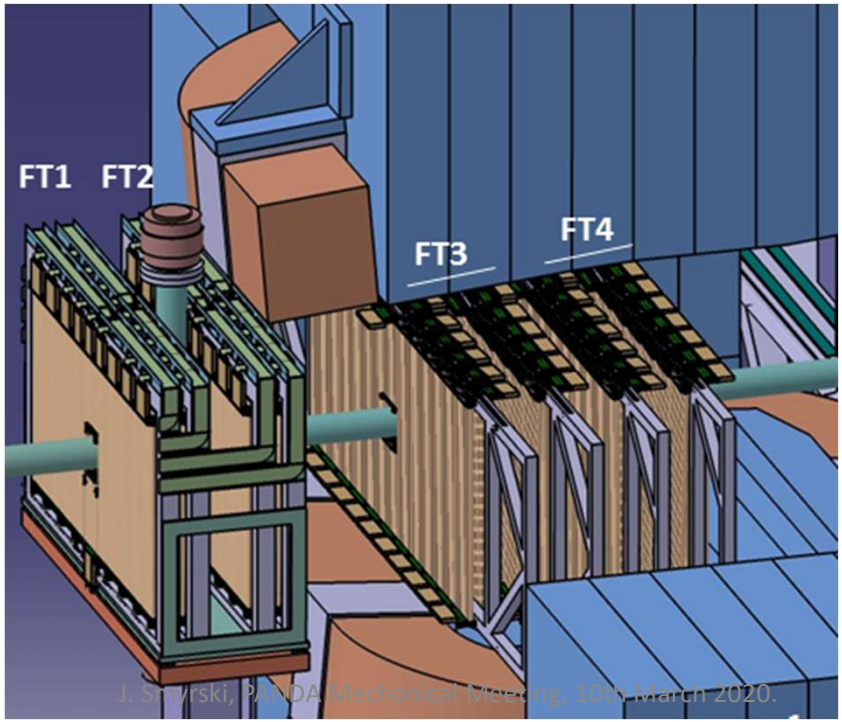
Installation procedure of FT1-4

J.Smyrski, PANDA Mechanical Meeting, 10th of March 2020

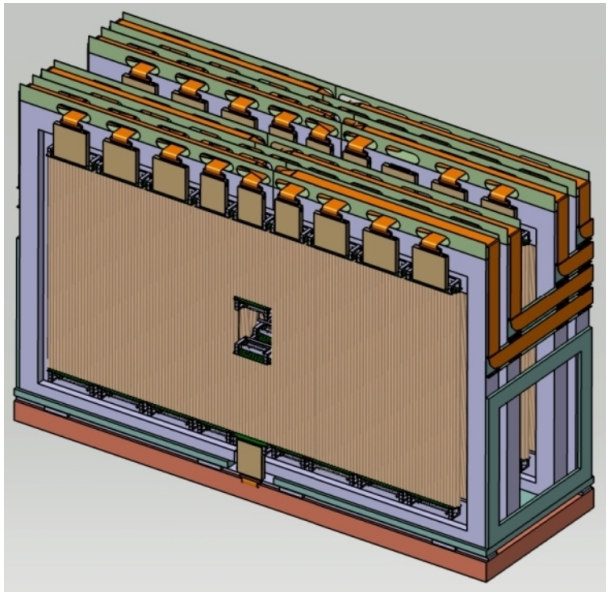


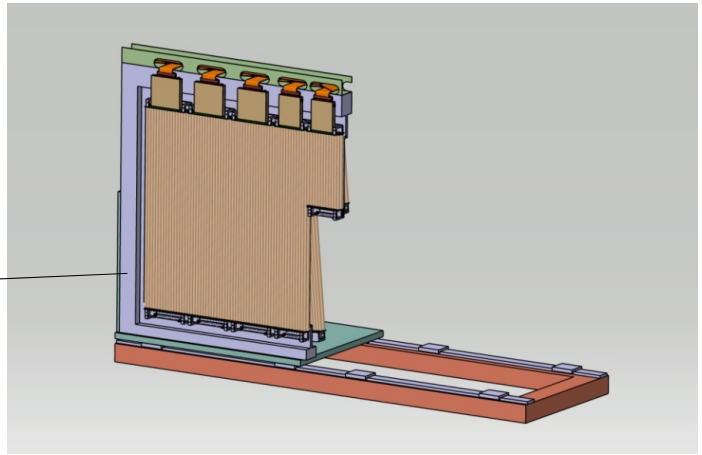
FT1, 2

- **8 double layers** of straws mounted on 8 half-frames

Total of **80 modules (2304 straws)**

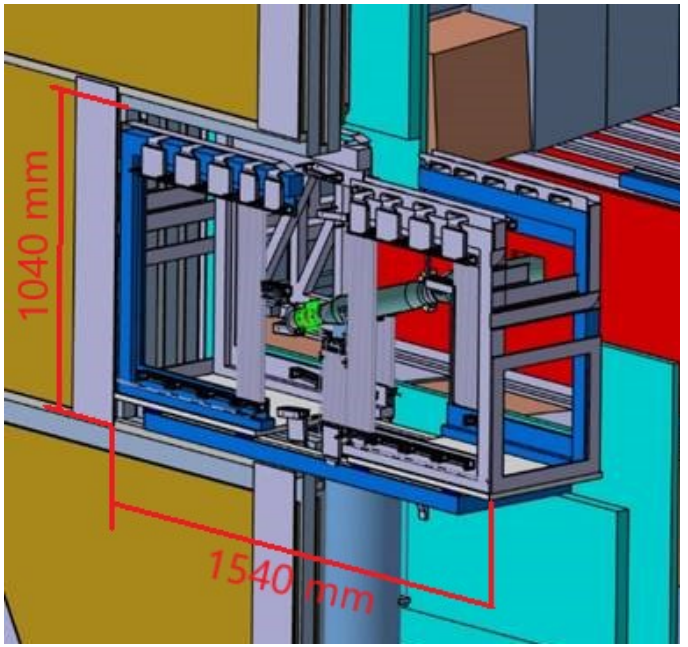
- Weight (FT1+FT2): **200 kg force**
  ~100 kg (frames) + 80 kg (modules) + 20 kg (2m long cables)





Space foreseen for FT1, 2

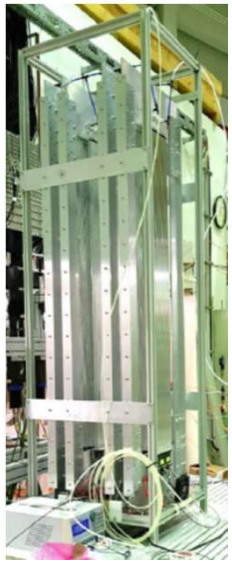
x × y = 1540 mm × 1040 mm (opening in Forward Muon Filer)
clearance Δx = Δy = Δz = 5 mm



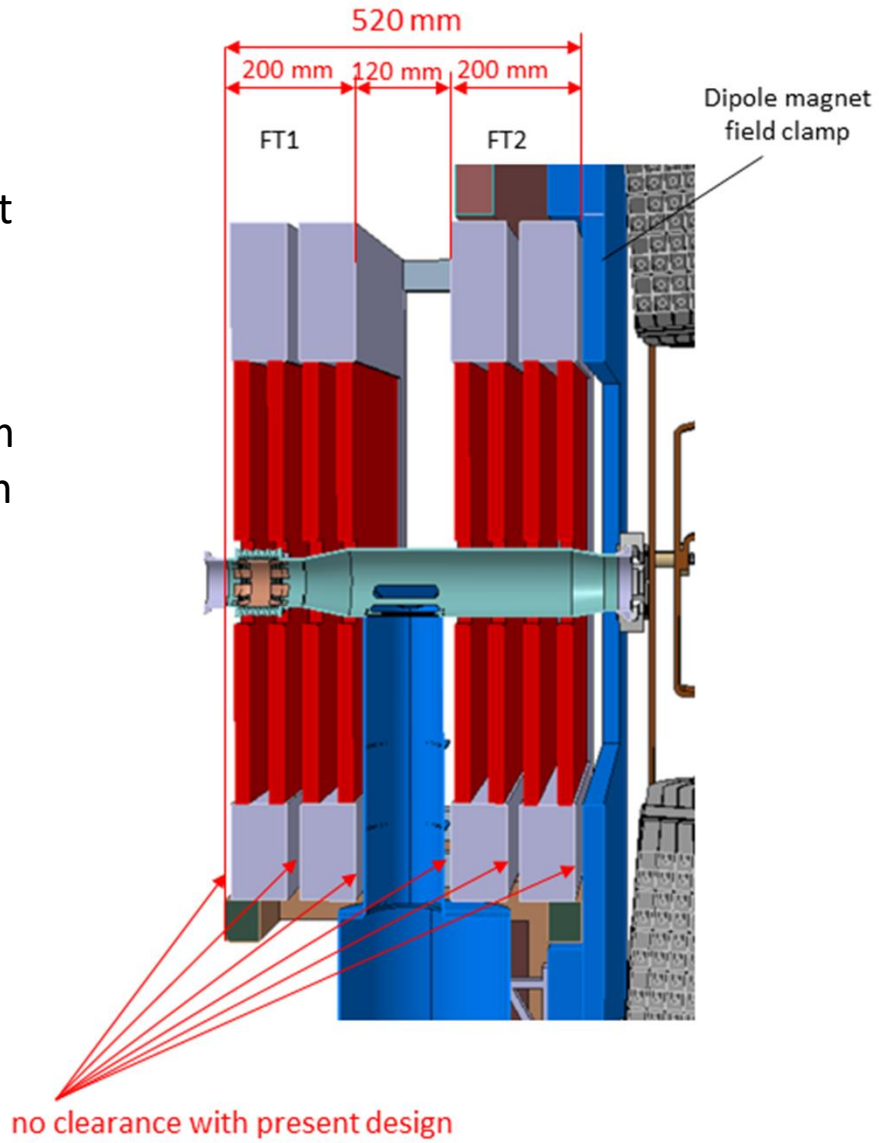
Space foreseen for FT1, 2

z = 520 mm space between TS forward door and dipole magnet field clamp with exclusion of 120 mm for vacuum pipe

With present design clearance Δz = 0 mm (!)
Desired total cumulative clearance: 5+2+3+3+2+5 mm = 20 mm
(can the spacing between FT1 and FT2 be reduced from 120mm to 100 mm?)

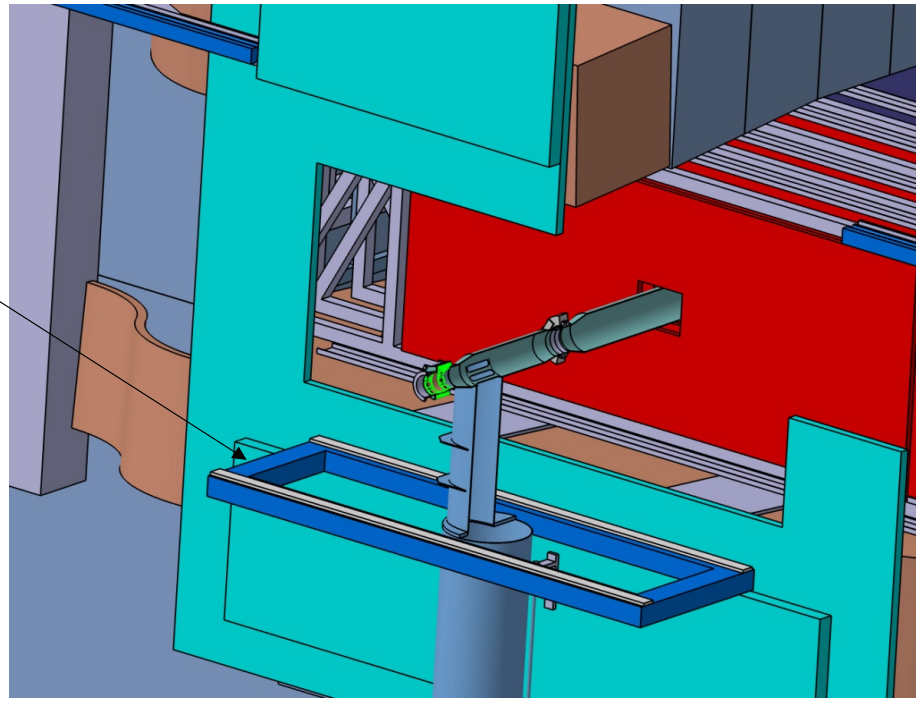


Prototype setup with arrangement of modules as in FT1, FT2



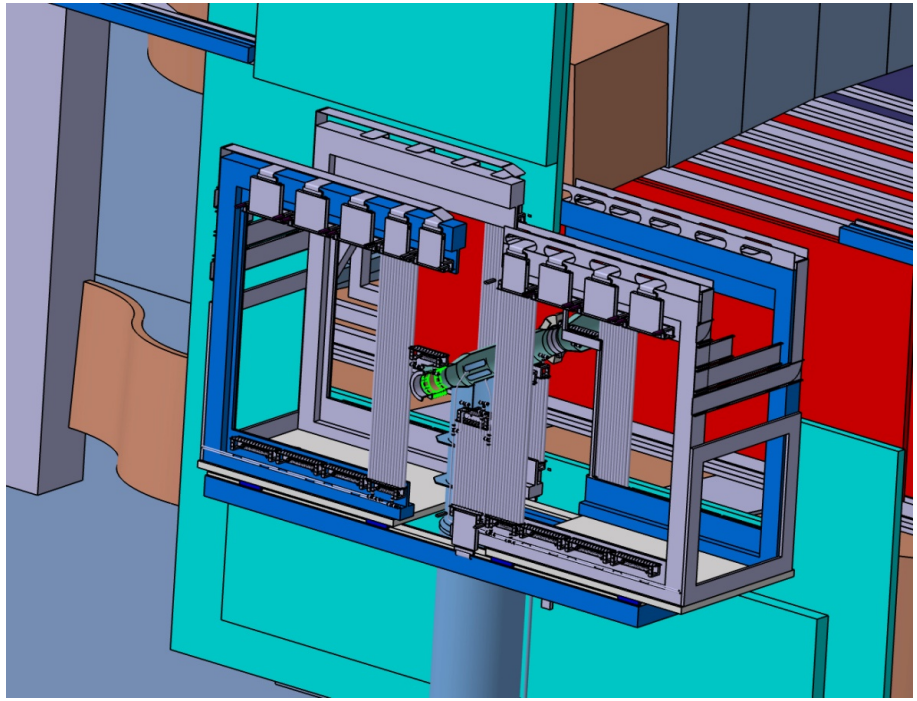
Installation of FT1, FT2 (step 1)

- The TS downstream door and the two halves of Forward Muon Filer opened.
- The steel frame with rails for two movable tables fixed to the dipole magnet field clamp.



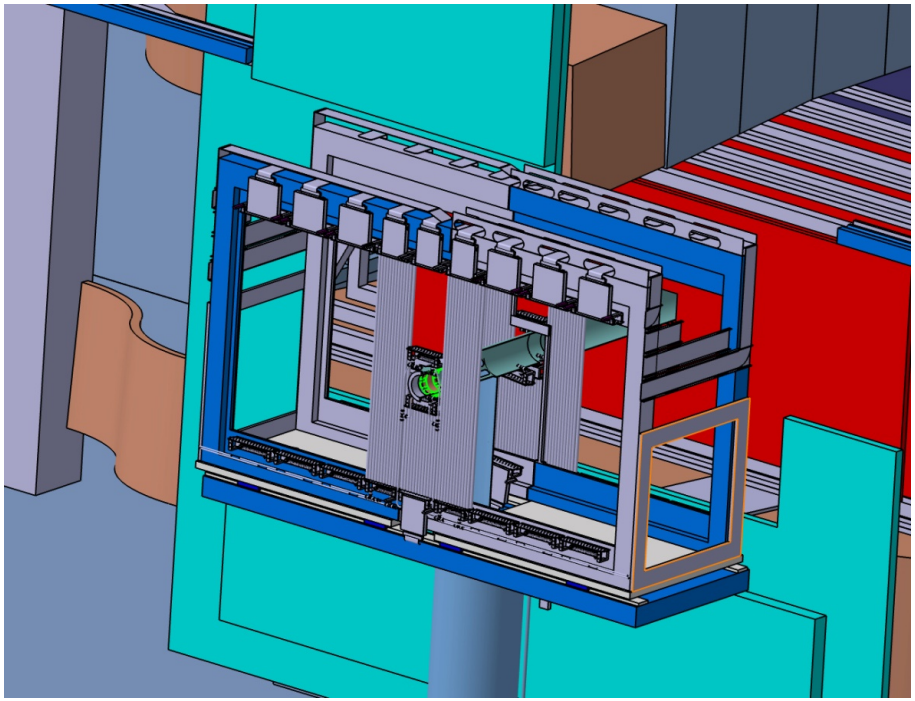
Installation of FT1, FT2 (step 2)

The half-frames with modules mounted on two tables (left and right one) placed on the steel frame.



Installation of FT1, FT2 (step 3)

The tables with half-frames moved towards the beam line to form FT1, FT2.



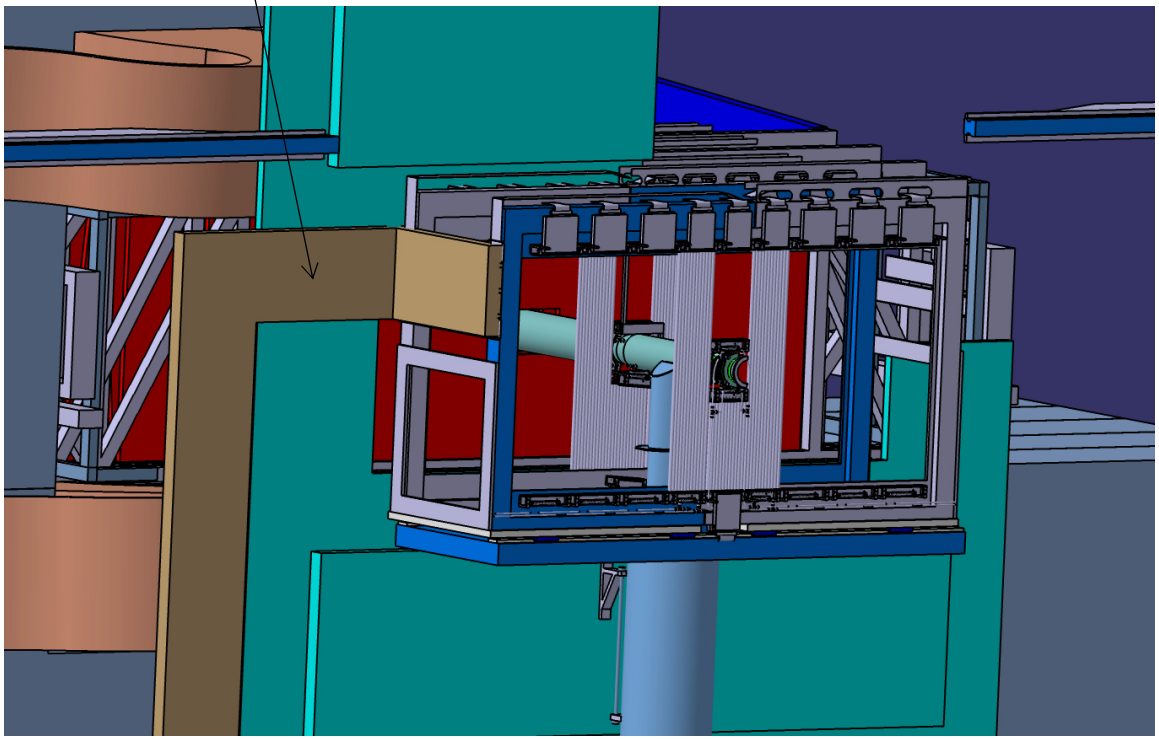
Cabling

80 signal cables (~1.4 × 50 mm^2)
80 HV cables ∅ = 4mm
2x8 LV cables ∅ ~7mm
2x8 plastic pipes for gas ∅ = 6mm

ΣS_i = 8240 mm^2 = 82.4 cm^2
× factor 2 to add free space between cables = 165 cm^2

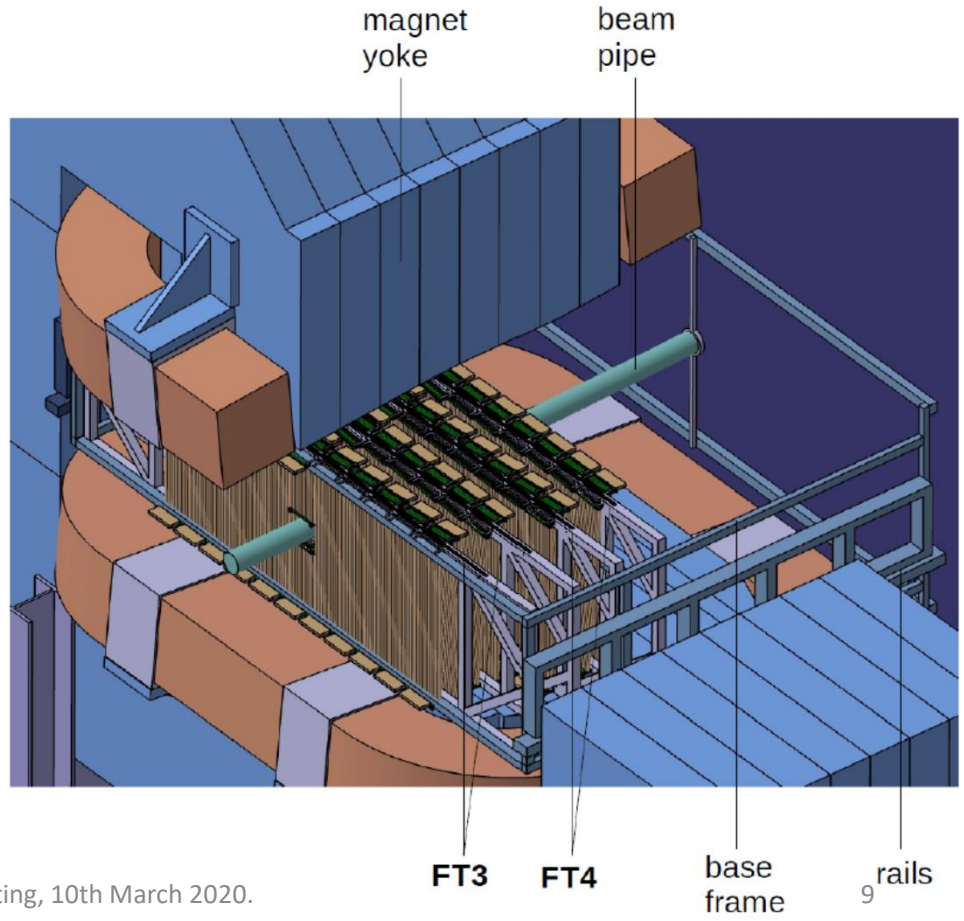
Two cable trays – left and right one – each with section 5x20cm^2 = 100cm^2 should be sufficient

Cables and gas pipes placed
in cable trays and connected to FT1, 2



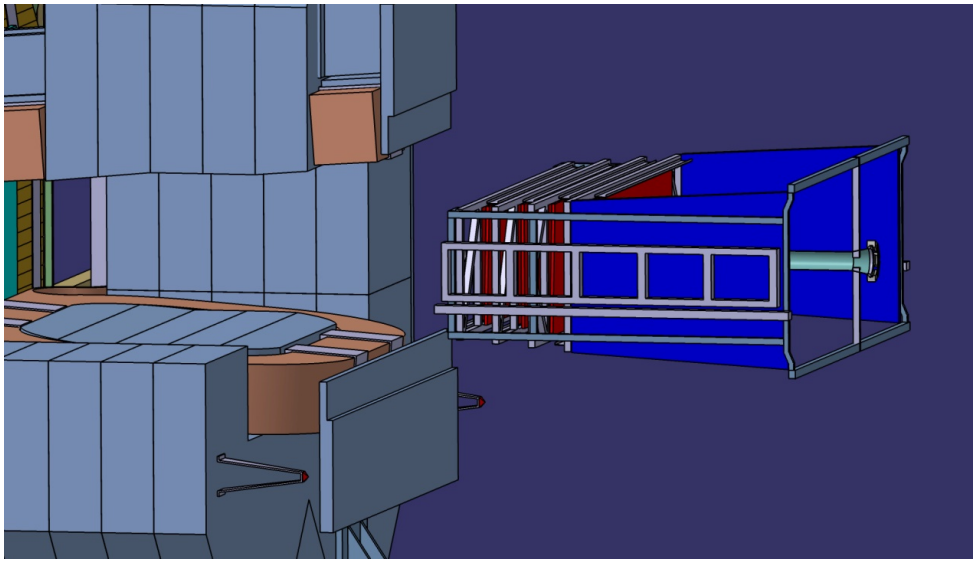
FT3, FT4

8 double layers of straws mounted on 4 rectangular frames
Total of **104 modules (3328 straws)**



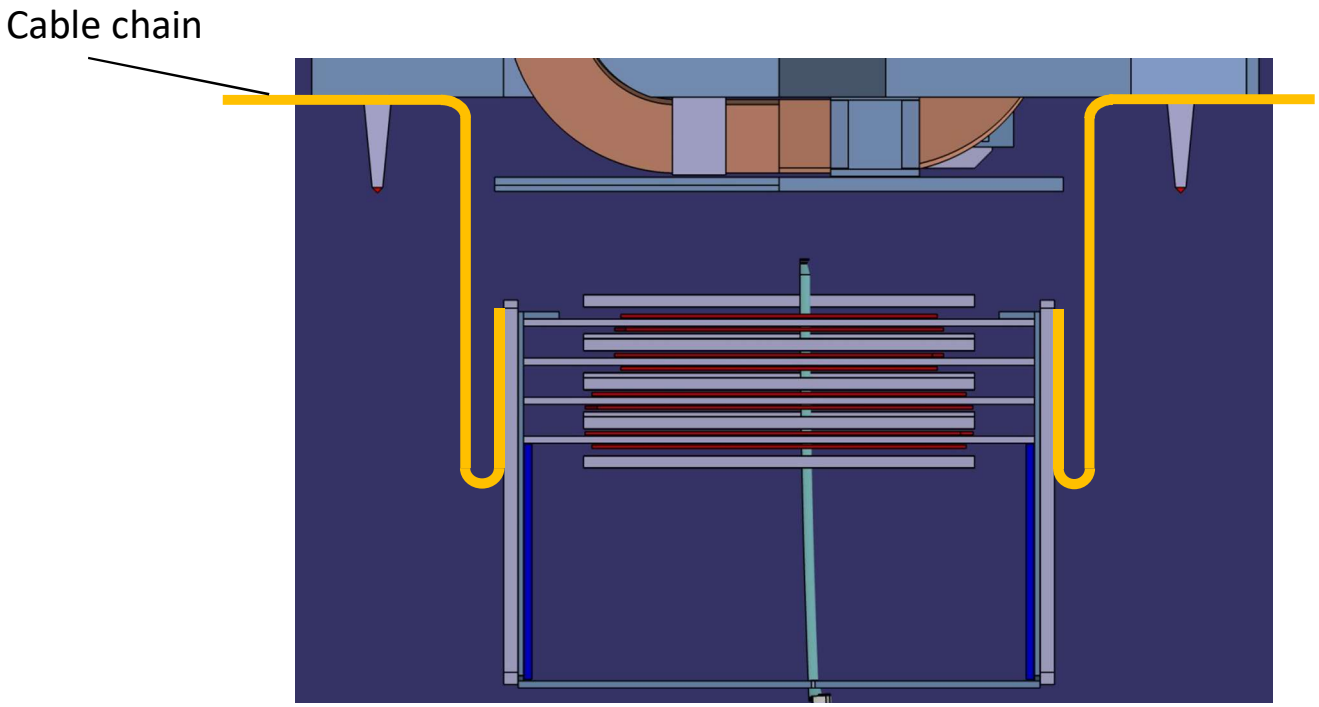
Mounting FT3, 4 on base frame

- The FT3, FT4 installed on the base frame outside the magnet gap.
- The beam pipe inserted in the central openings in the tracking stations and hanged on the base frame by means of two vertical bars (weight of the pipe = ?).



Cable routing

- The gas pipes and the gas cables connected to the stations.
- The base frame with the stations rolled inside the gap.



Issues to study

- Clearance in z-direction for the FT1, FT2 (can the distance between FT1 and FT2 be reduced by 2 cm?)
- Inserting the beam pipe in the openings in the FT3, FT4 and supporting the pipe