



Università degli Studi
Guglielmo Marconi



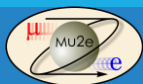
Northern Illinois
University

Laser fiber distribution system for the Mu2e calorimeter

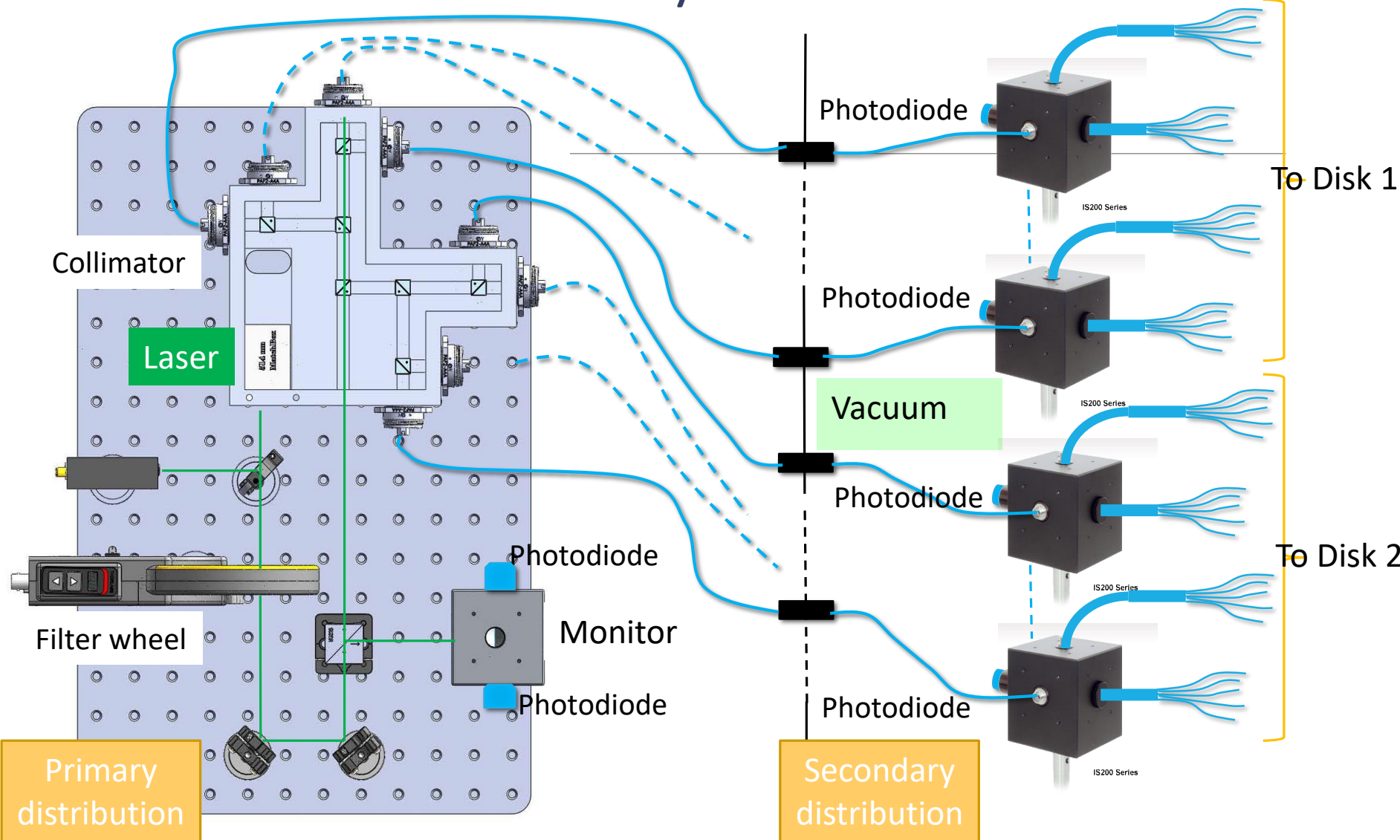
DANIELE PASCIUTO

MUSE Network General Meeting

24 October 2019



Laser distribution system



Primary distribution system

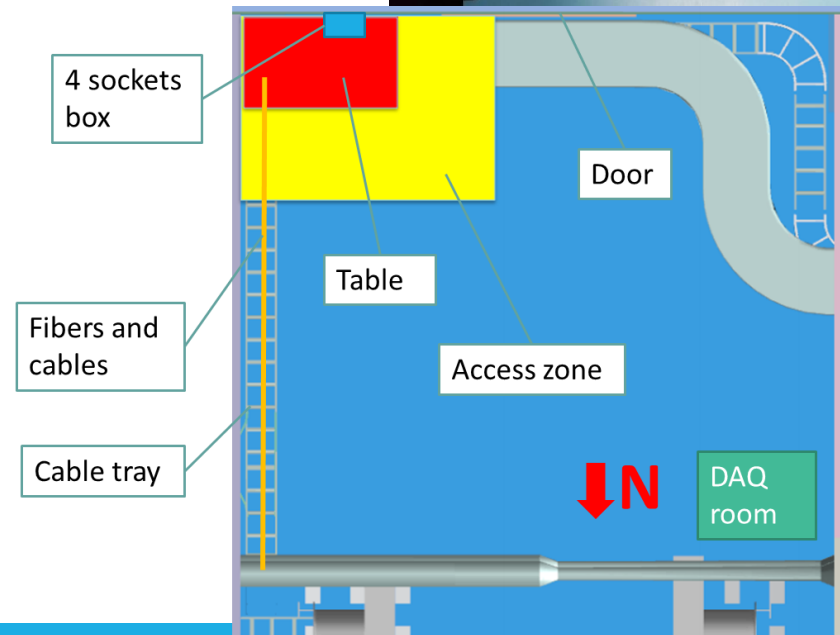
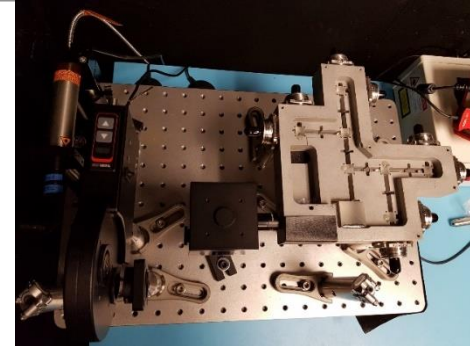
The Laser station is composed by:

1. Laser primary distribution system
2. Digitizer board
3. Pulse generator
4. Scope
5. Personal computer

Laser 3B Class

The whole system is closed in a locked box
Light coming out from the fibers (if
accidentally broken) is Class 1 (filters are
present in the distribution system)

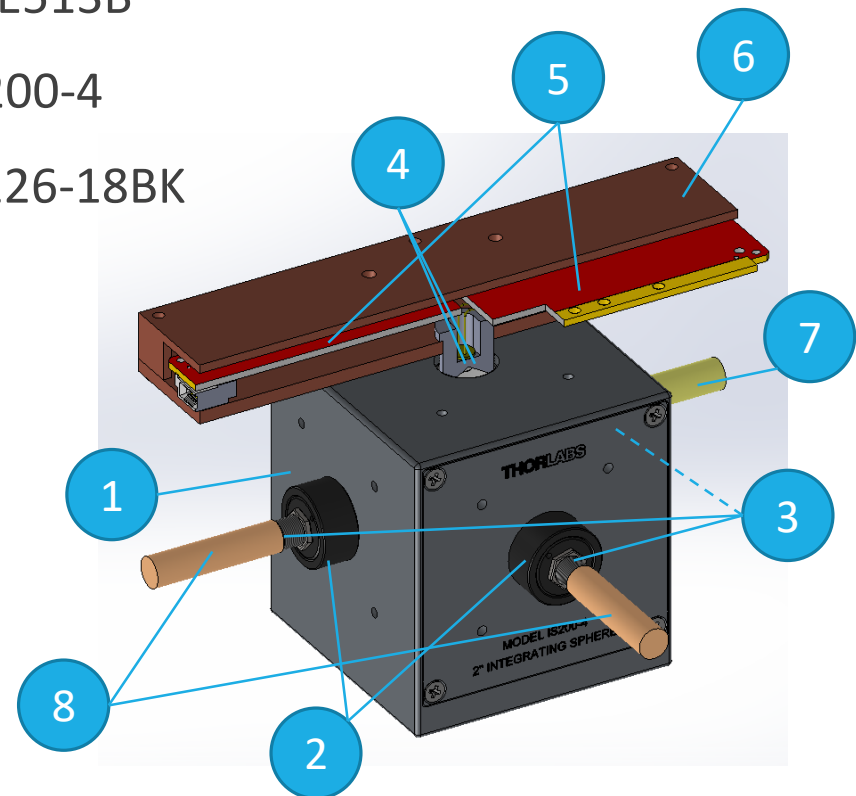
More info DocDb 27067



Secondary distribution system

Main components (8x whole calorimeter)

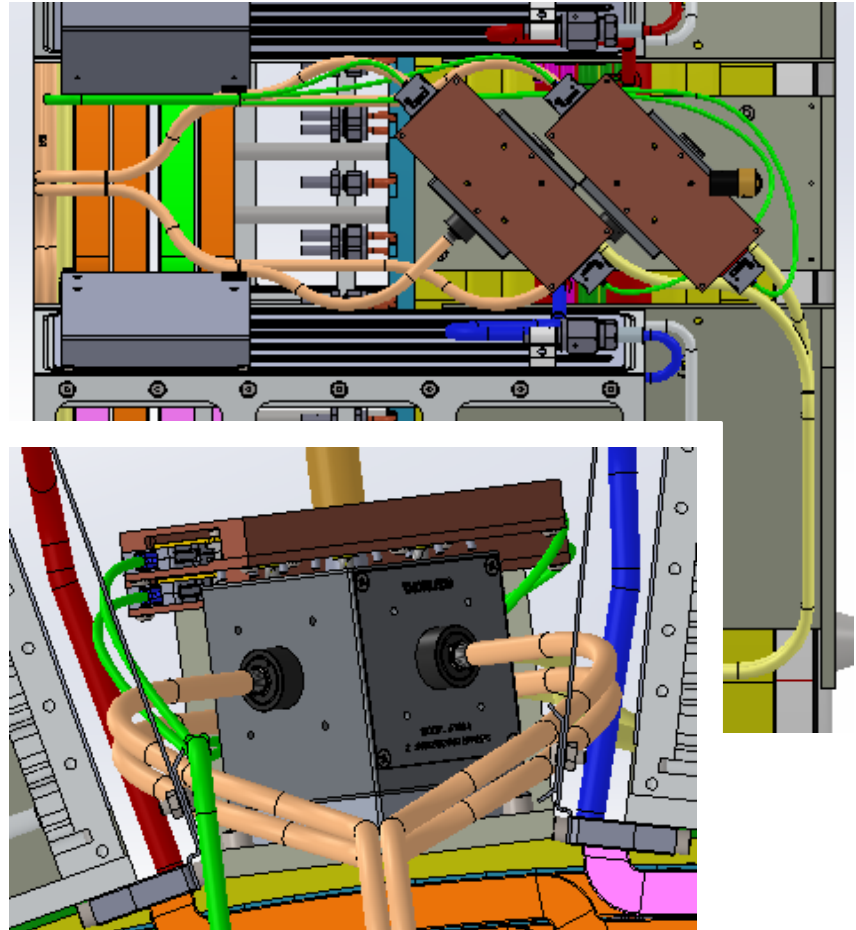
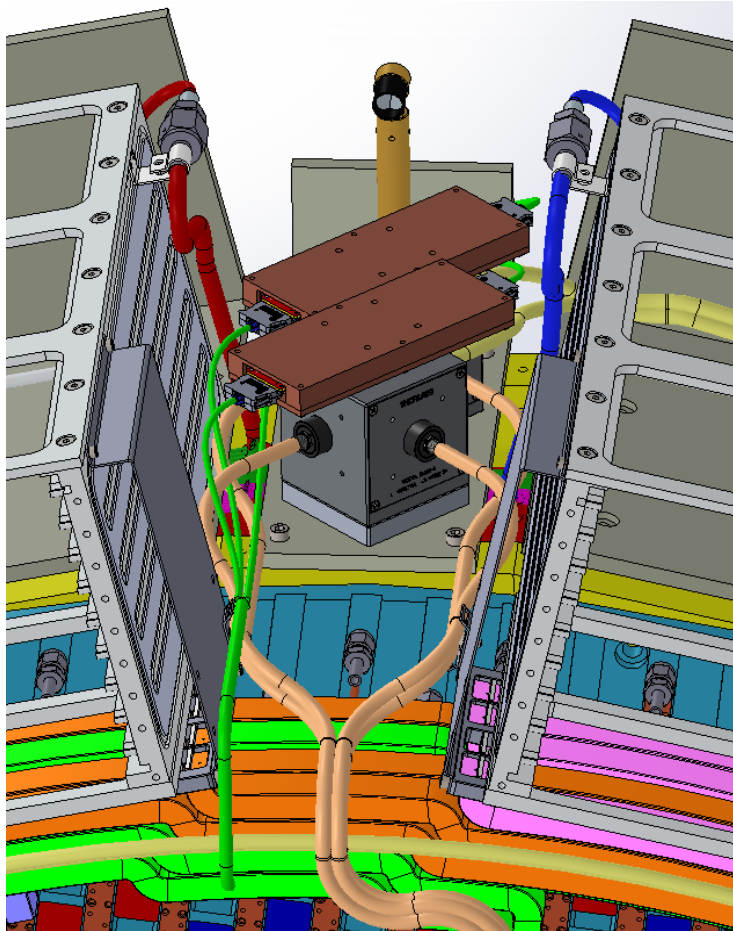
1. Sphere: Thorlabs, IS200-4
2. Filter (2x): Thorlabs, SM05L03 + NE513B
3. Fiber connector (3x): Thorlabs, IS200-4
4. Photodiode (2x): Hamamatsu, S1226-18BK
5. FEE board (2x)
6. Faraday cage
7. Fiber in
8. Fiber bundle out (2x)



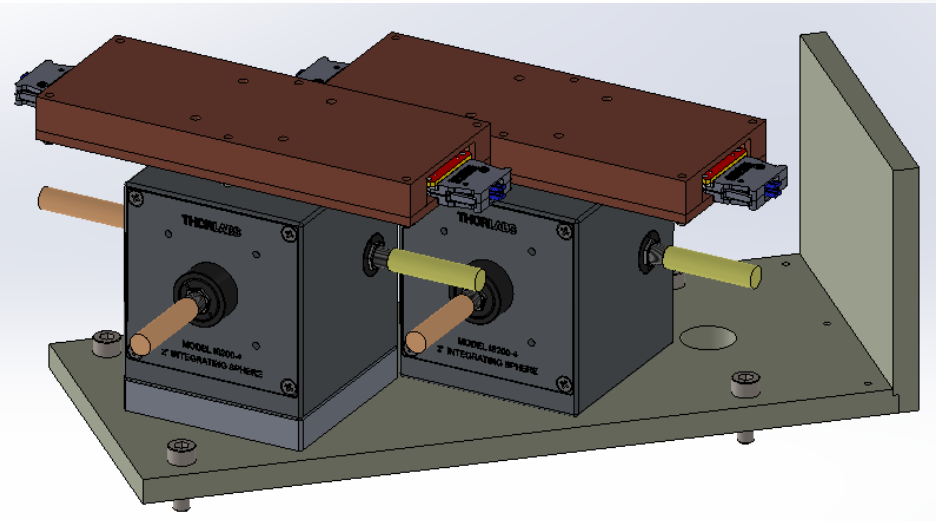
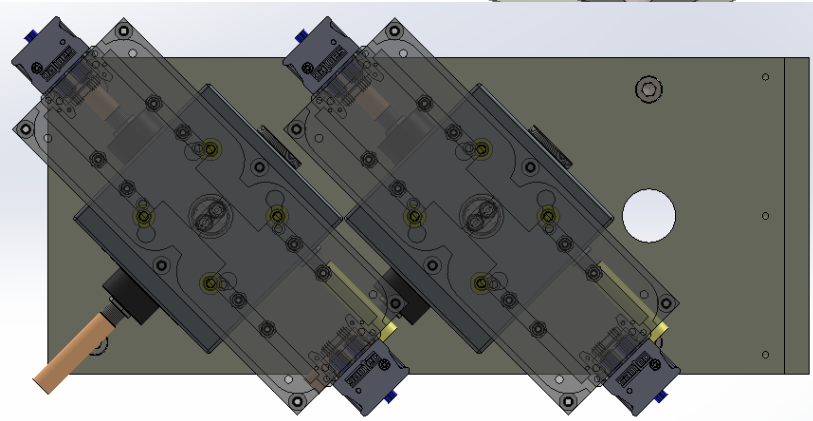
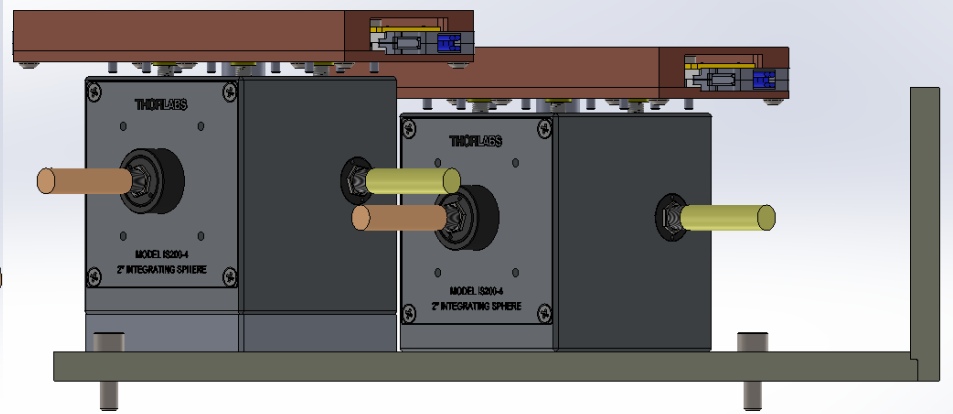
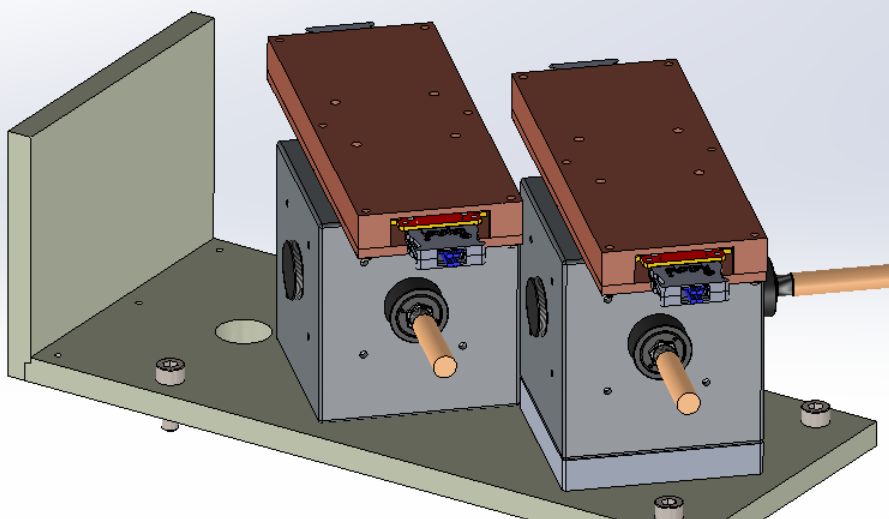
Constraints

- Short term fiber bending radius: 25 mm
- Long term fiber bending radius: 50 mm
- Fit between two crates (0 and 1)
- Leave space for Tracker alignment system
- Protection from radiation
- Dissipate heat (0.35 W per FEE)
- Vacuum ok (no virtual leak, vacuum material)
- FEE electrically isolated
- FEE easy to mount-dismount during maintenance
- Easy to rout

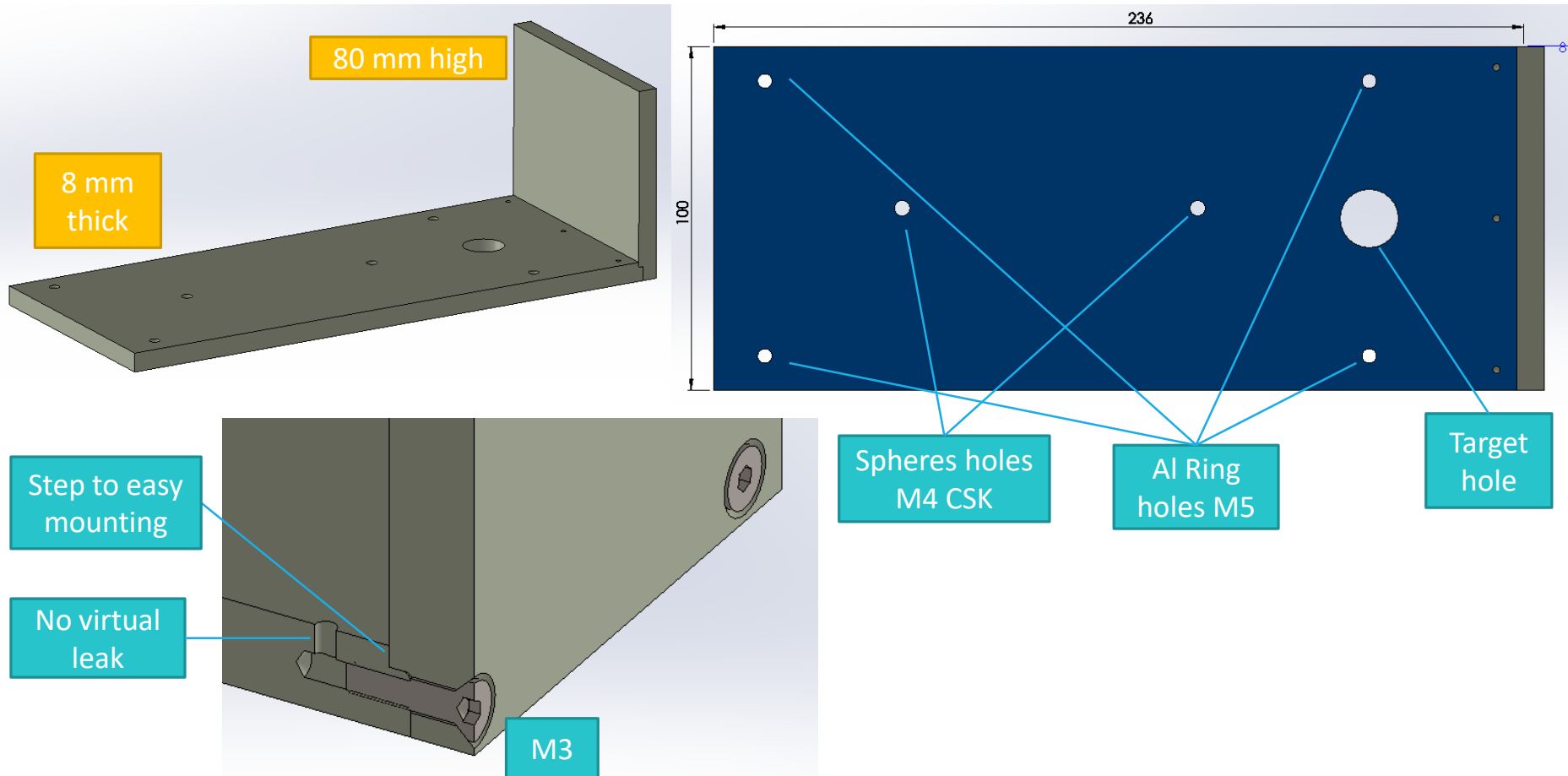
Mounting solution



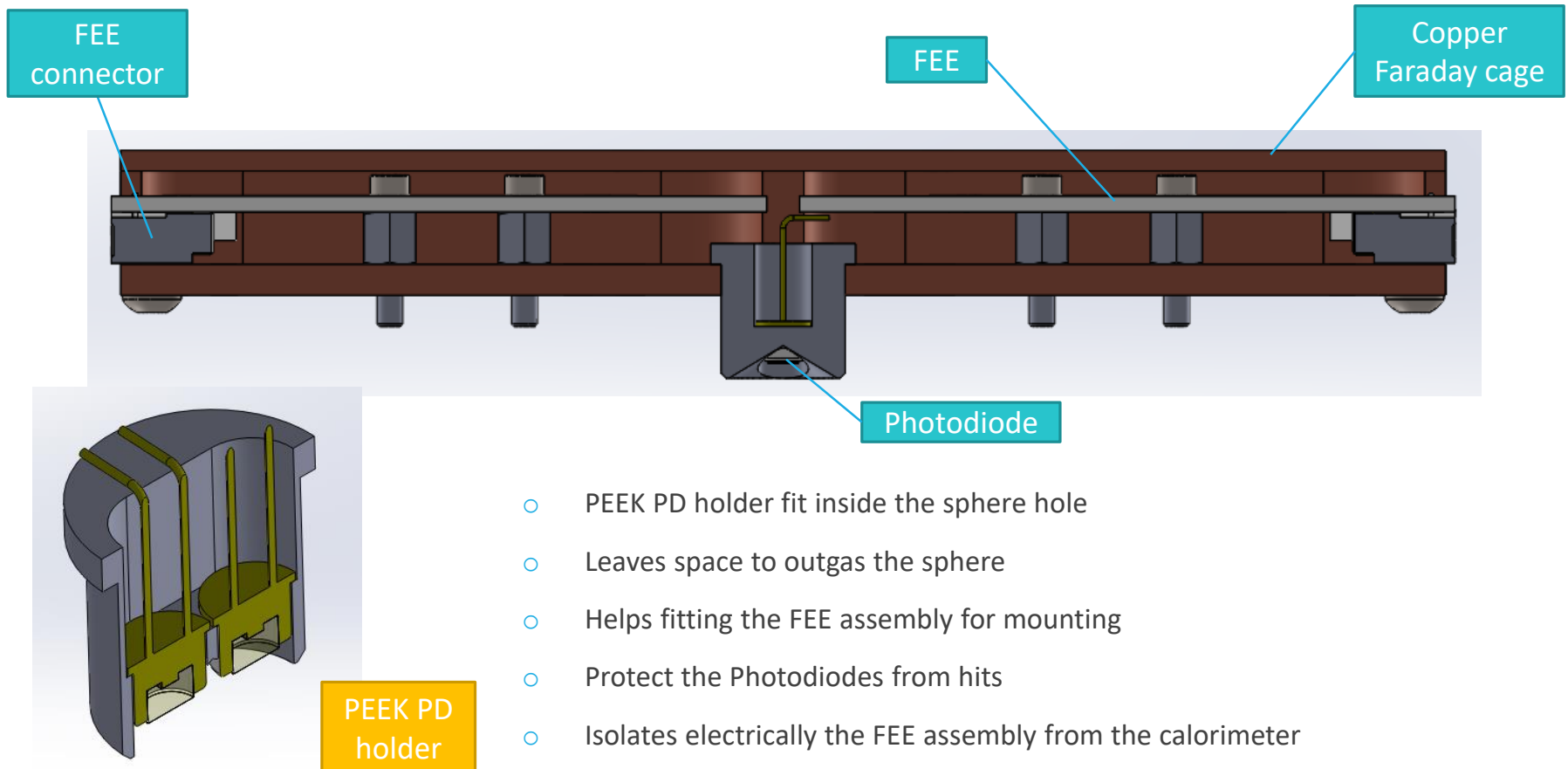
Mounting solution



Tungsten shield

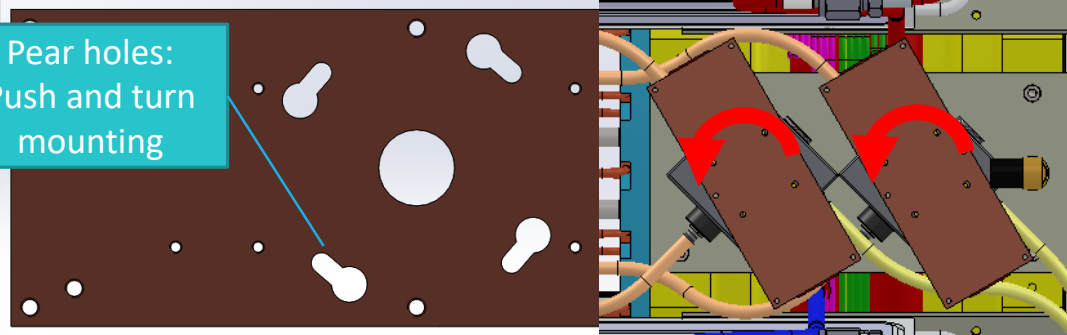
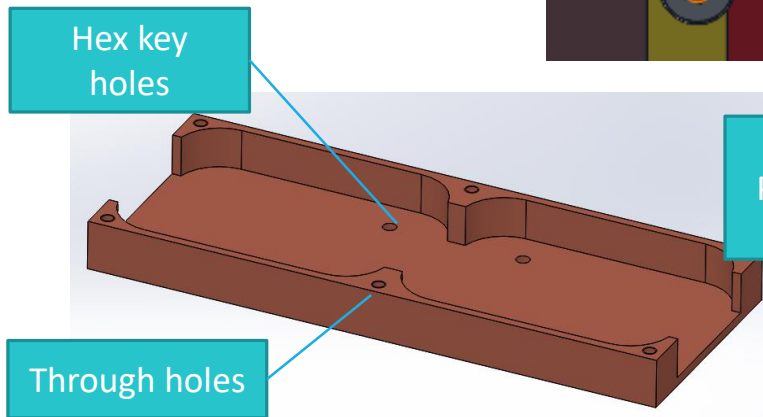
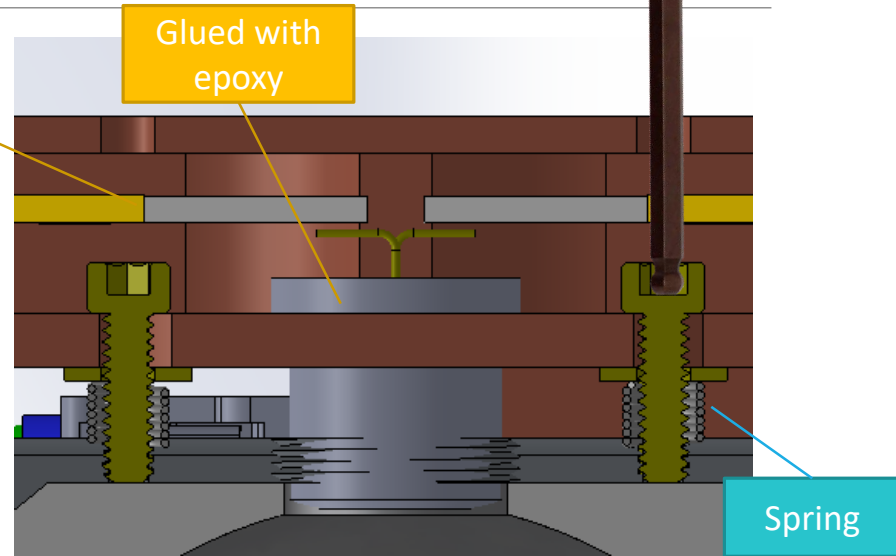
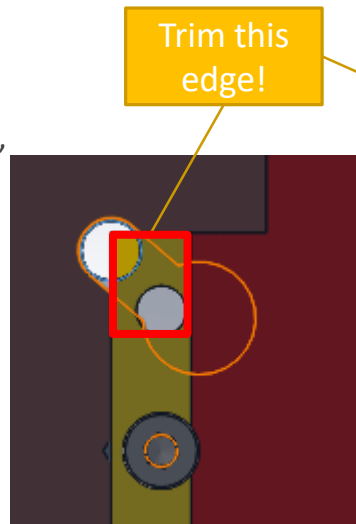


FEE board assembly



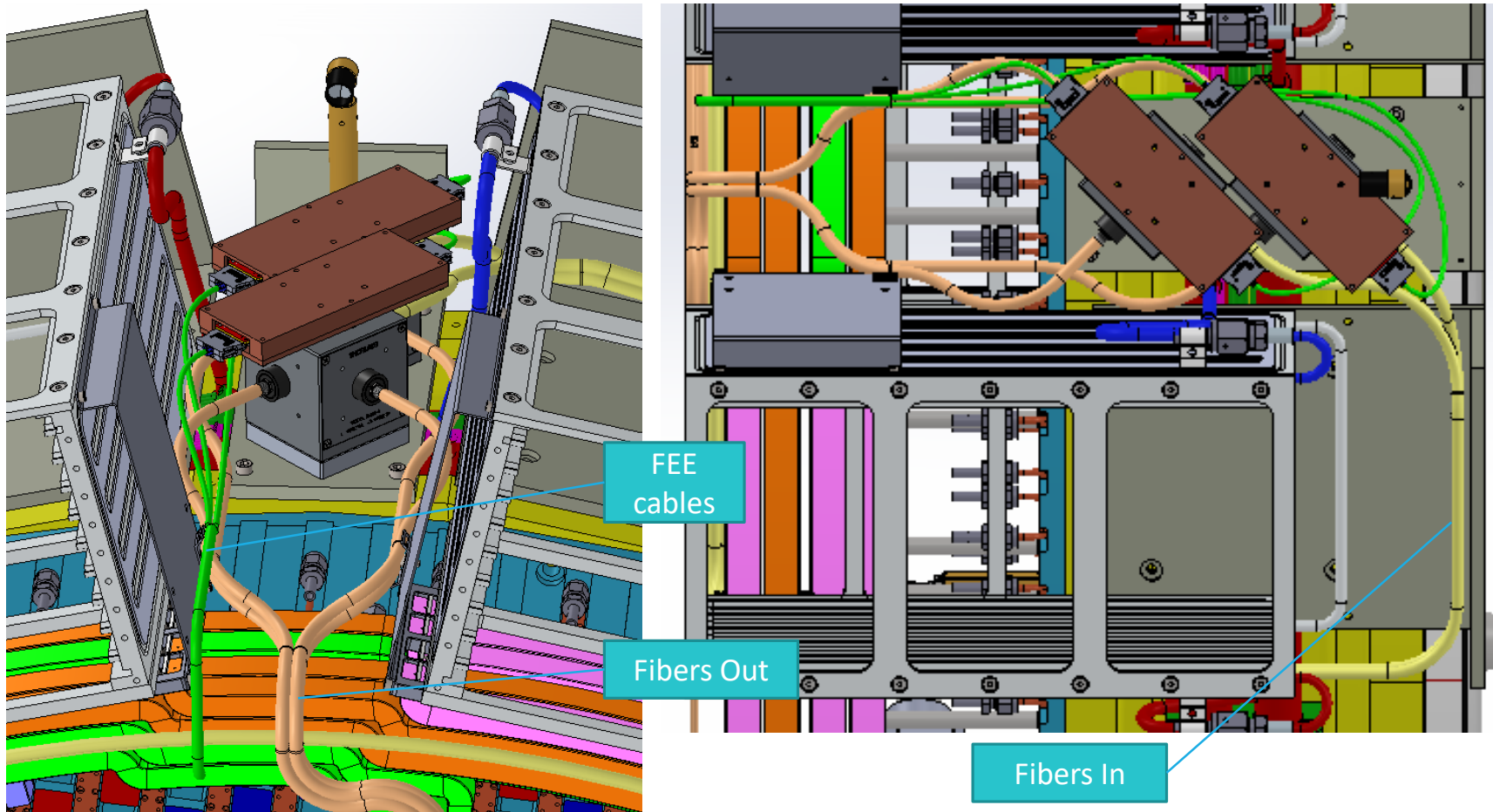
FEE Faraday cage mounting

- Assembling offsite
 - Mounting without screwing (worse thermal conductance, better access)
 - Mounting screwing (better thermal conductance, worse access)
- (to decide in advance -> presence spring)

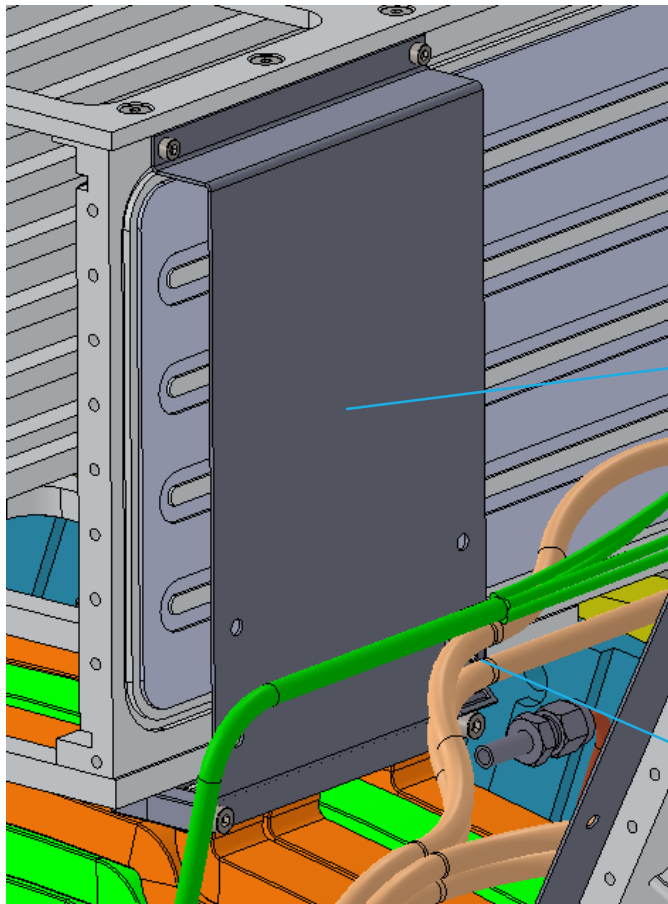


Cabling

- Fibers bending radius 50 mm

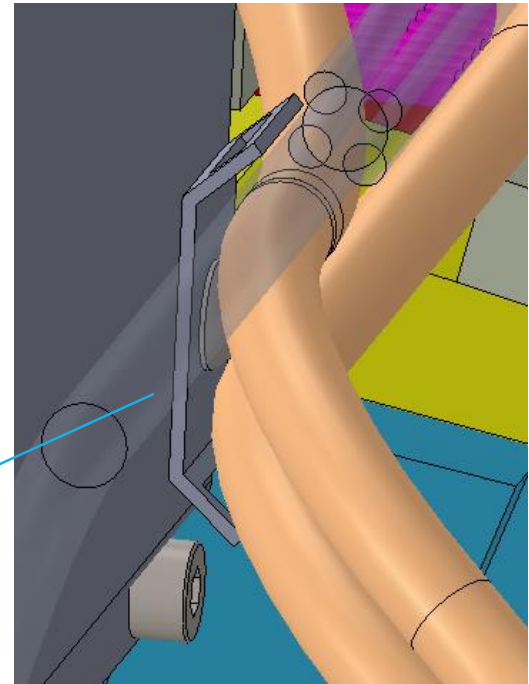


Cabling



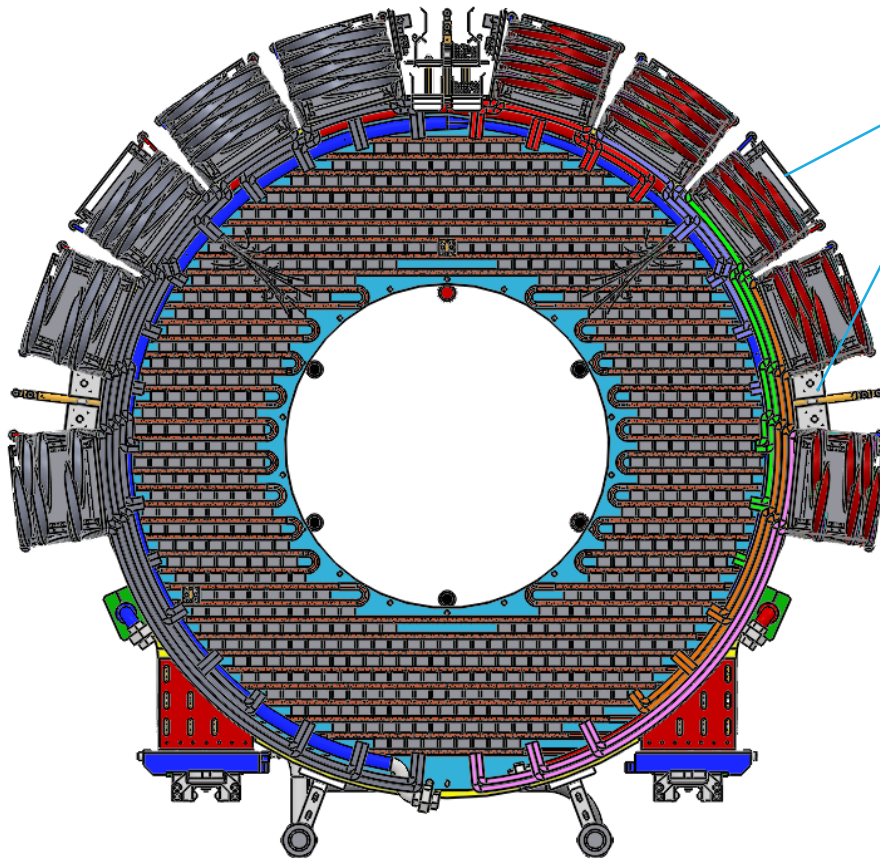
Readout
cables
container

Cable tie

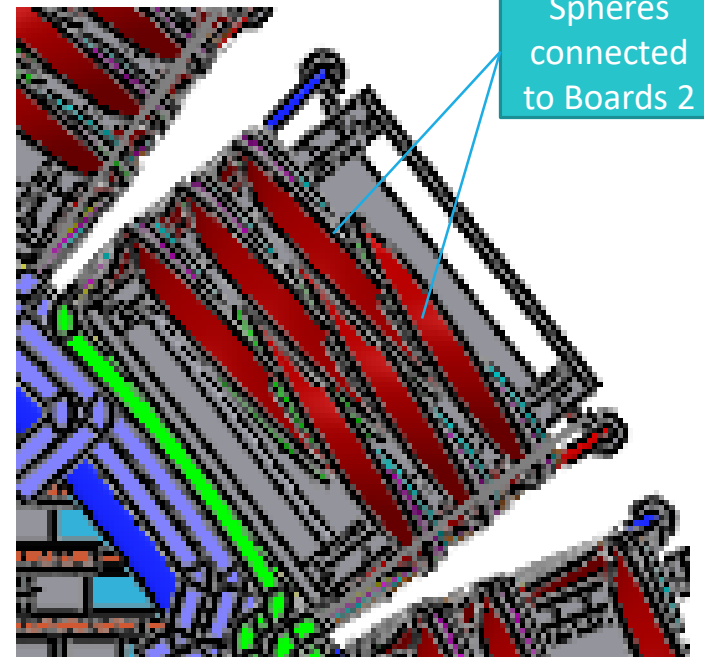


Connection

- Symmetrical for half disk
- Same for both disks
- 2/4 connector of a cable (the others are not connected)
- PDs of the same sphere are connected to two different boards (sensor 1 and sensor 2)

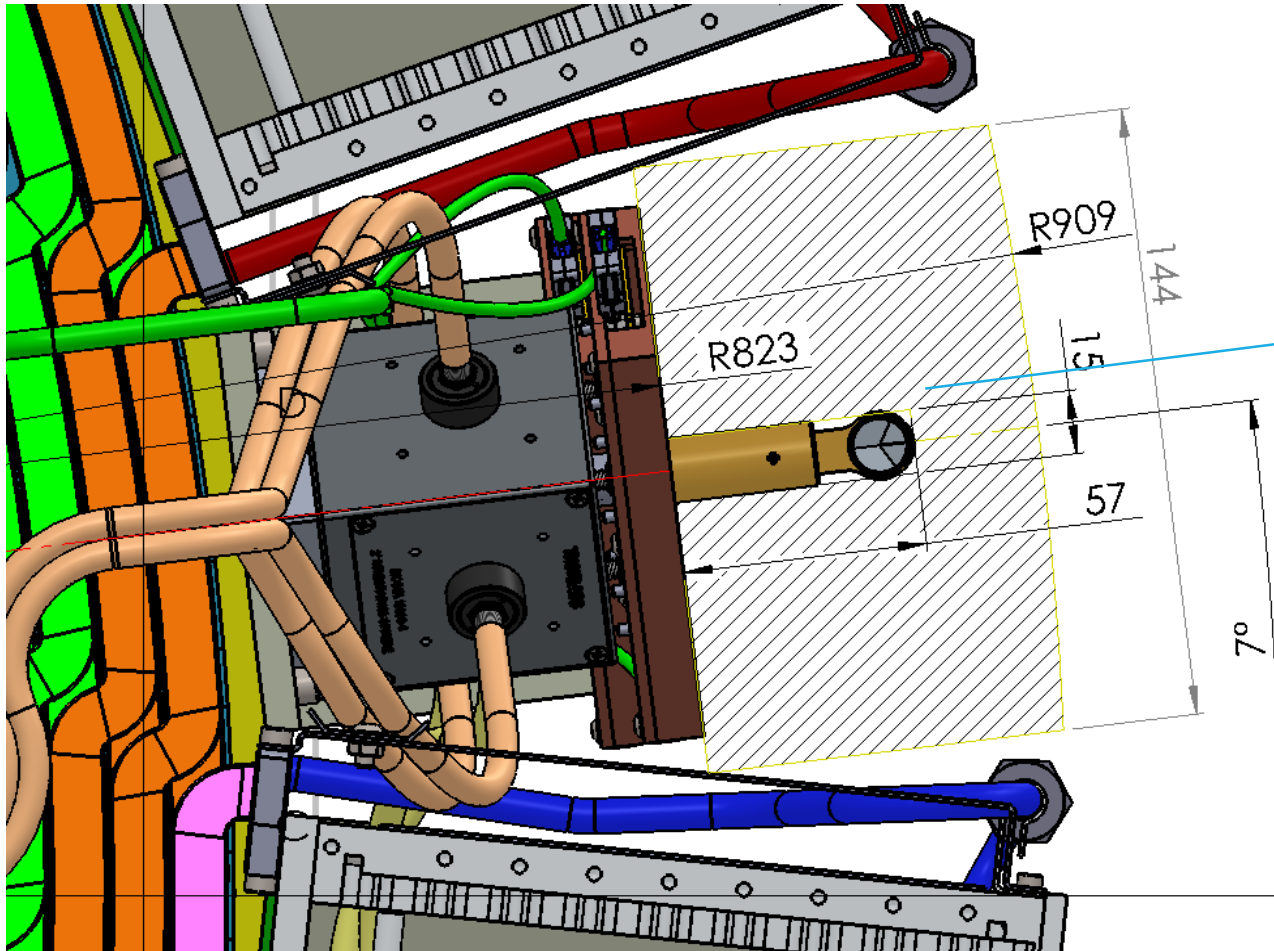


Spheres
connected
to Crates 2



Spheres
connected
to Boards 2

See of Sight



Tracker
Target See
of Sight

- All cables are fixed or contained
- No spare cables in that region

Thanks for your attention

