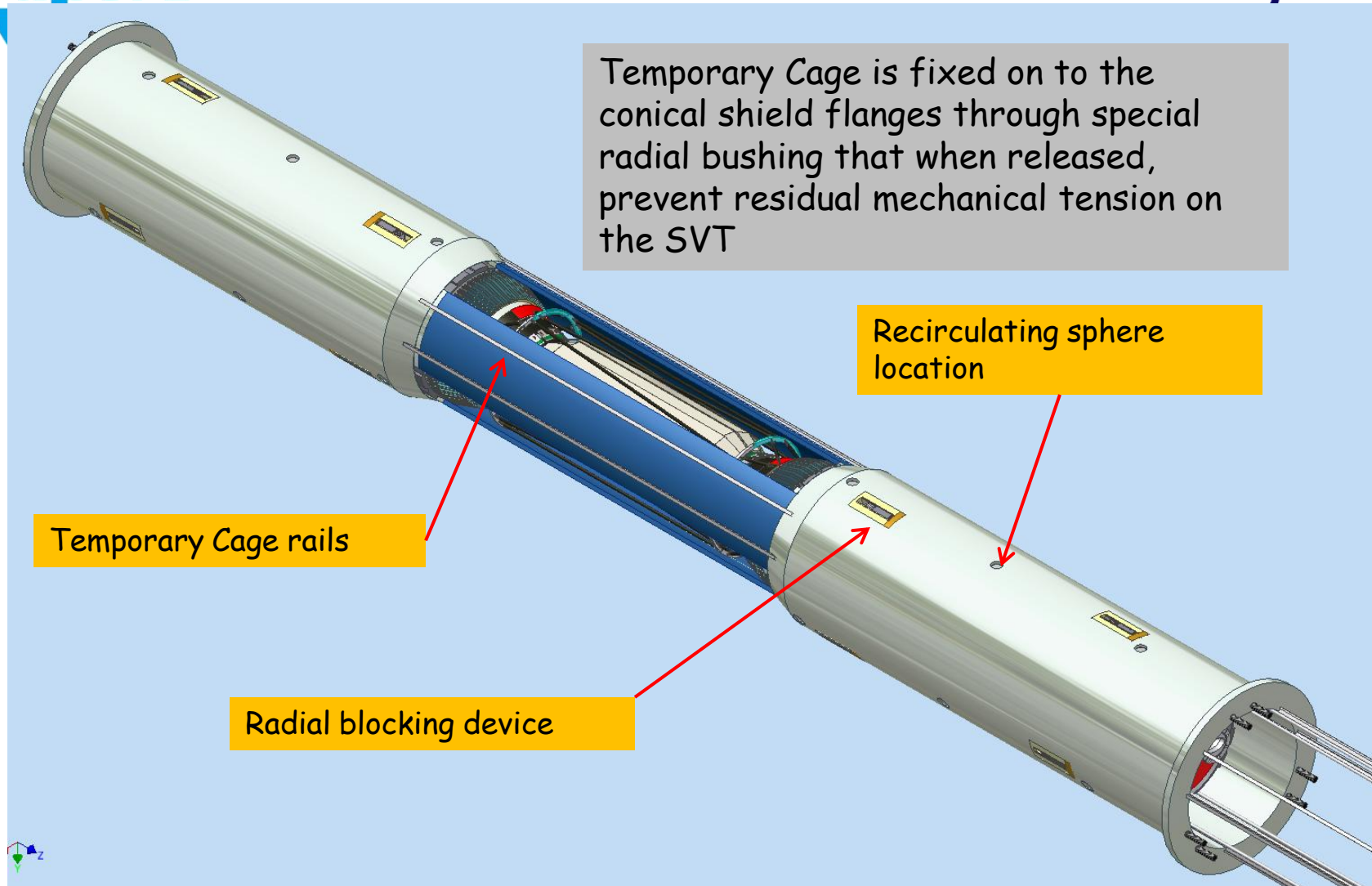
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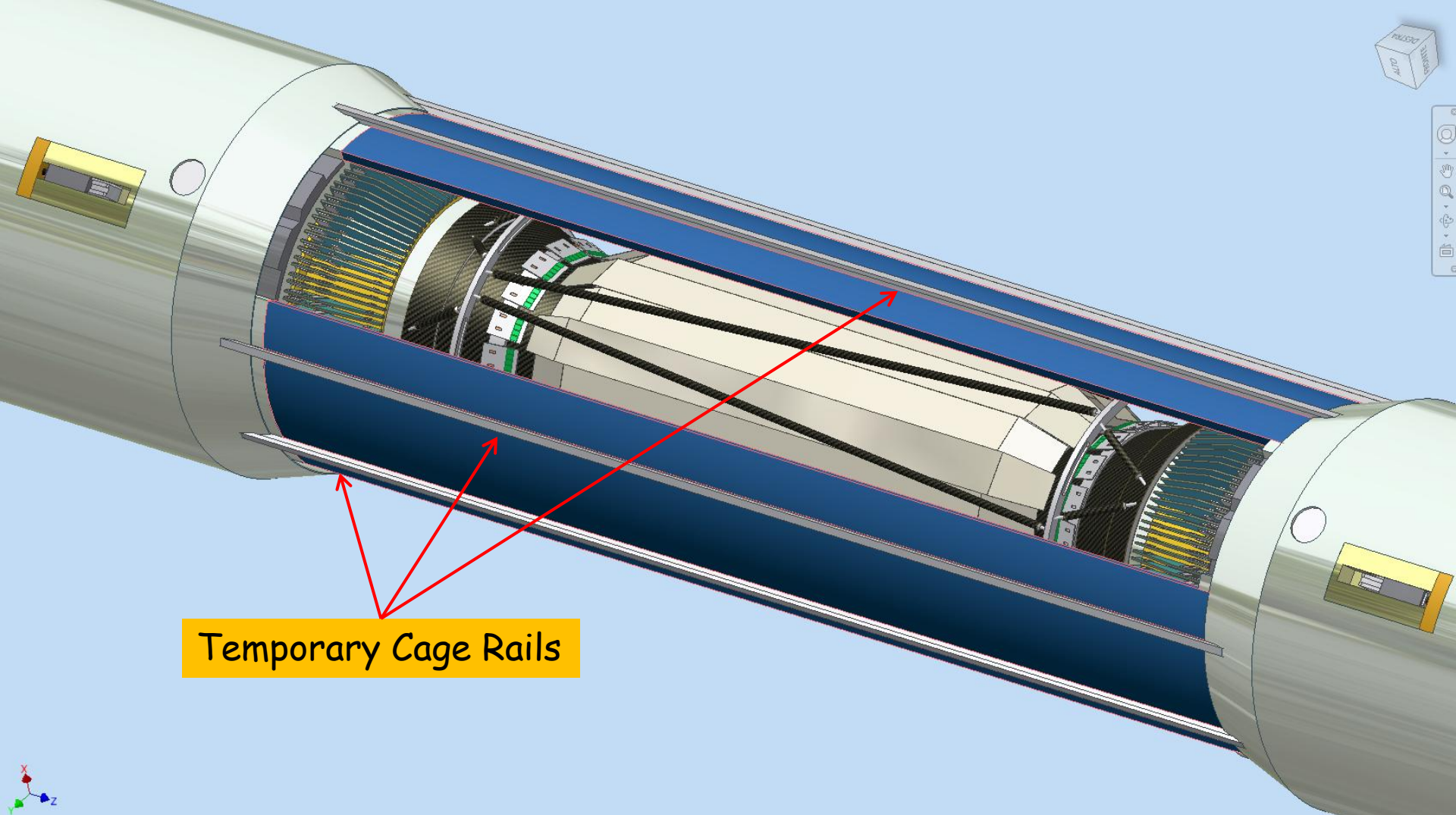
Temporary Cage is fixed on to the conical shield flanges through special radial bushing that when released, prevent residual mechanical tension on the SVT

Recirculating sphere location

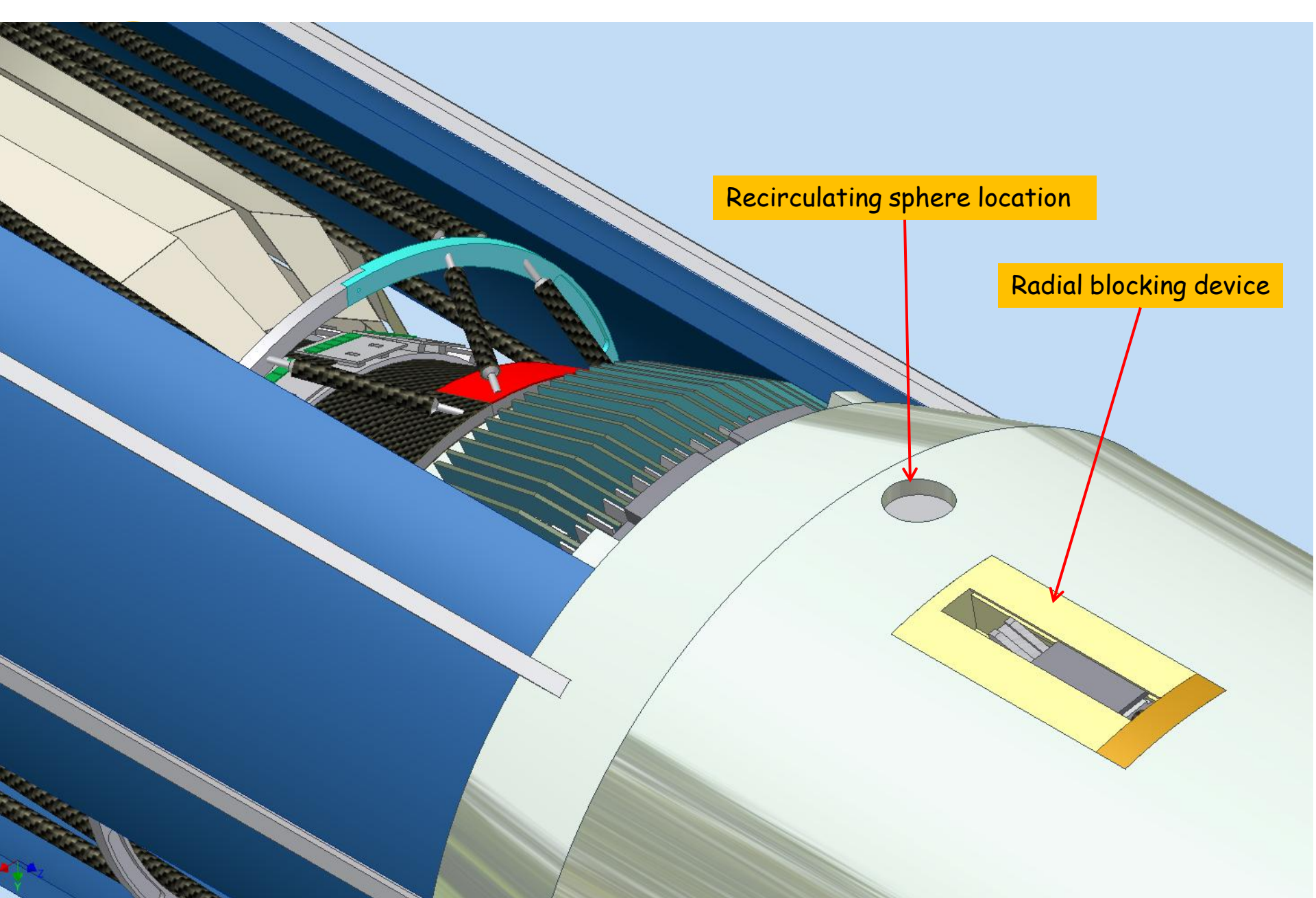
Temporary Cage rails

Radial blocking device



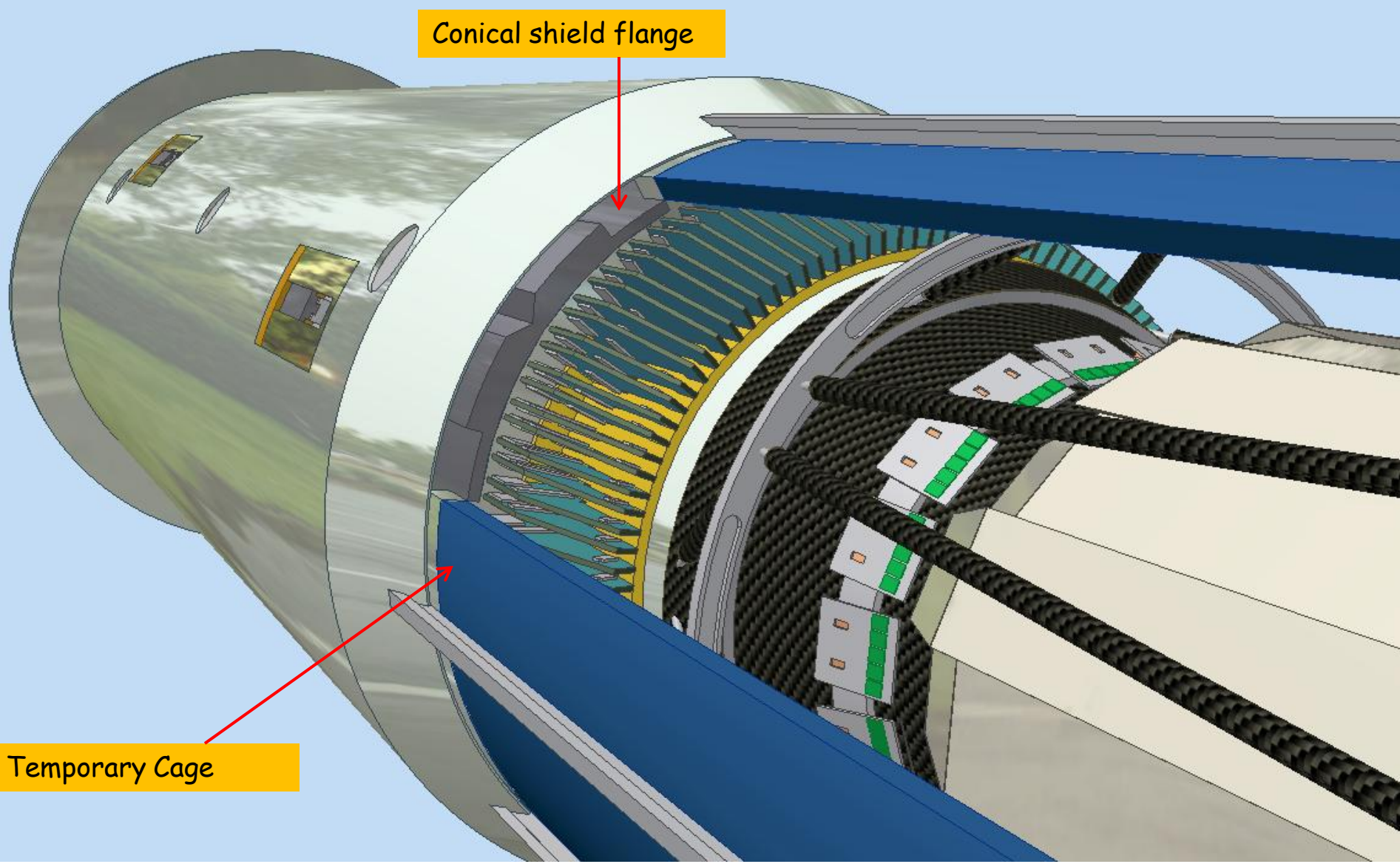


Temporary Cage Rails



Recirculating sphere location

Radial blocking device

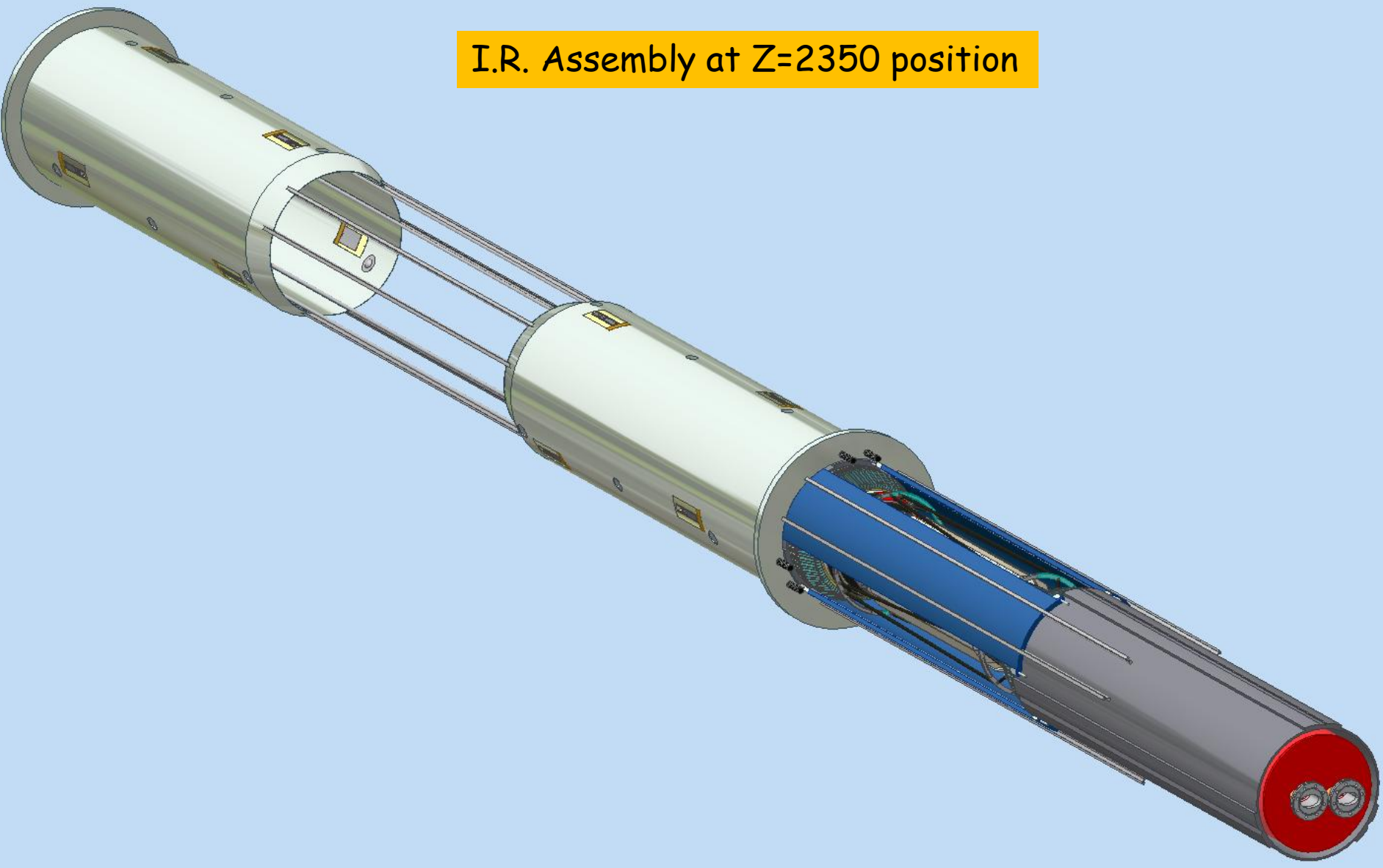


Conical shield flange

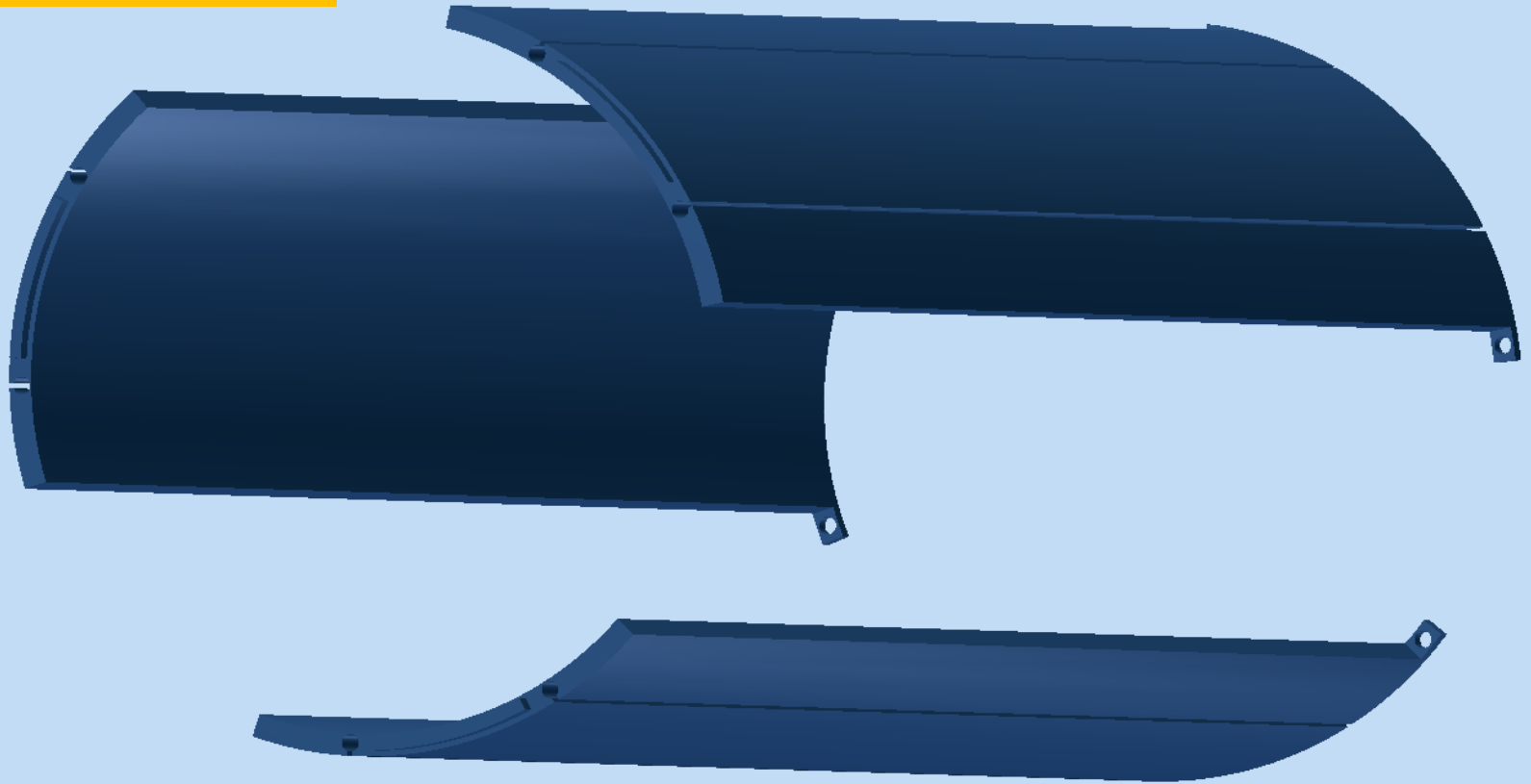
Temporary Cage

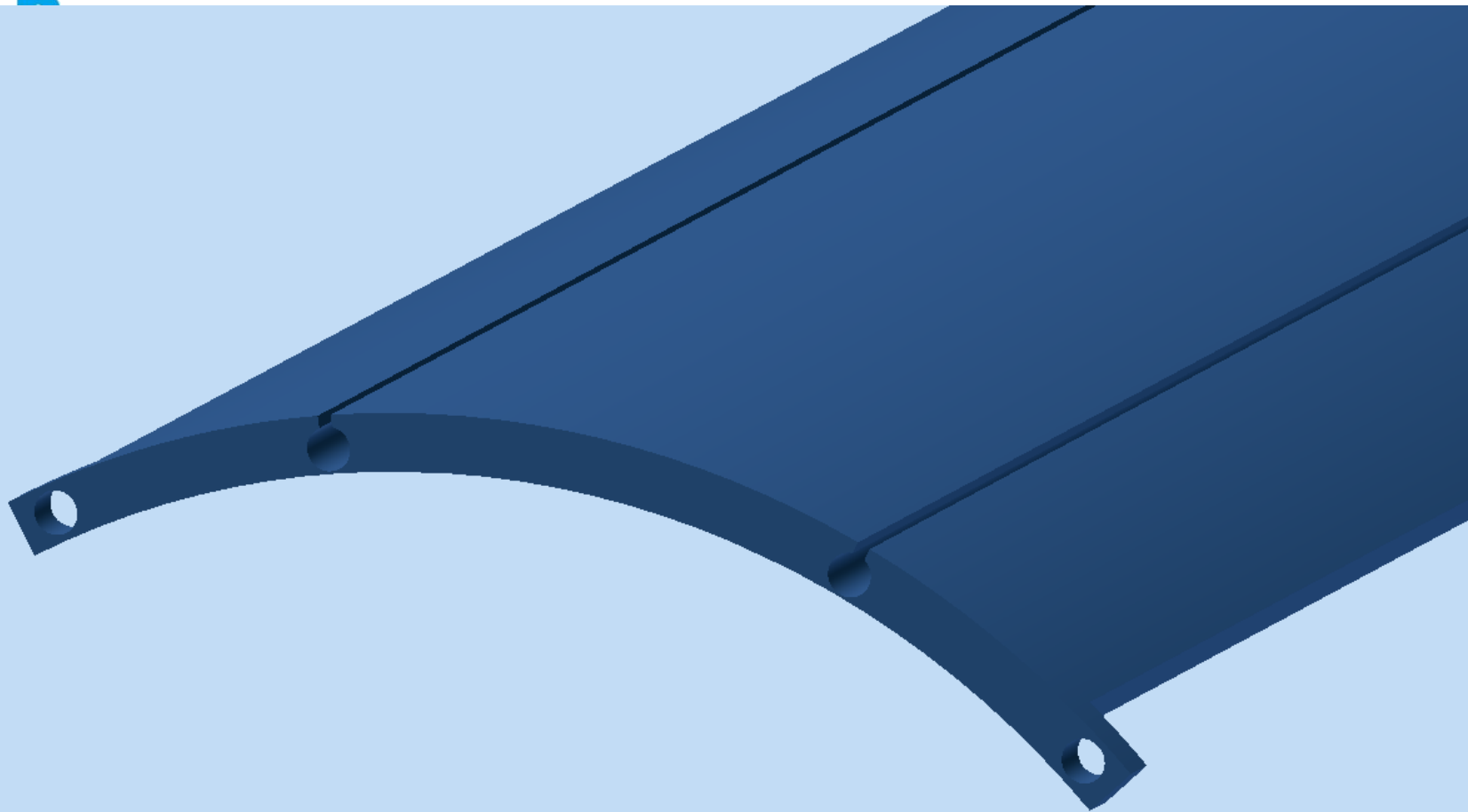


I.R. Assembly at Z=2350 position



Temporary Cage sectors

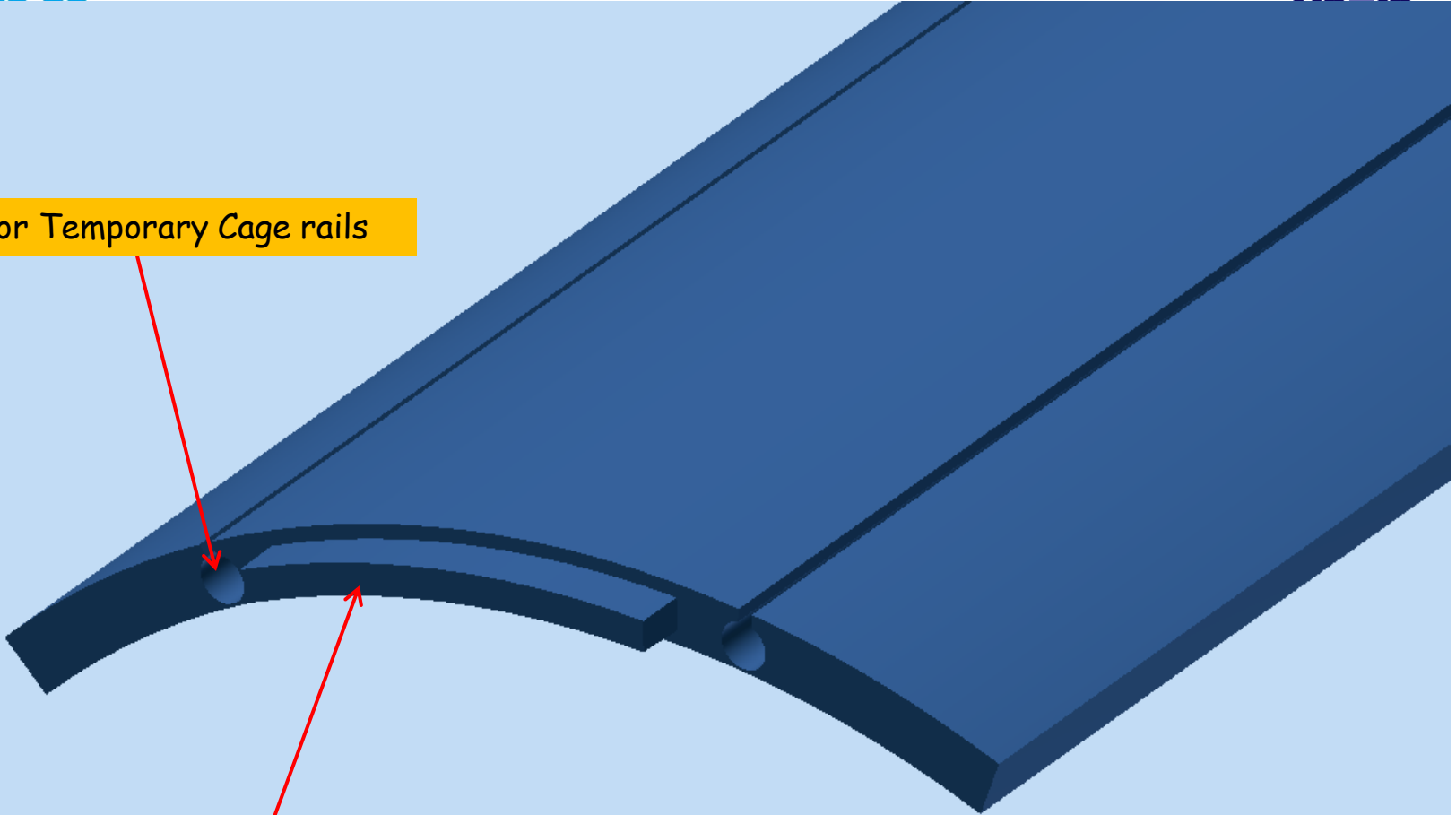




Temporary Cage joint to the forward conical shield flange

Space for Temporary Cage rails

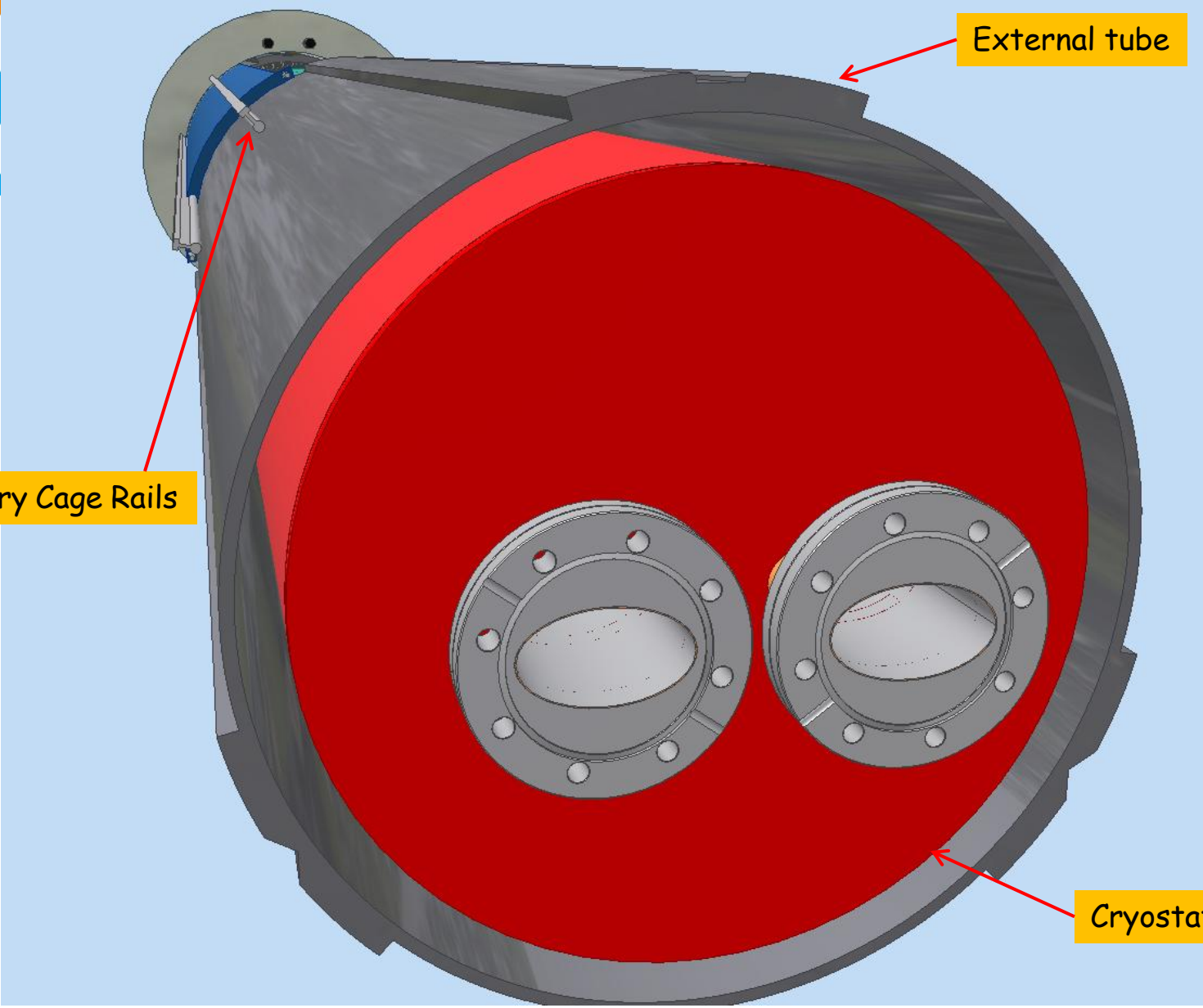
Temporary Cage shear joint to the backward conical shield flange

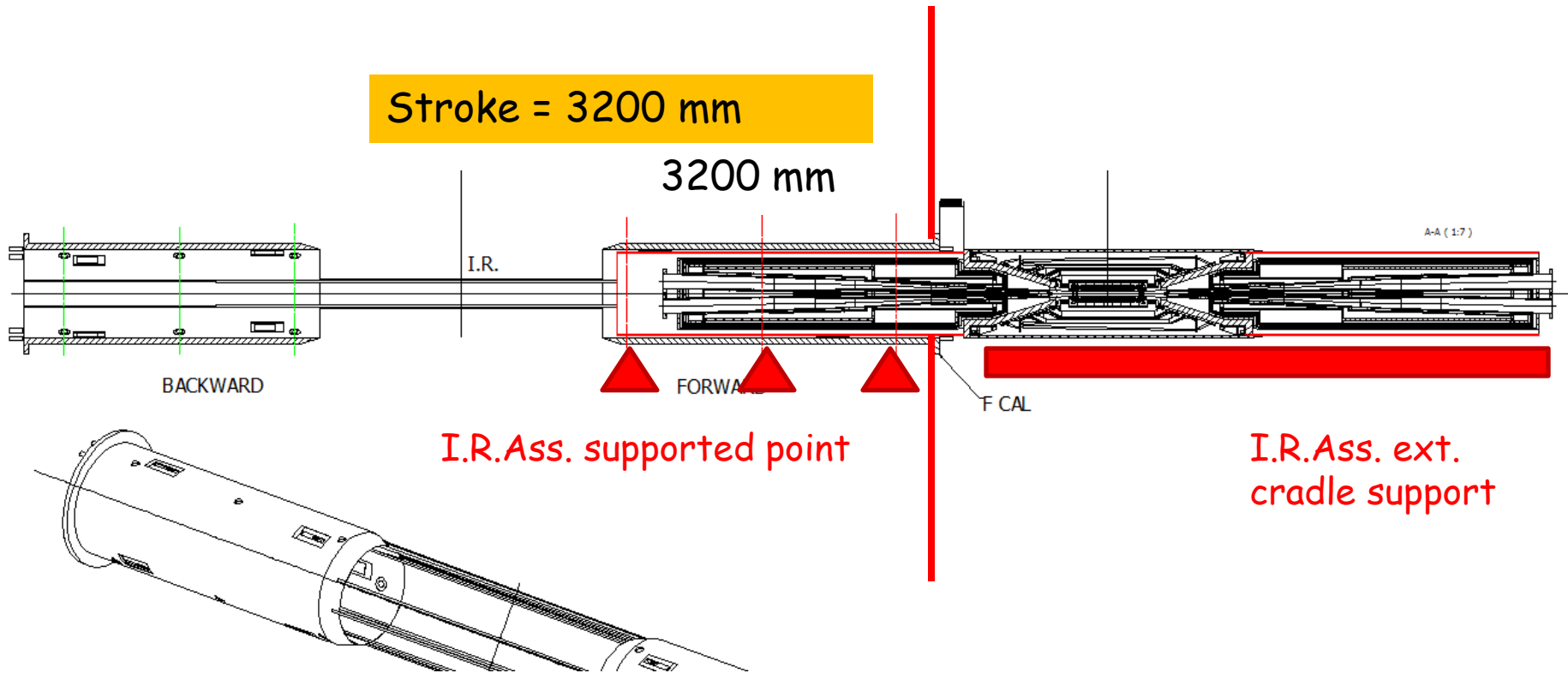


Temporary Cage Rails

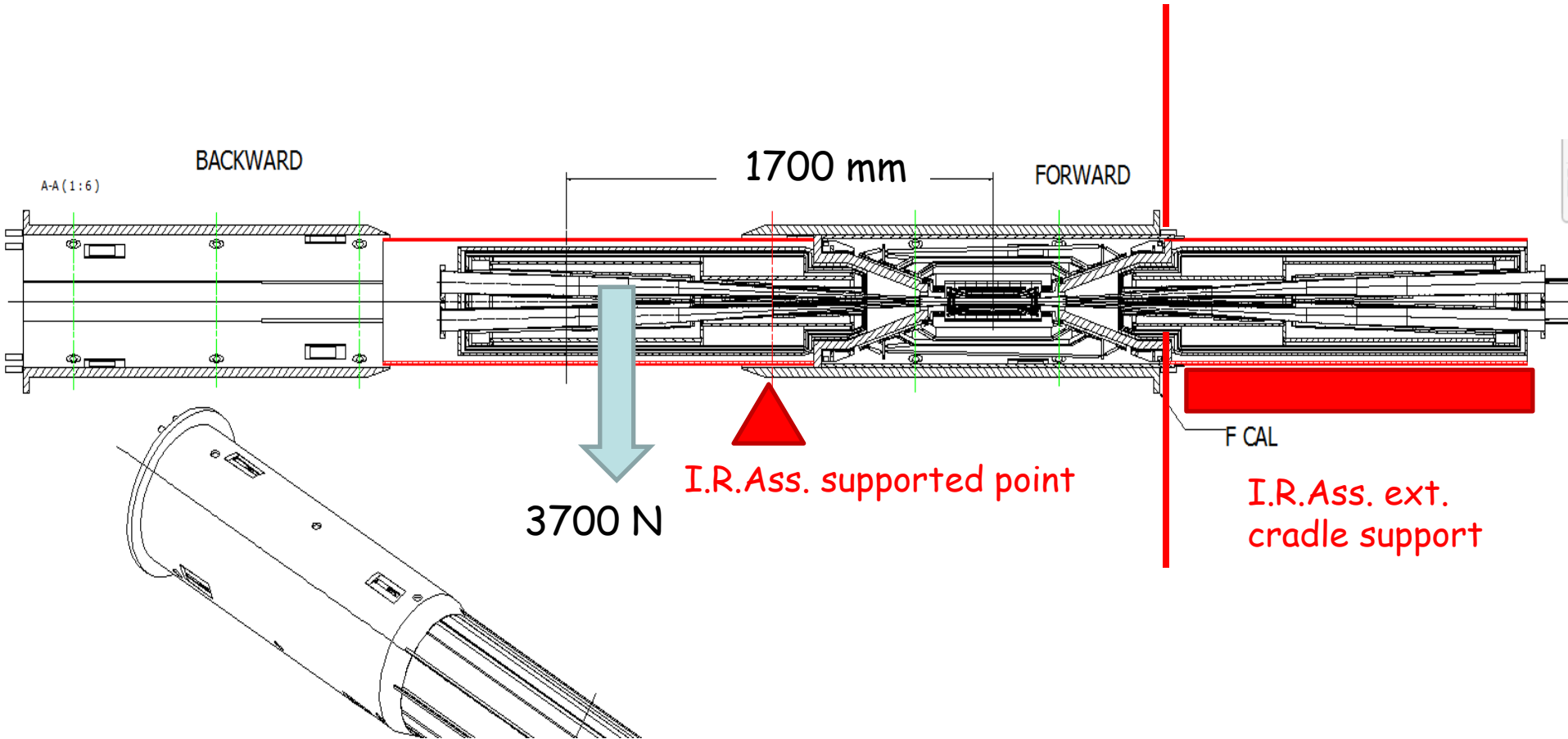
External tube

Cryostat ext. vessel

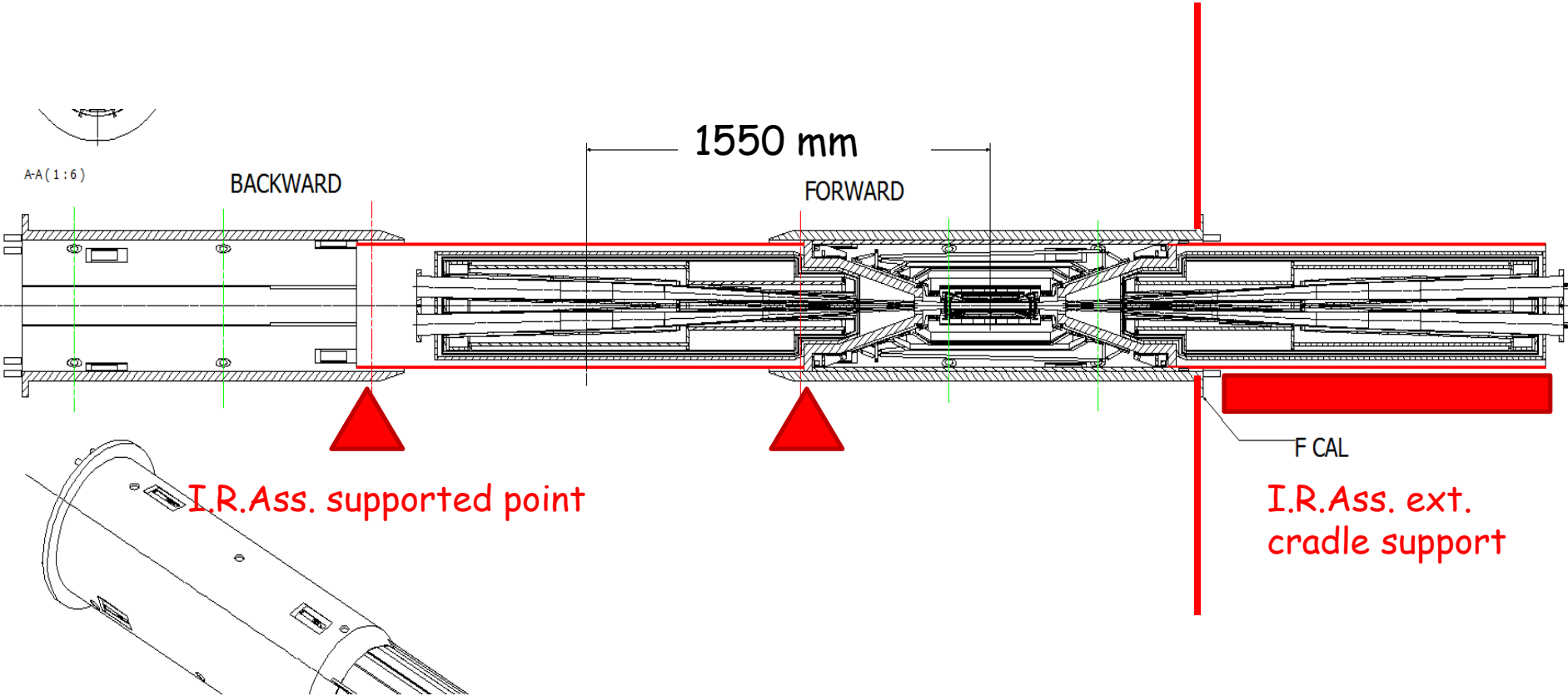




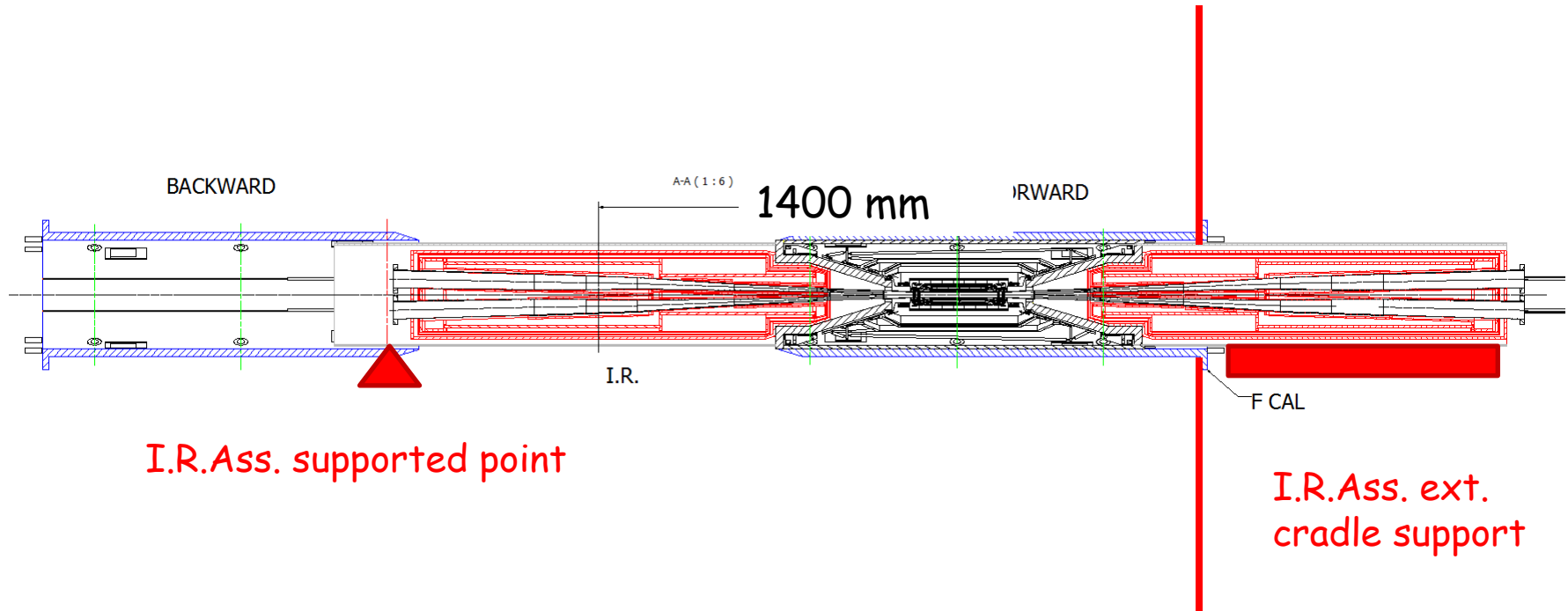
Stroke = 1700 mm

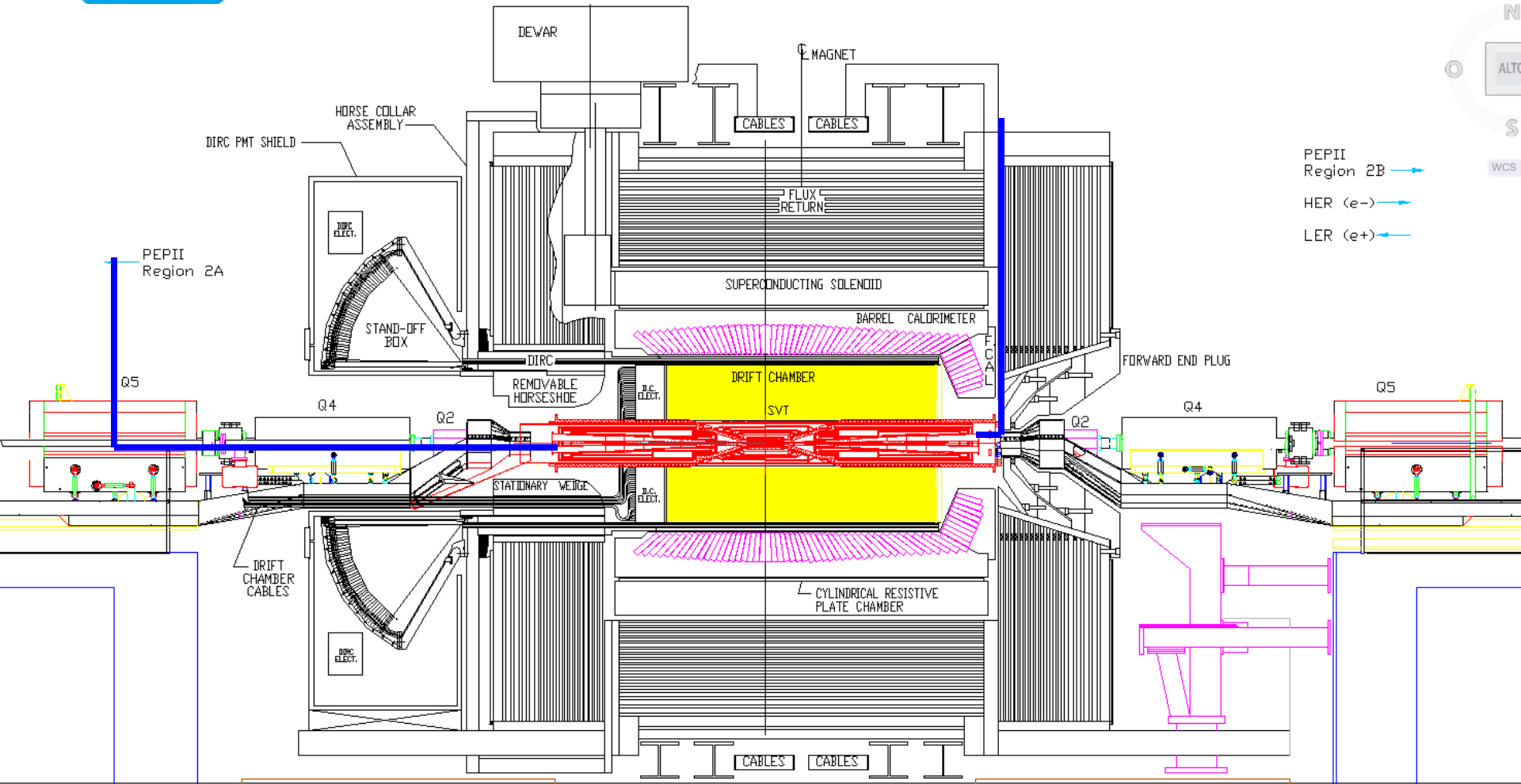


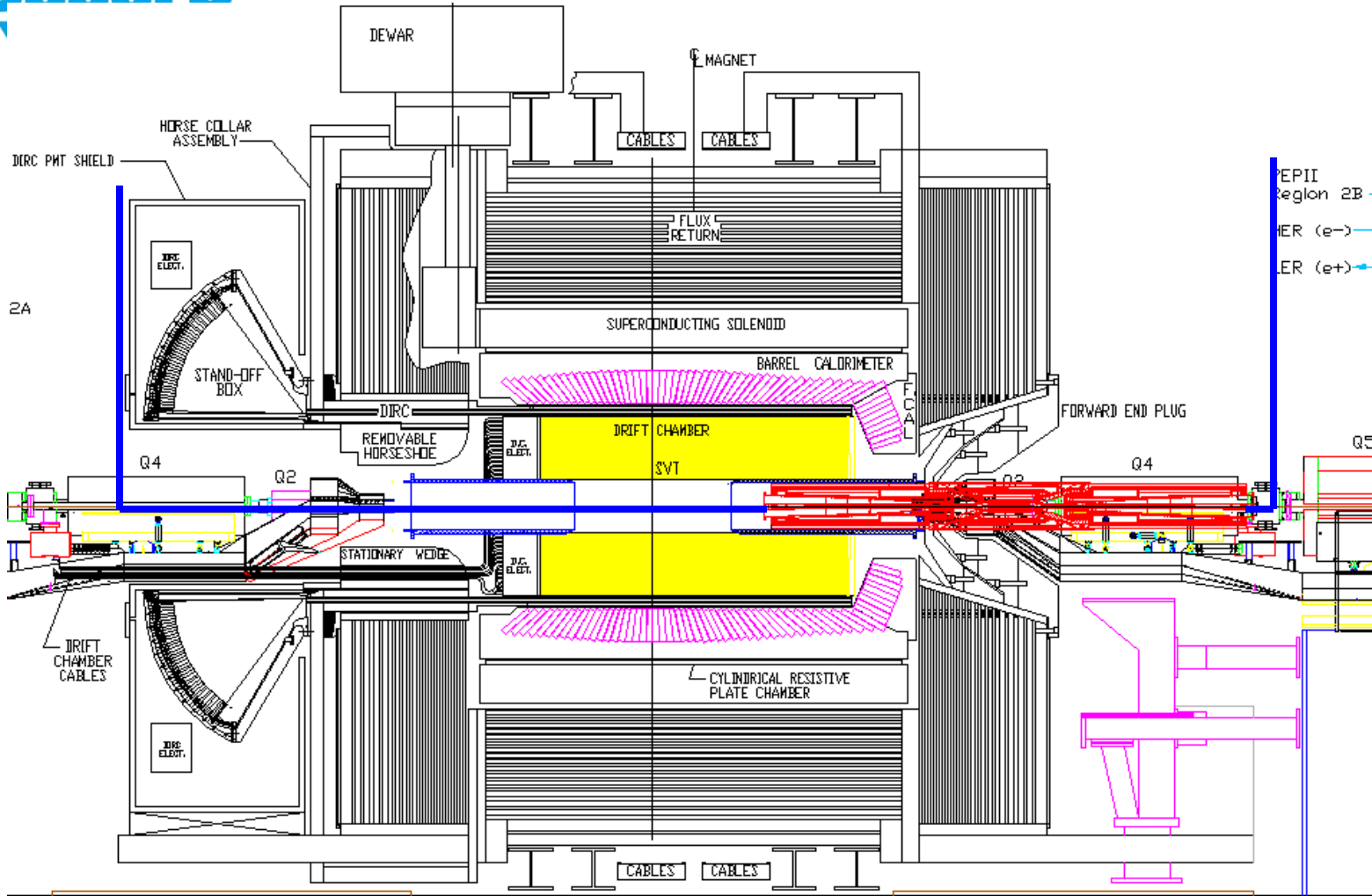
Stroke = 1550 mm



Stroke = 1400 mm









Conclusion



- 1) The Quick Demounting operation is an important issue for SVT system
- 2) The working solution presented affects the general exp. Layout design
- 3) Still needed a lot of details for the final dimensioning/description of the operations



BACKUP