

COMPASS-U

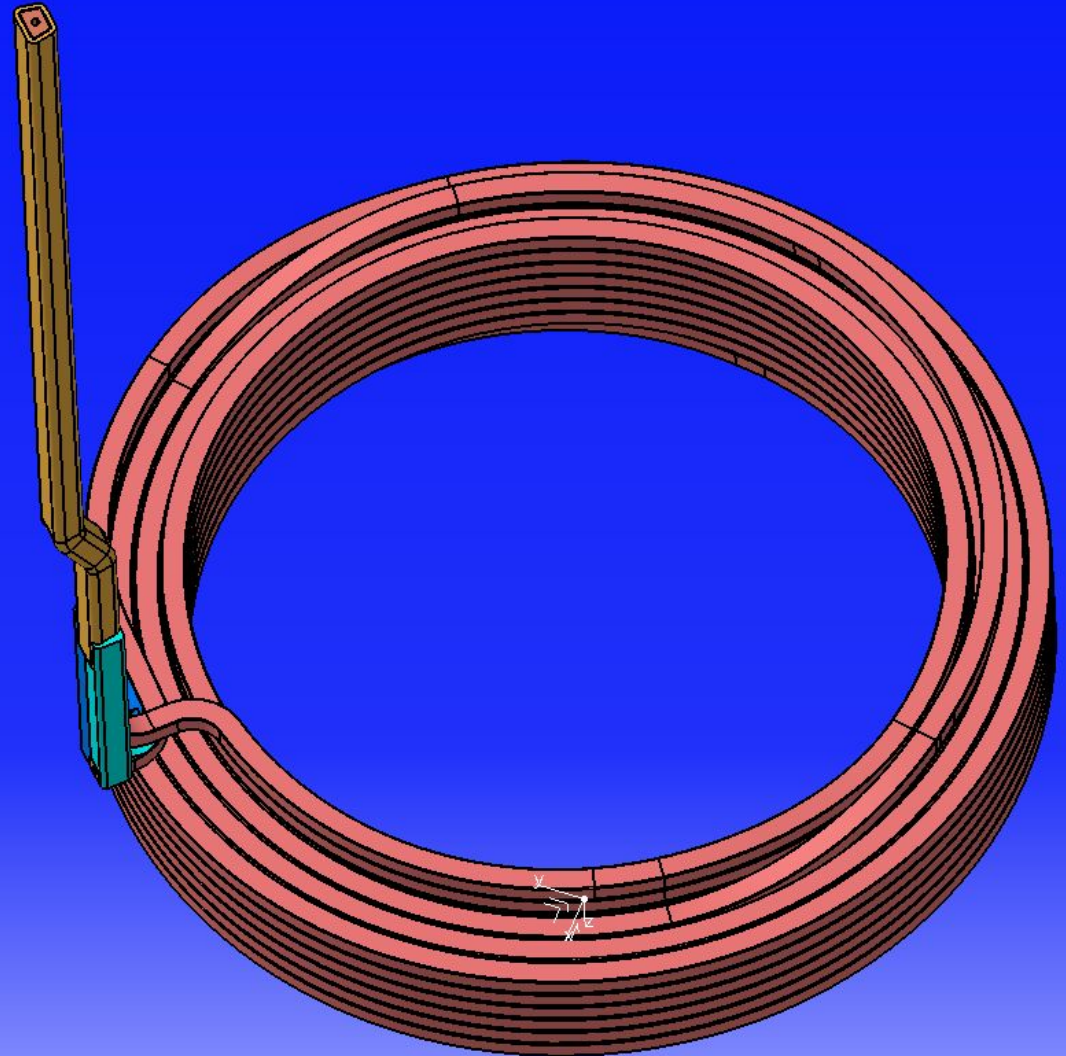
Winding of the central solenoid on the TF core v 1.1

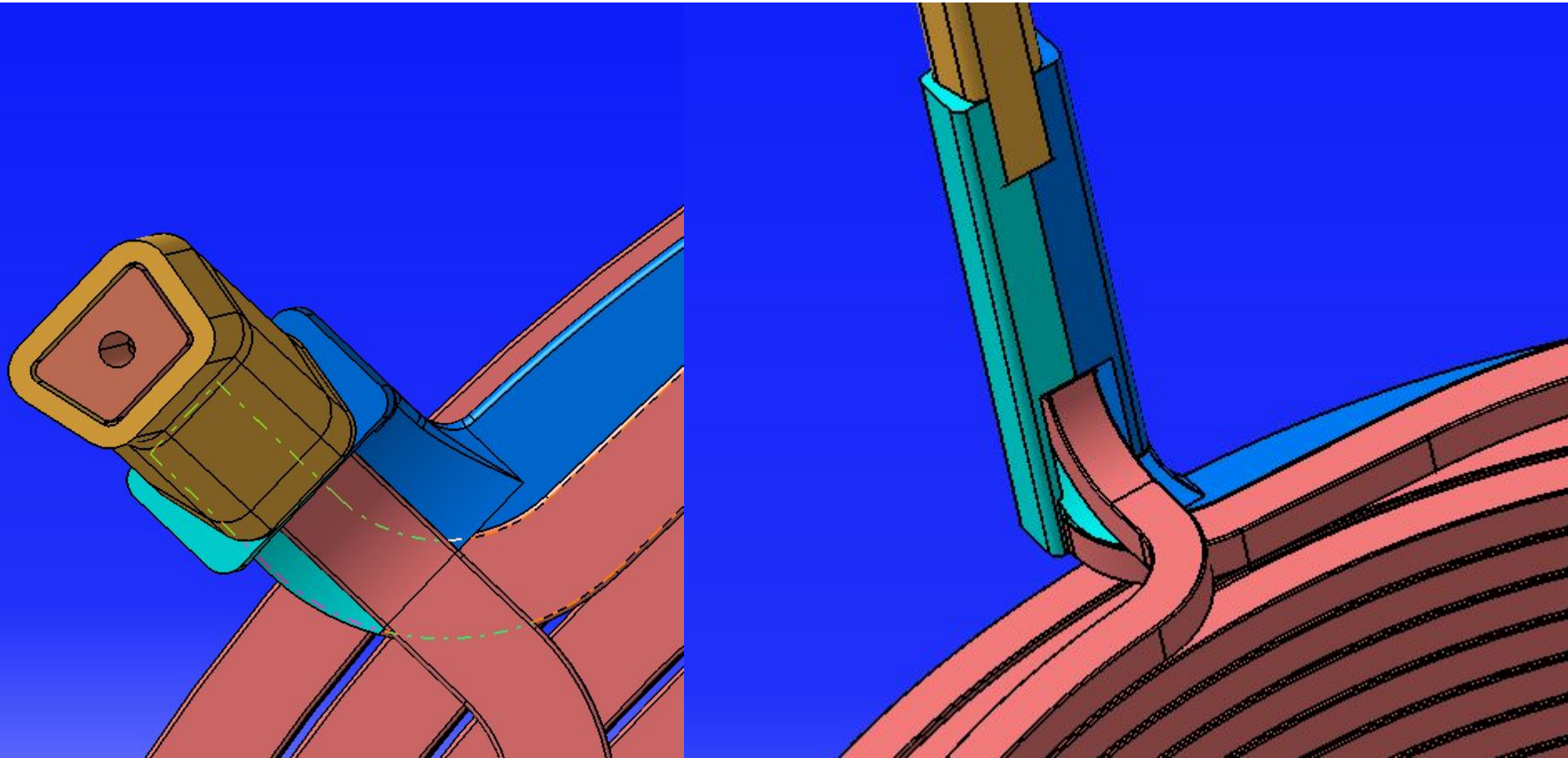
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Presentation for Preliminary Market Consultations

- outer conductor dimension 40 x 33 mm, wall thickness 5 mm
- inner conductor dimension 33 x 21 mm cooling channel dia 8 mm
- solid insulation between conductors - G10?
- We need to do a conductor's bend of both conductors with insulation - can it be done?
- first conductor channel is connected directly to conductor, second is terminated before coaxial cable and coolant is driven separately by stainless steel pipe and cu/SS transition piece
- We have asked the manufacturer of conductor if it is possible to do this shape (Luvata)





One “piece” of assembled TF core without lower bolted joint

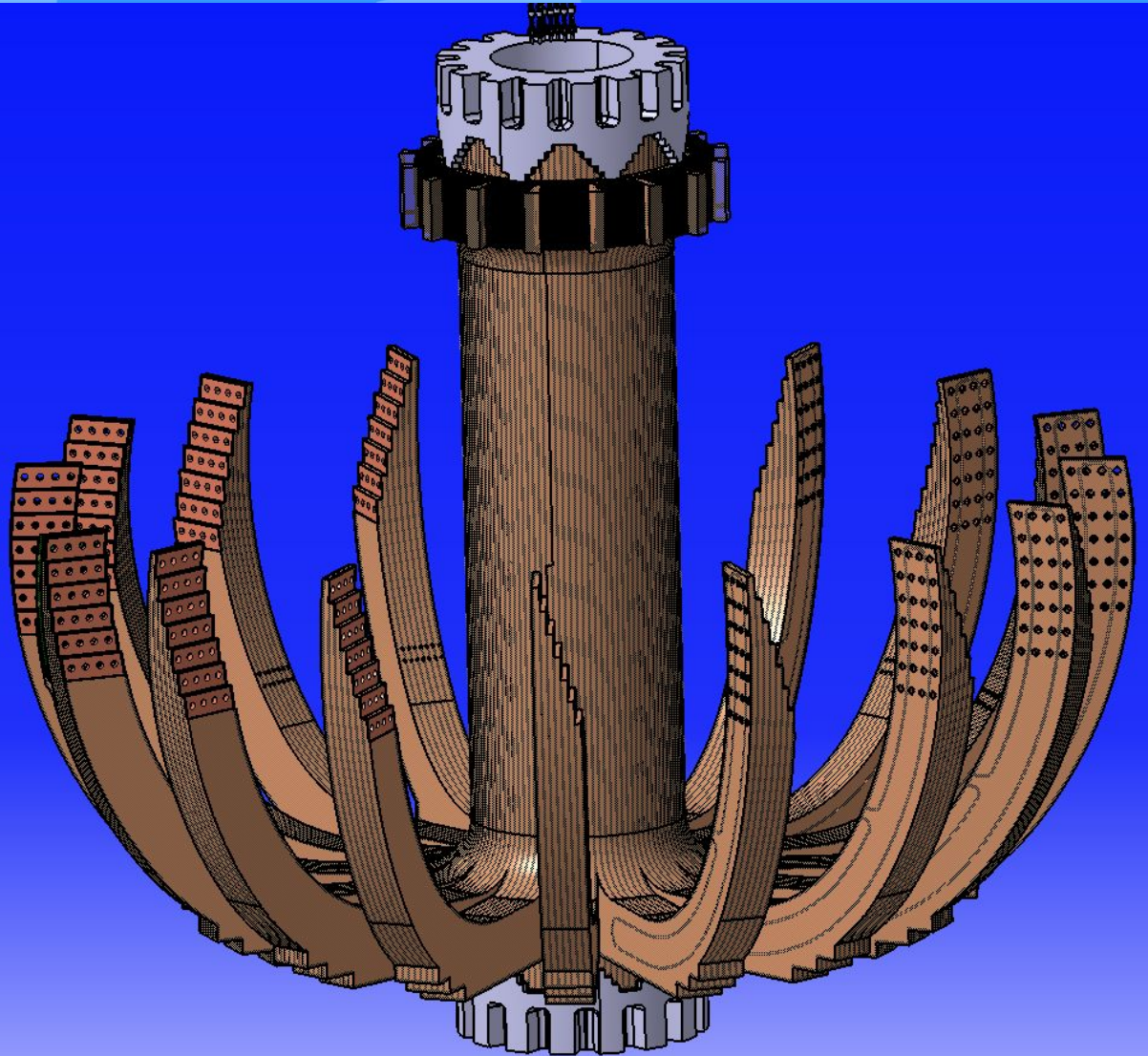
Outer dimensions of one turn $\sim 2.6 \times 1.7$ m

TF core ~ 16 tons,

Turns insulated by fiberglass cloth + VPI

Turn cross section 20×200 mm made from hardened (CuAg0.1(OF) or CuZr0.1)

Cryogenically cooled by gaseous Helium down to $T > 50$ K by cooling channels in each turn

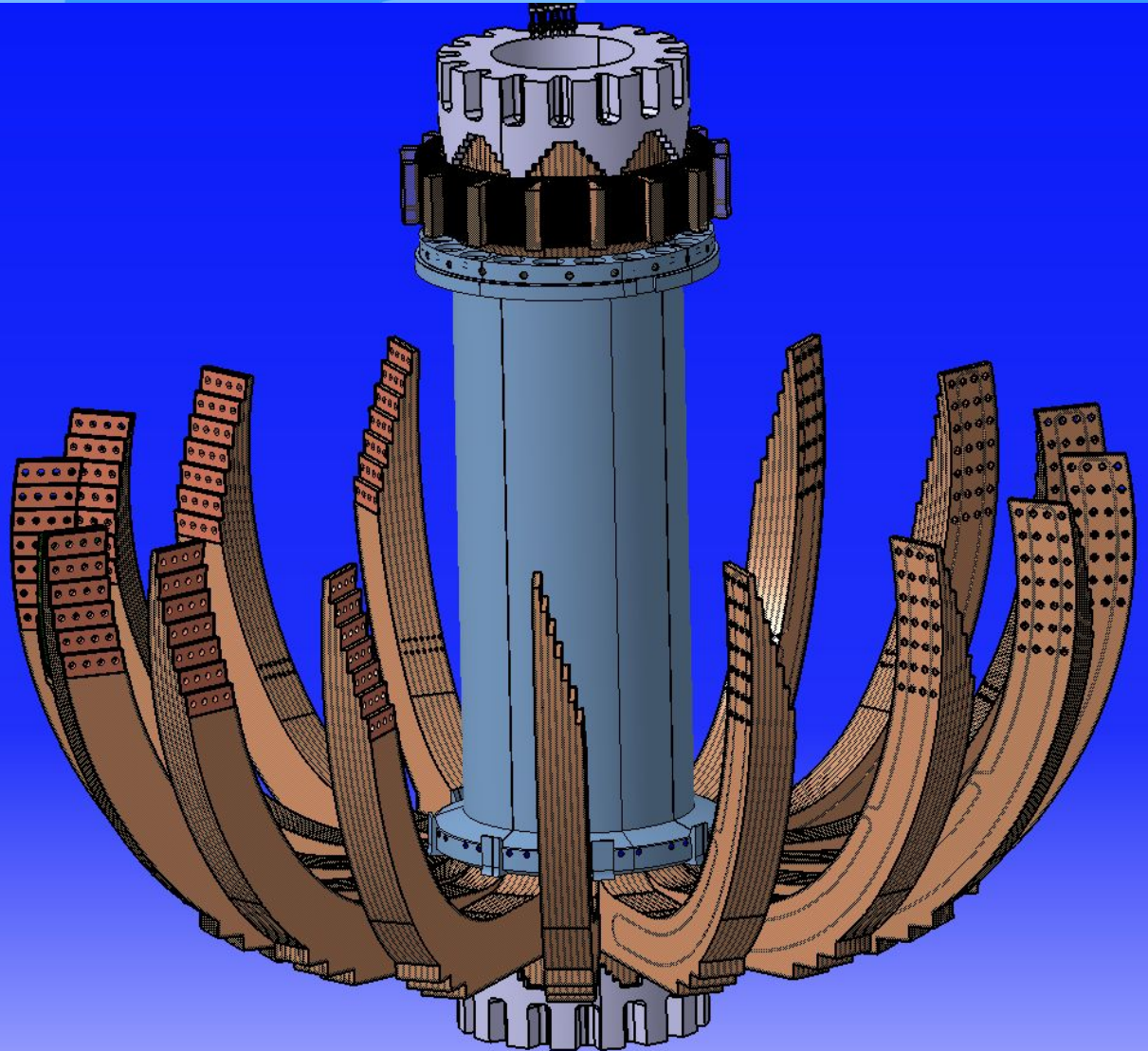


TF core plus inner tie tube

material of TT - NITRONIC 50

Gap between TF core and inner tie tube is 3 mm

Tie tube from 4 piece

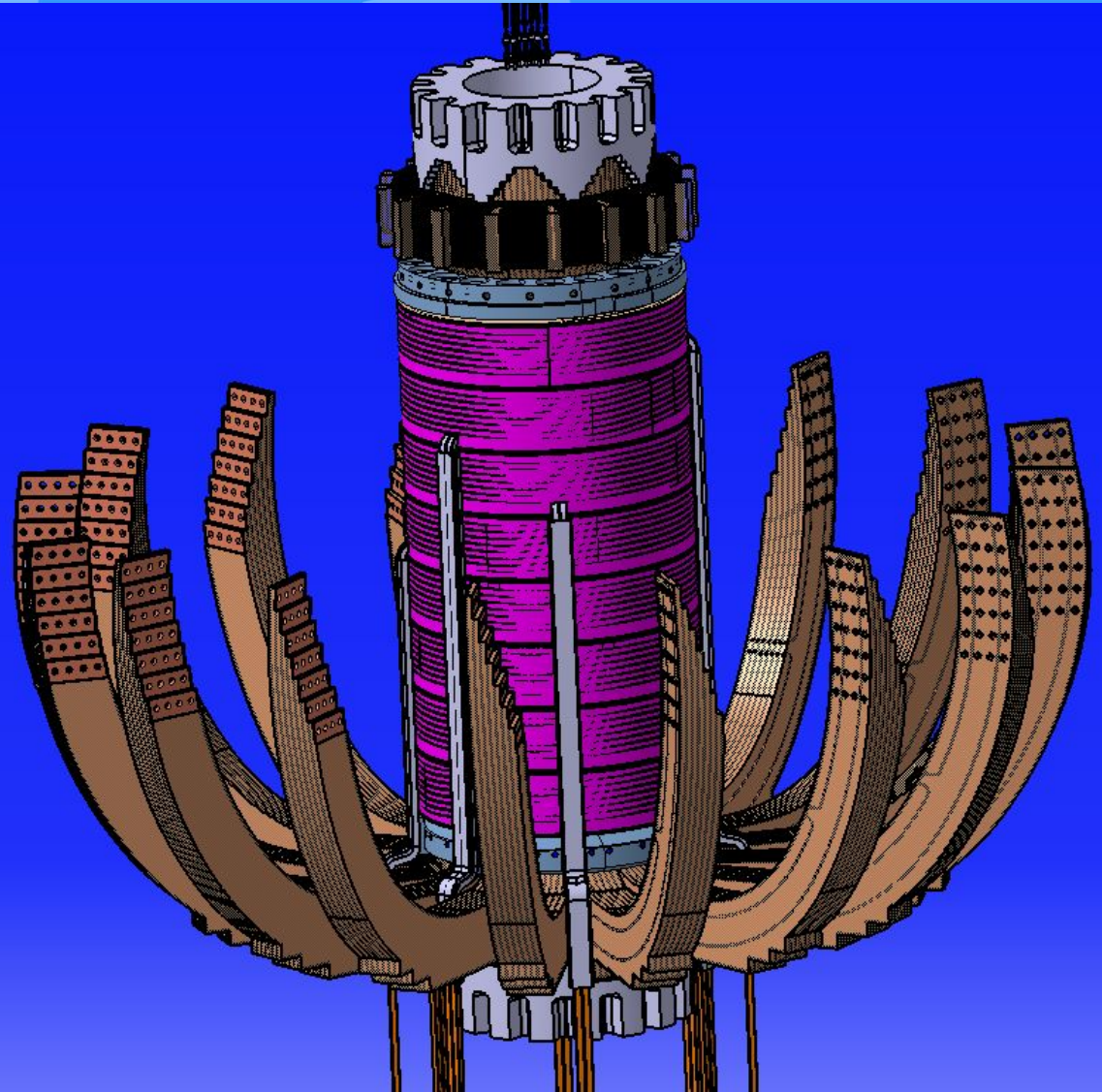


TF core + inner tie tube + 8 CS coils with their feeders

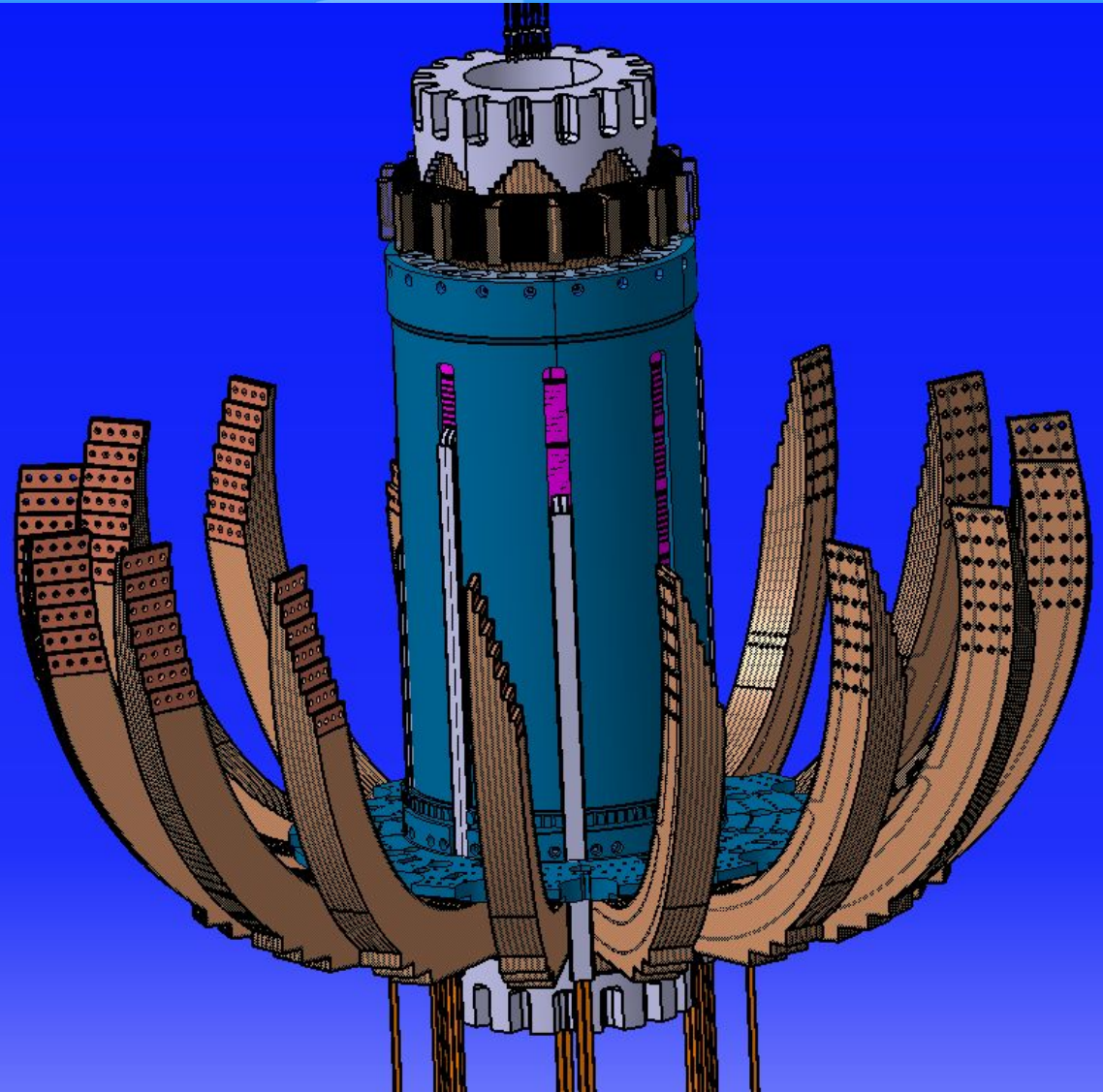
Between CS coils there are G10 inserts
6,5 mm thick from top and bottom of
the coil

gap between the top-most coil (with
G10 insert) and tie tube is 20 mm

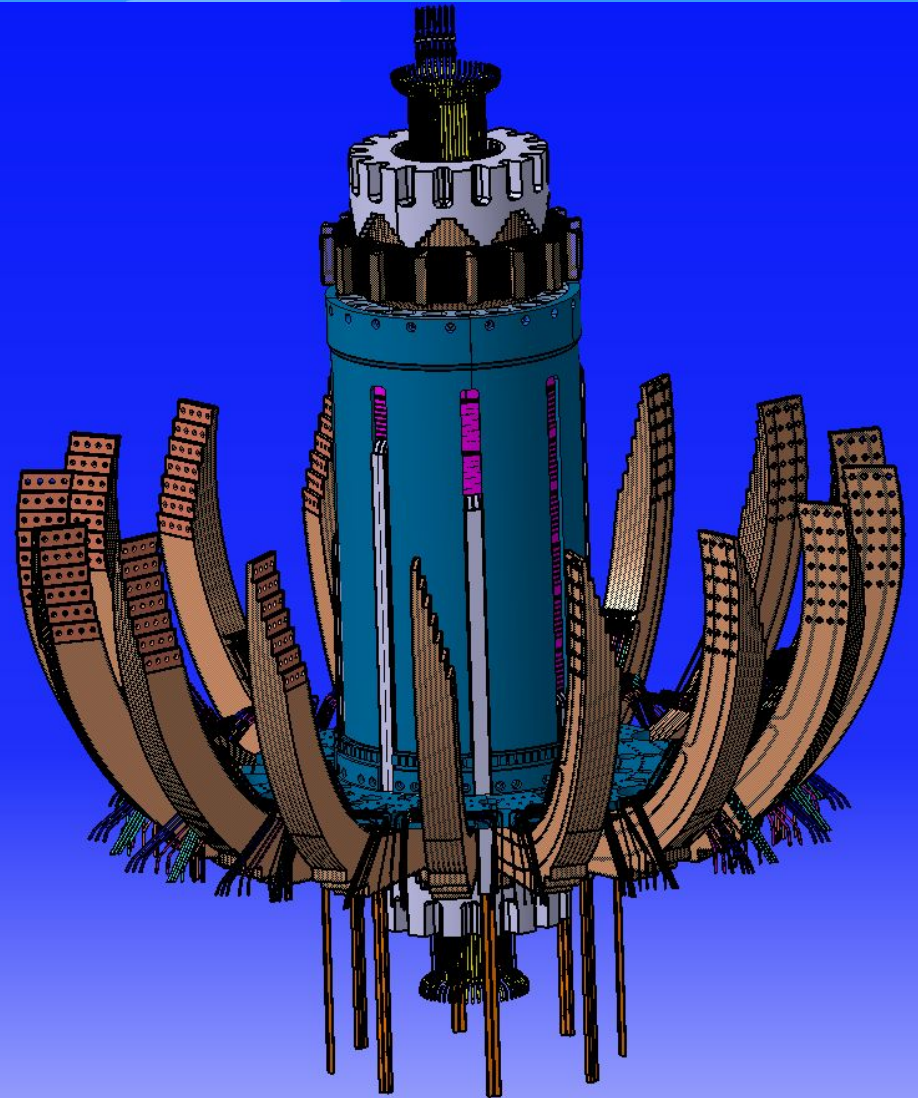
gap between the bottom-most coil
(with G10 insert) and tie tube is 15 mm



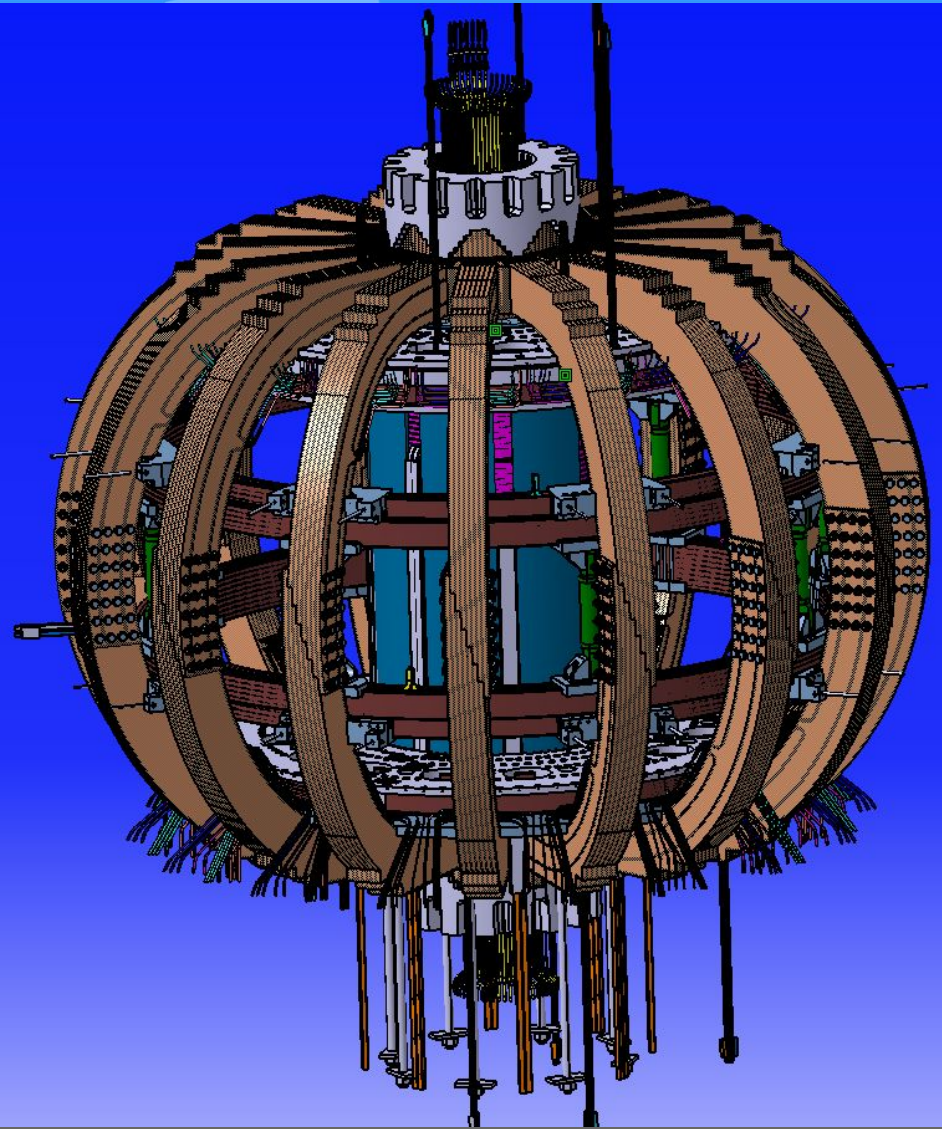
TF core + inner tie tube + 8 CS coils with
their feeders + outer tie tube

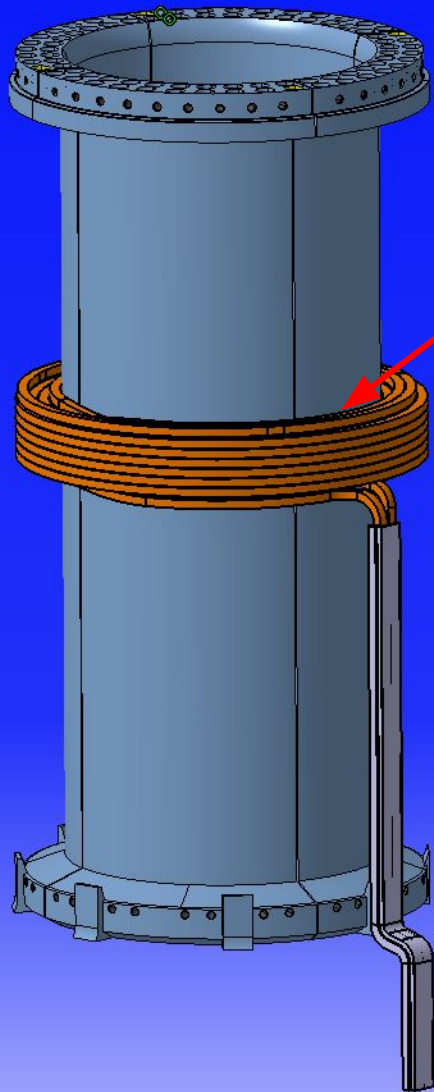


TF core + inner tie tube + 8 CS coils with their feeders +
outer tie tube + cryo pipes for TF core

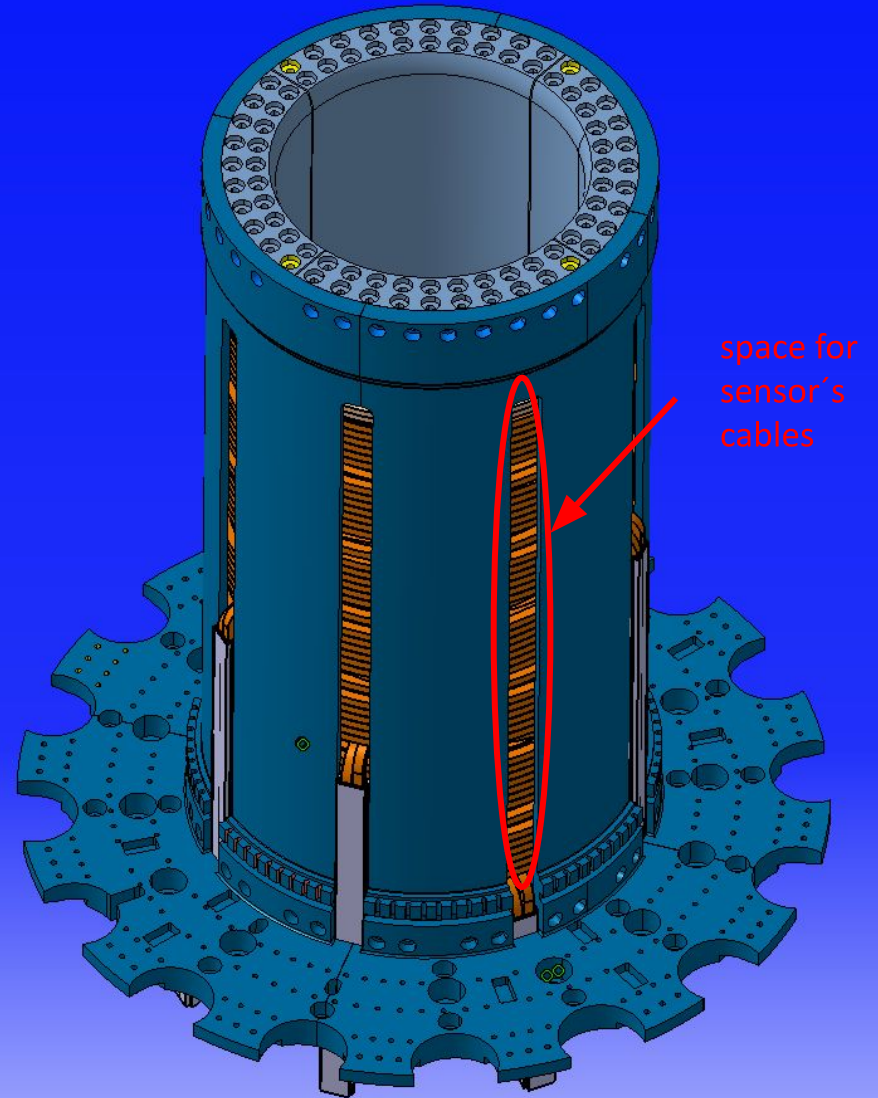


Complete set of TF and PF coils

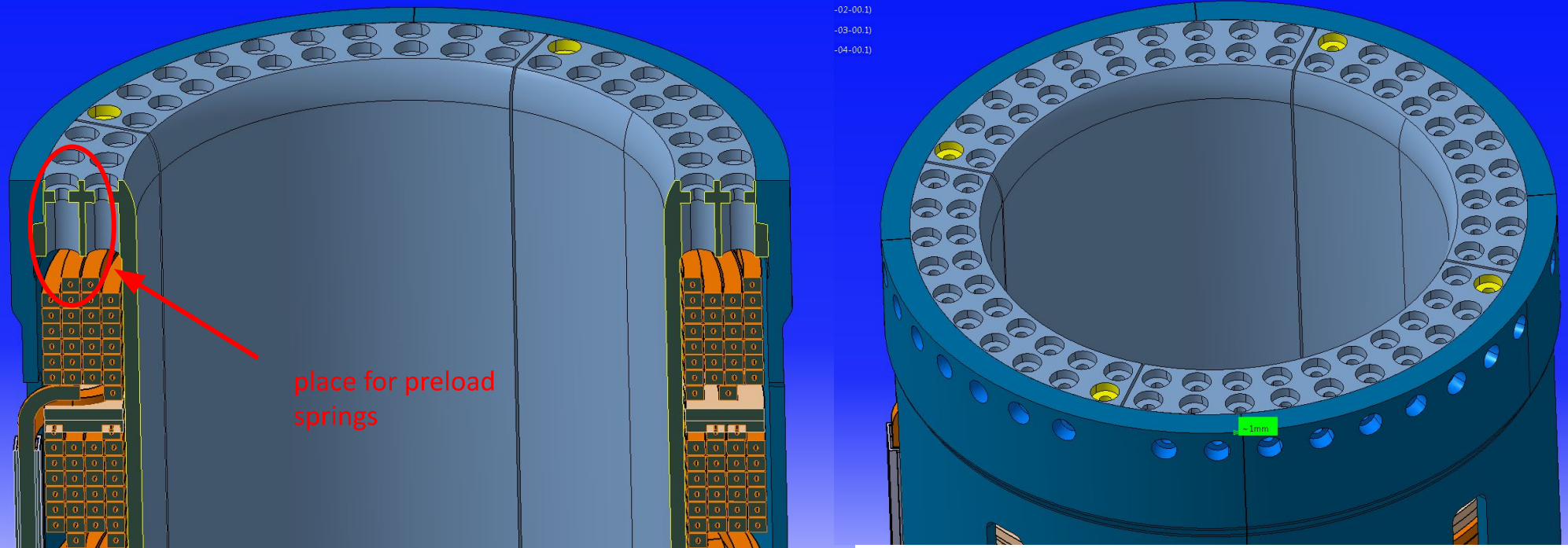




space between tie tube and coil's insulation is 1 mm
This gap needs to stay free that CS coils can vertically move



space for sensor's cables



Can inner tie tube be used as vessel for VPI? Place for springs can not be glued same as coils to tie tube

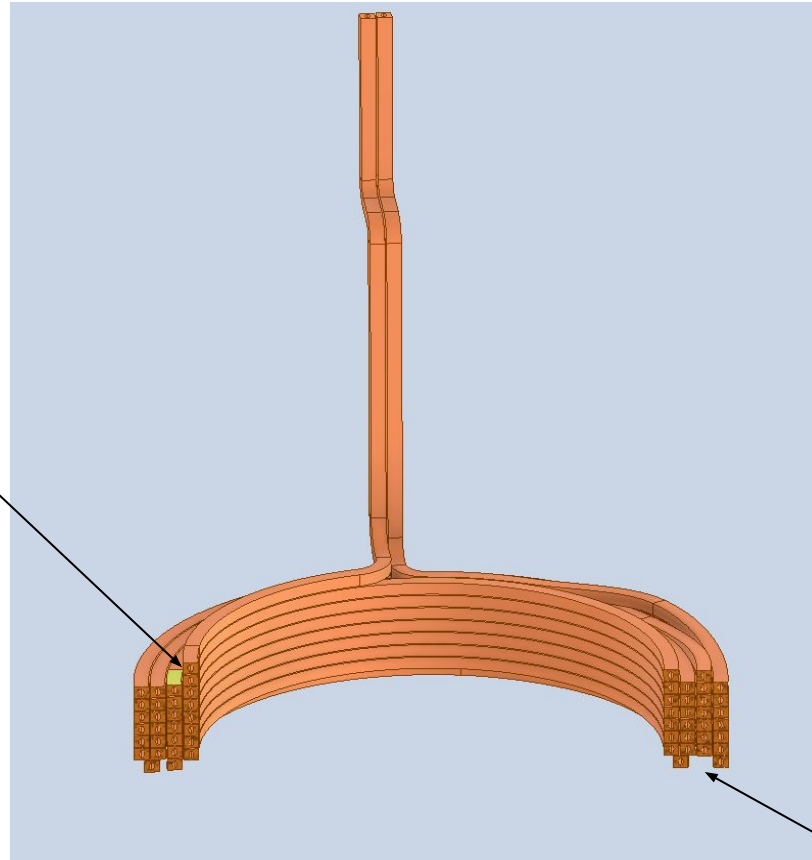
two G10 inserts between coils 2 x 6,5 mm, each made from two pieces to be possible to insert.

Because of eddy currents we may electrically insulated inner and outer tie tube - We are running simulation at this time

PT100 sensors inserted in free space between turns and impregnated together with coil

sensor's cables leads through G10 insert and attached to the closest cable bundle

1 sensor + 1 reserve

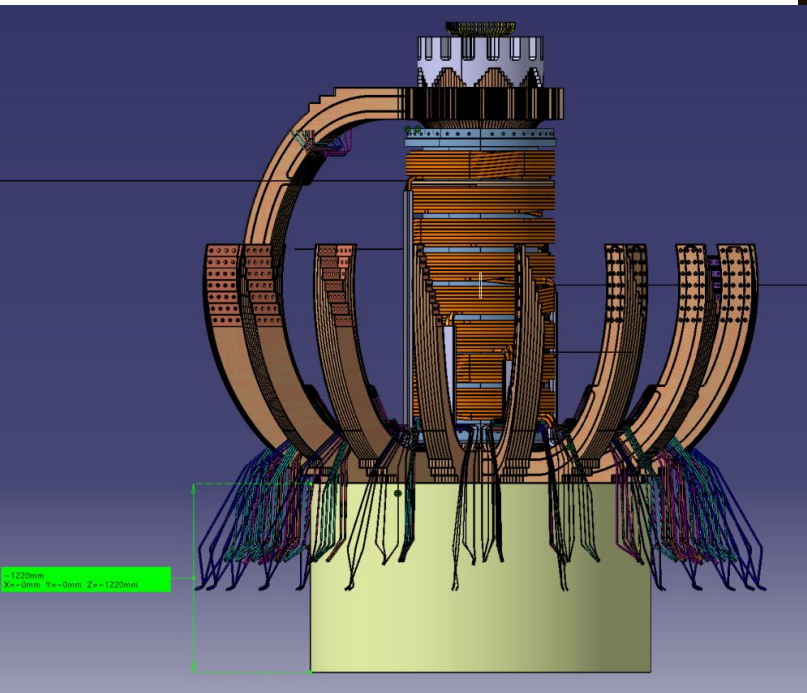


PT100 sensor

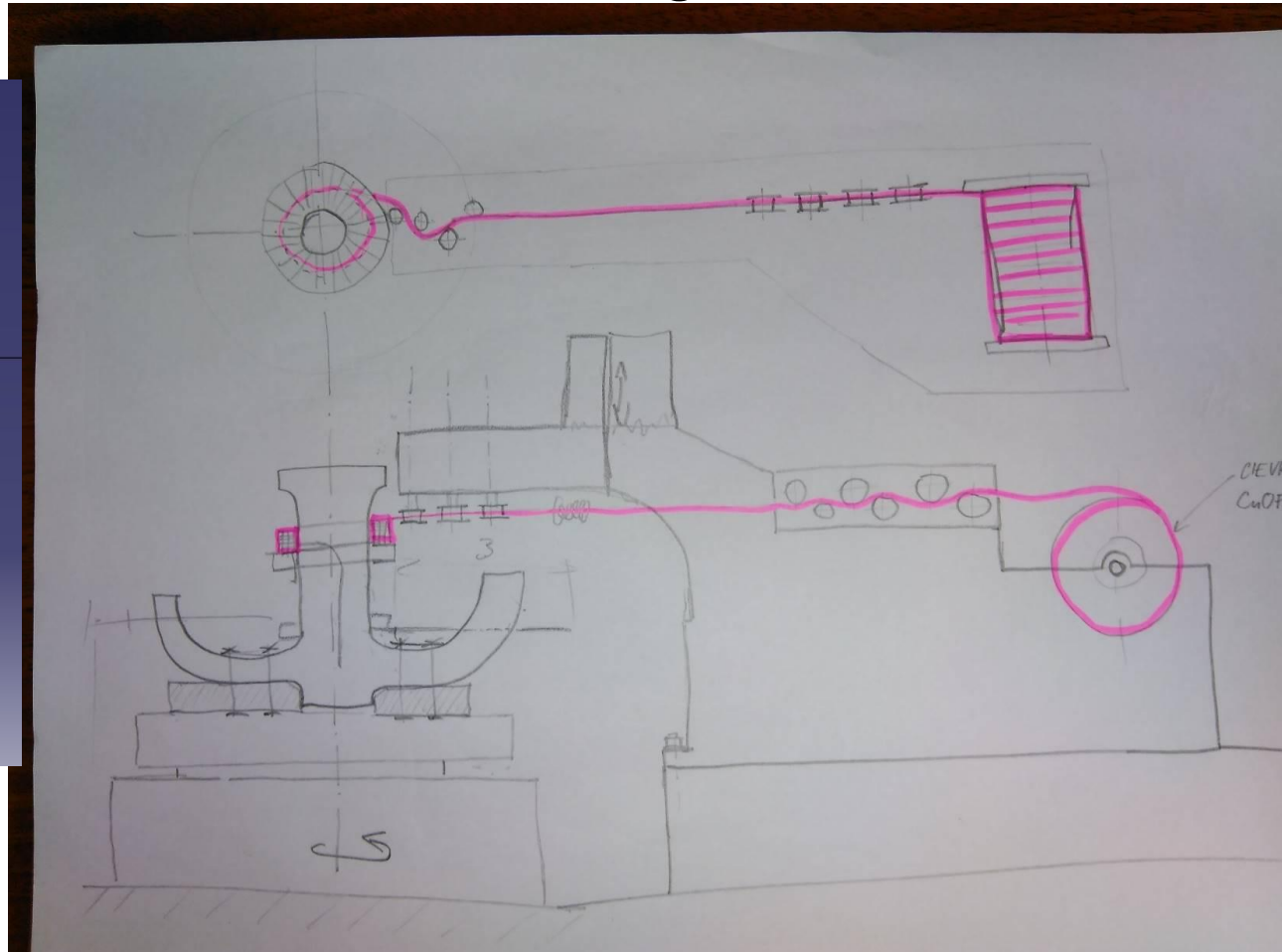
CS winding design on TF core:

- Manufacturing of the TF core with tie tube

- TF core mounting on turntable and winding CS4L to CS3U

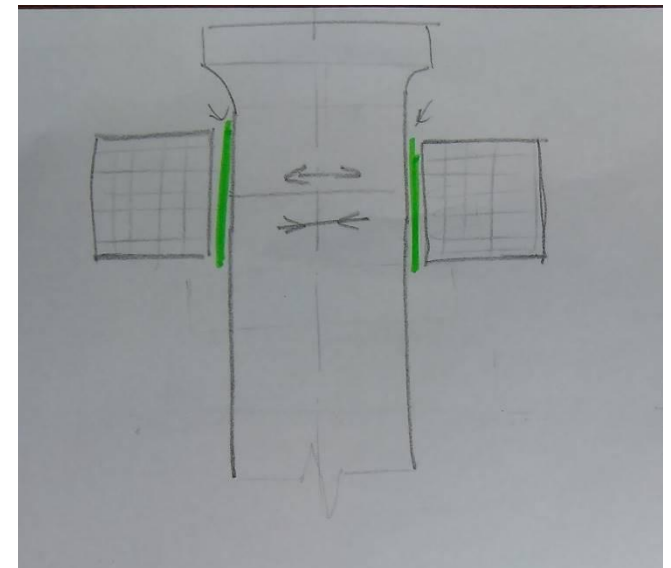
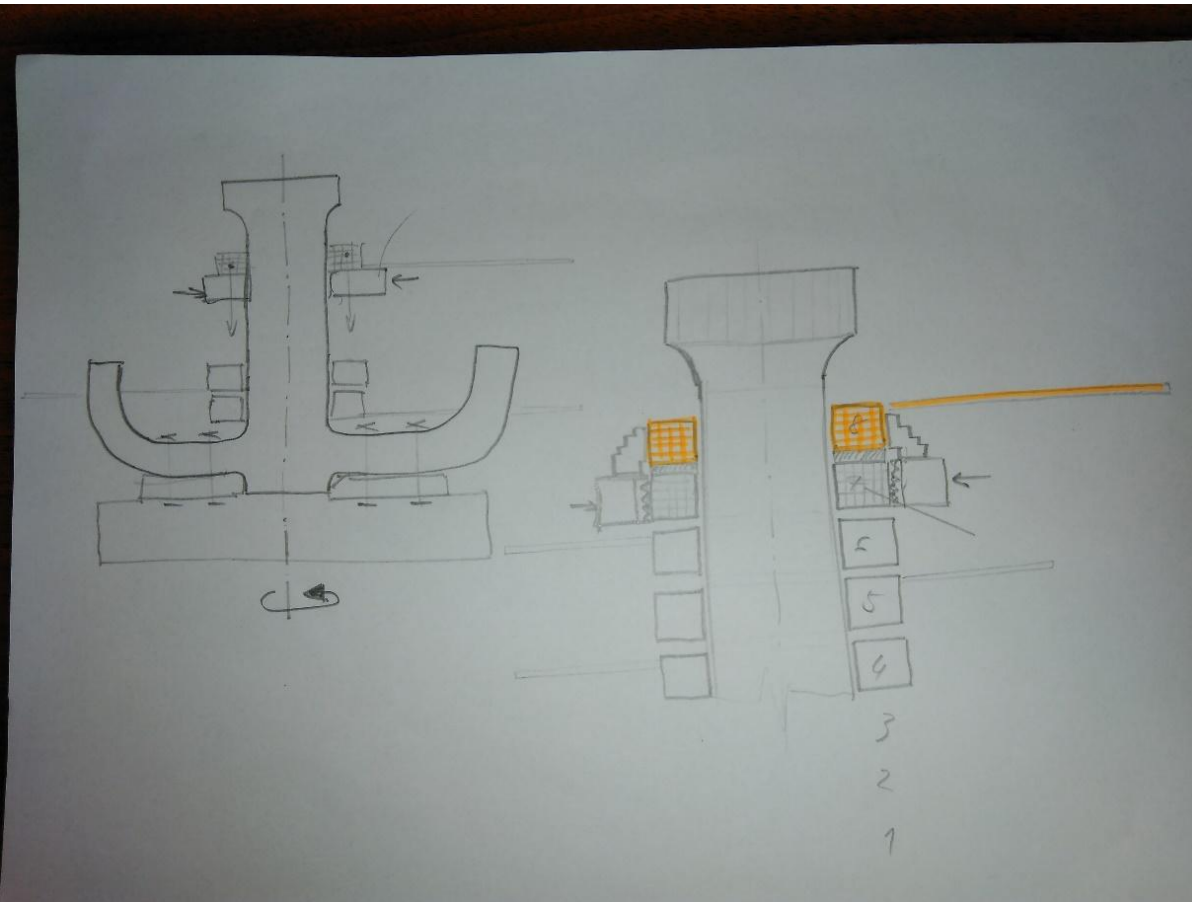


Without parallel current leads
are diameters 4 meters in
diameter x 4 meters in height

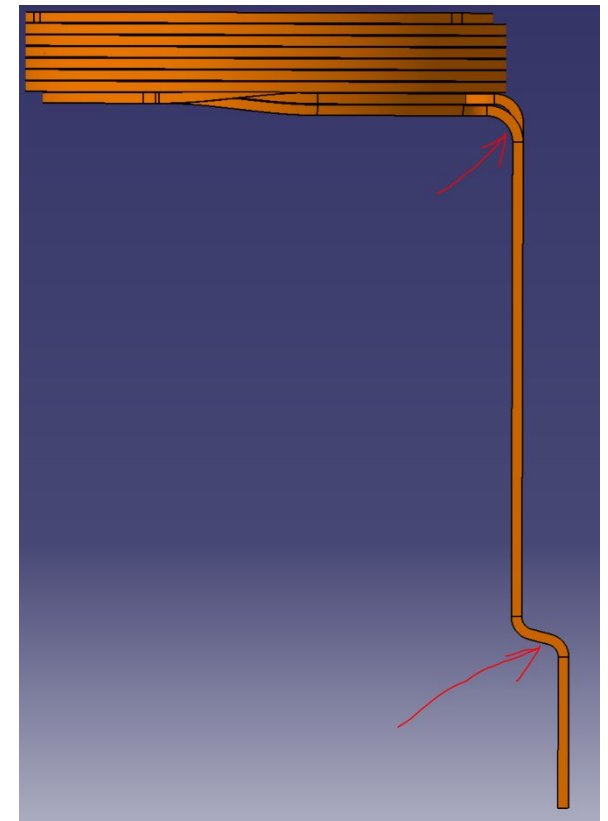
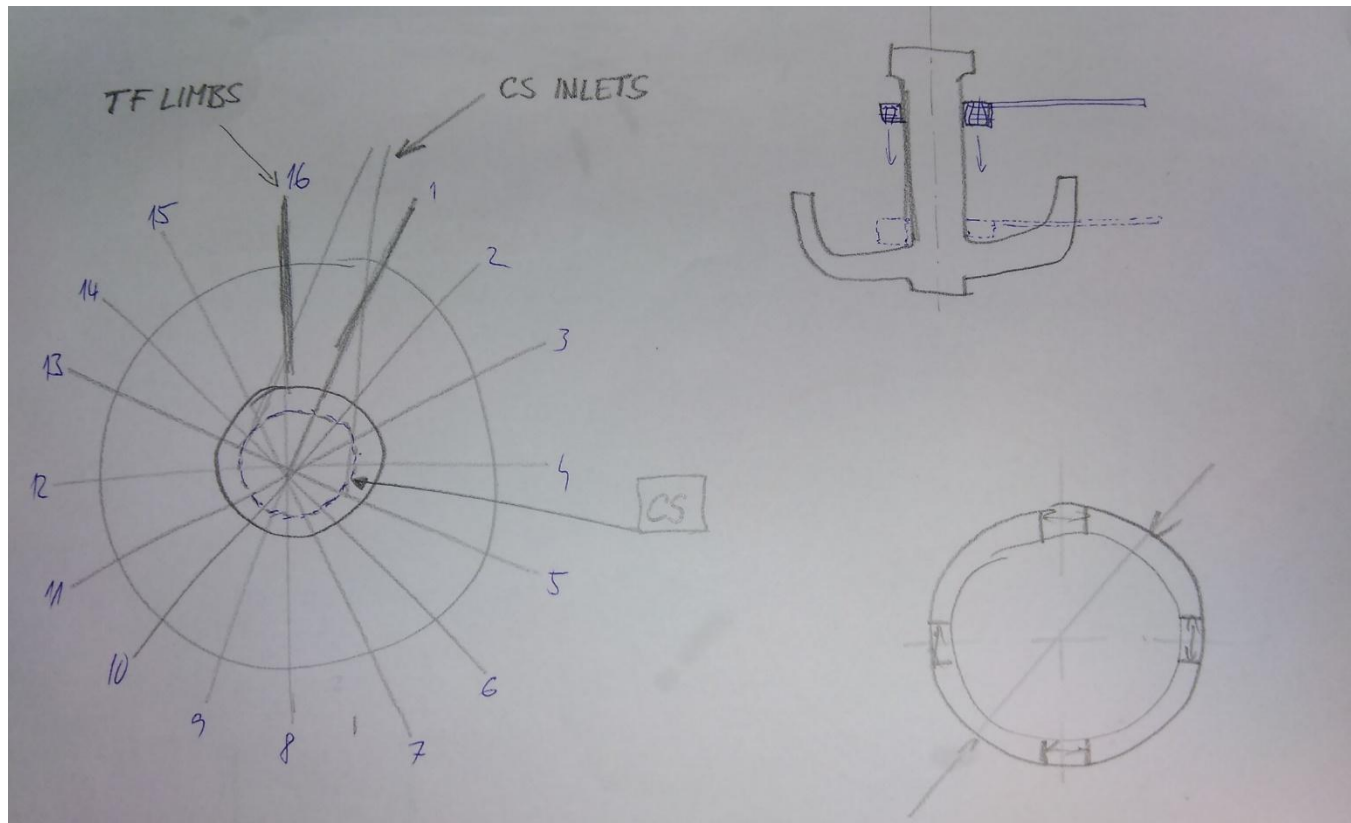


- CS4U winding - required fixture (clamping on CS3U)

When winding, we need to protect the insulation of TF core. Ensure that the CS is wound on a protective tube (removable) Ensure that the CS winding / holding device does not destroy the TF core insulation during winding

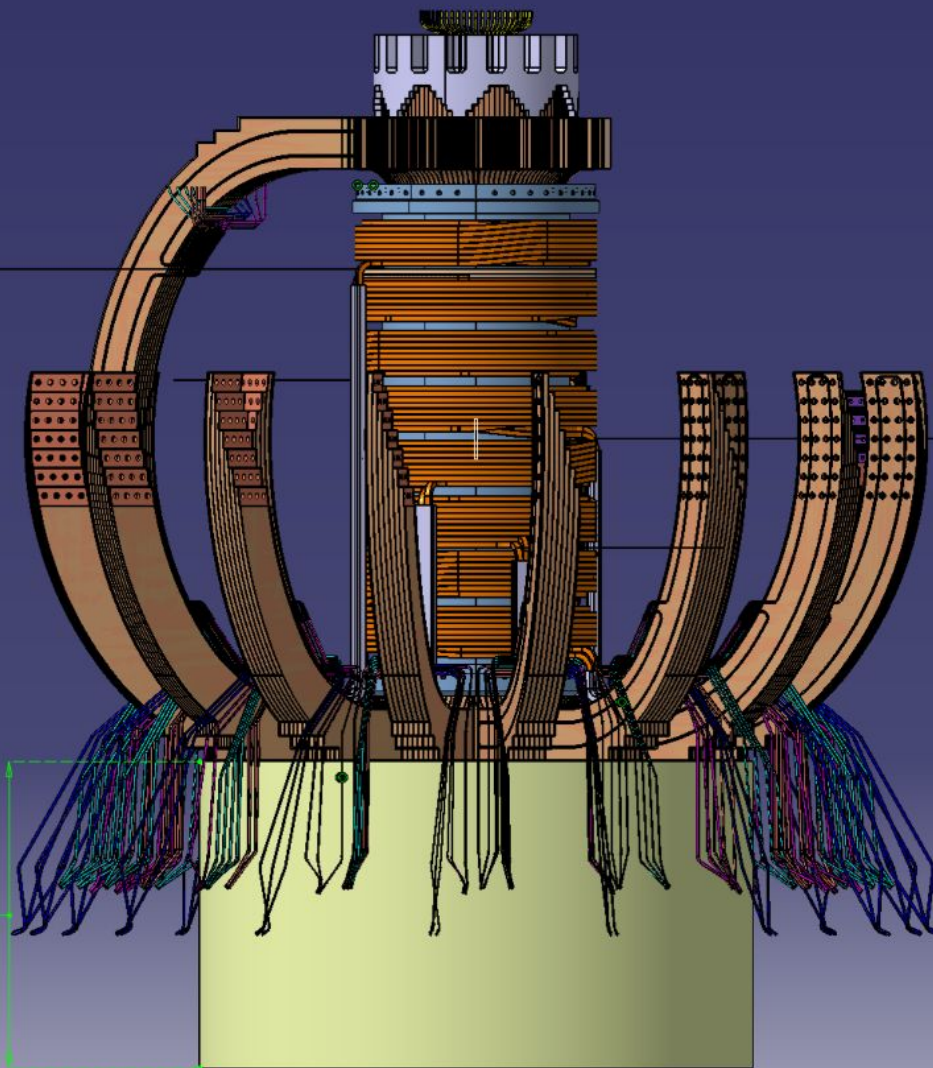


Wind the CS so, that the beginning and end of the conductor (CS leads) point radially outwards. The ends of the conductor point between the 2 curved parts of the TF limbs. Bending to the final shape according to the drawing.

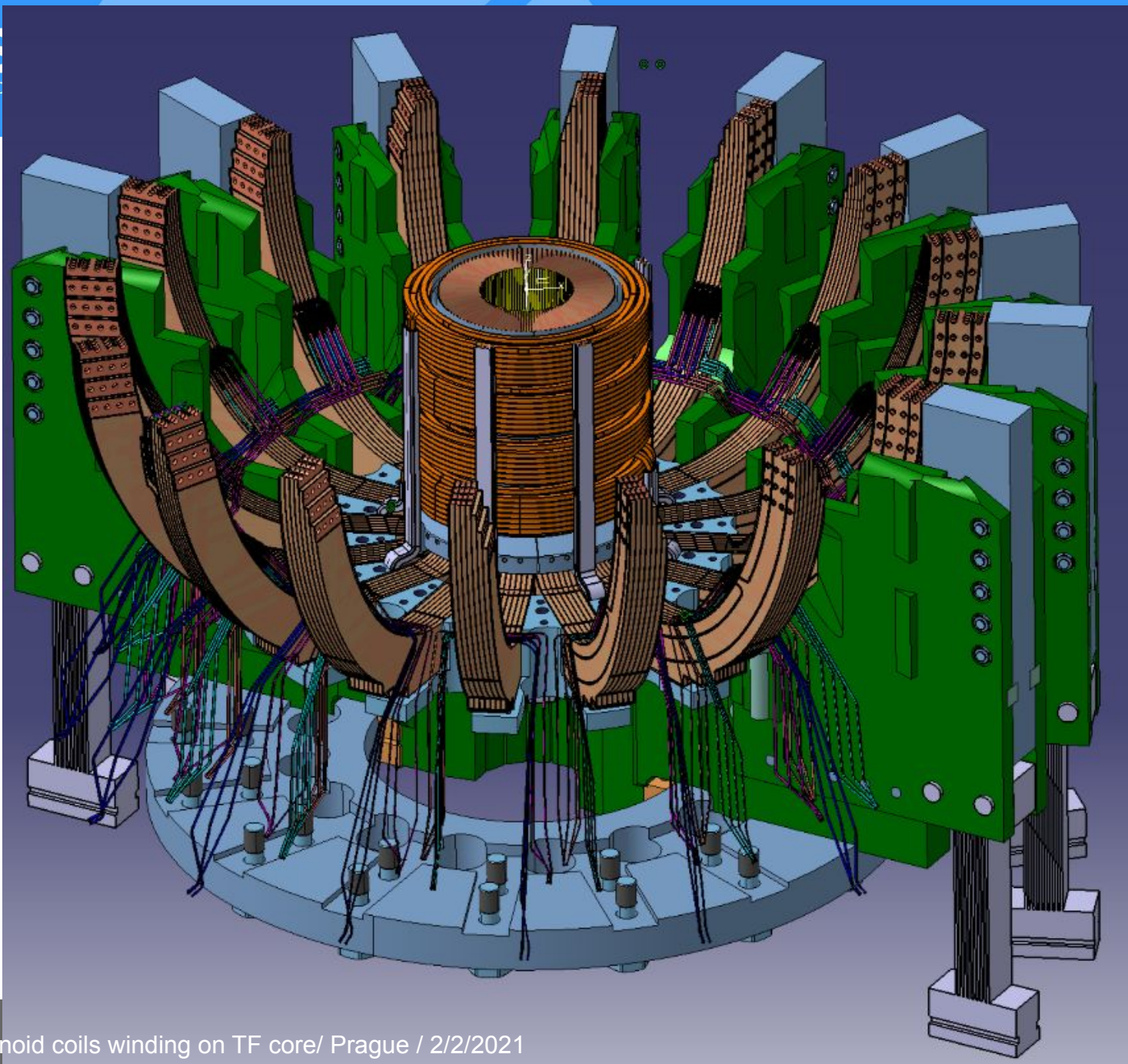


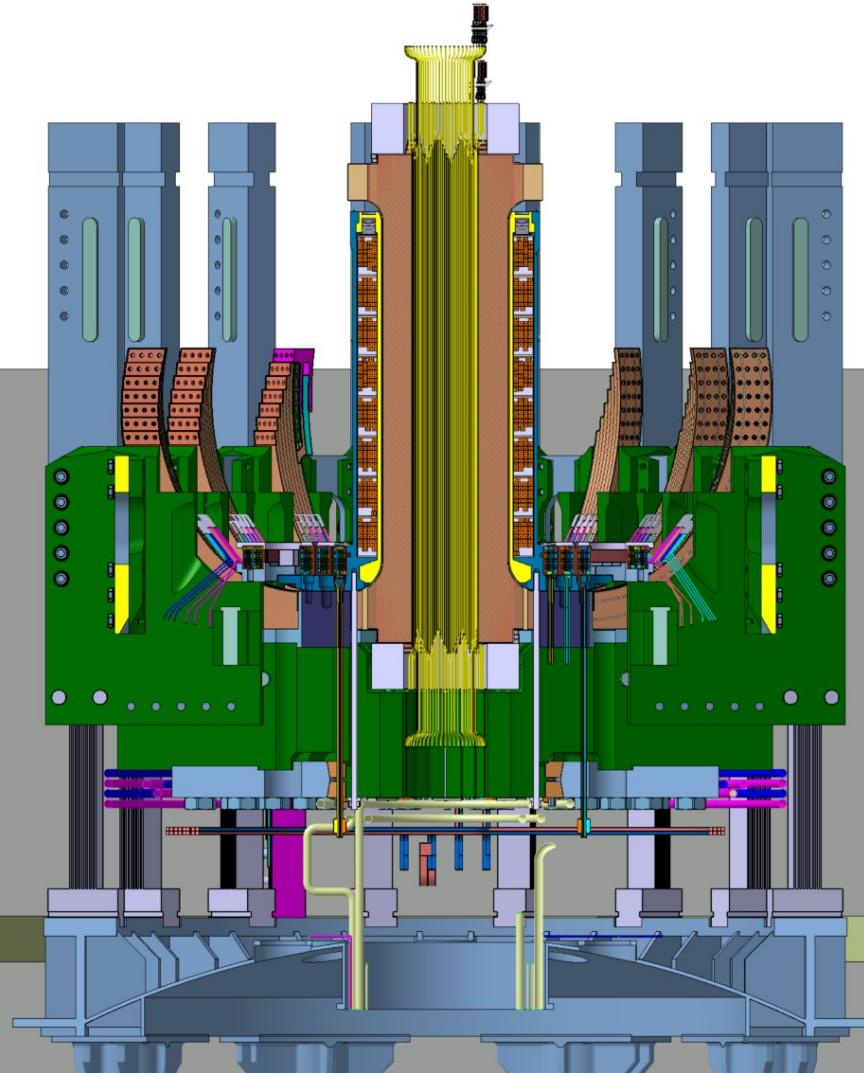
Issues in CS production

1. Do not damage the TF core insulation.
2. Ensure a smooth shift of the wound CS down into a place.
3. CS terminals have to be brazed - make it before VPI
4. Additional insulation of coaxial leads - all conductor surface have to be covered and VPI as a protection against electrical break at Paschen conditions
5. VPI of CS coils - use a part of Tie tube as pressure vessel? CS coils and Tie tube can not be glued together



Without parallel current leads
are diameters 4 meters in
diameter x 4 meters in height





Our questions:

- Manufacturability of CS coils to TF core without lower bolted joint
 - Transport of CS to IPP
 - How to ensure some surfaces will not be glued during VPI (CS to inner tie-tube, CS insulation spacers between coils)
 - Cabling from PT sensors and their insertion between turn insulation and ground insulation?
 - In the case that bottom joint will be introduced. Is it possible to assemble the TF core, wind the CS, assemble the TF core with the lower TF arms, insulate the joint, and VIP the whole assembly without glueing the inner tie tube to the TF core?
-
- Update of preliminary price offer with respect to TF core without lower bolted joint

Our questions:

- Experience with sliding pads? Friction coefficient in vacuum? (PF coils)

