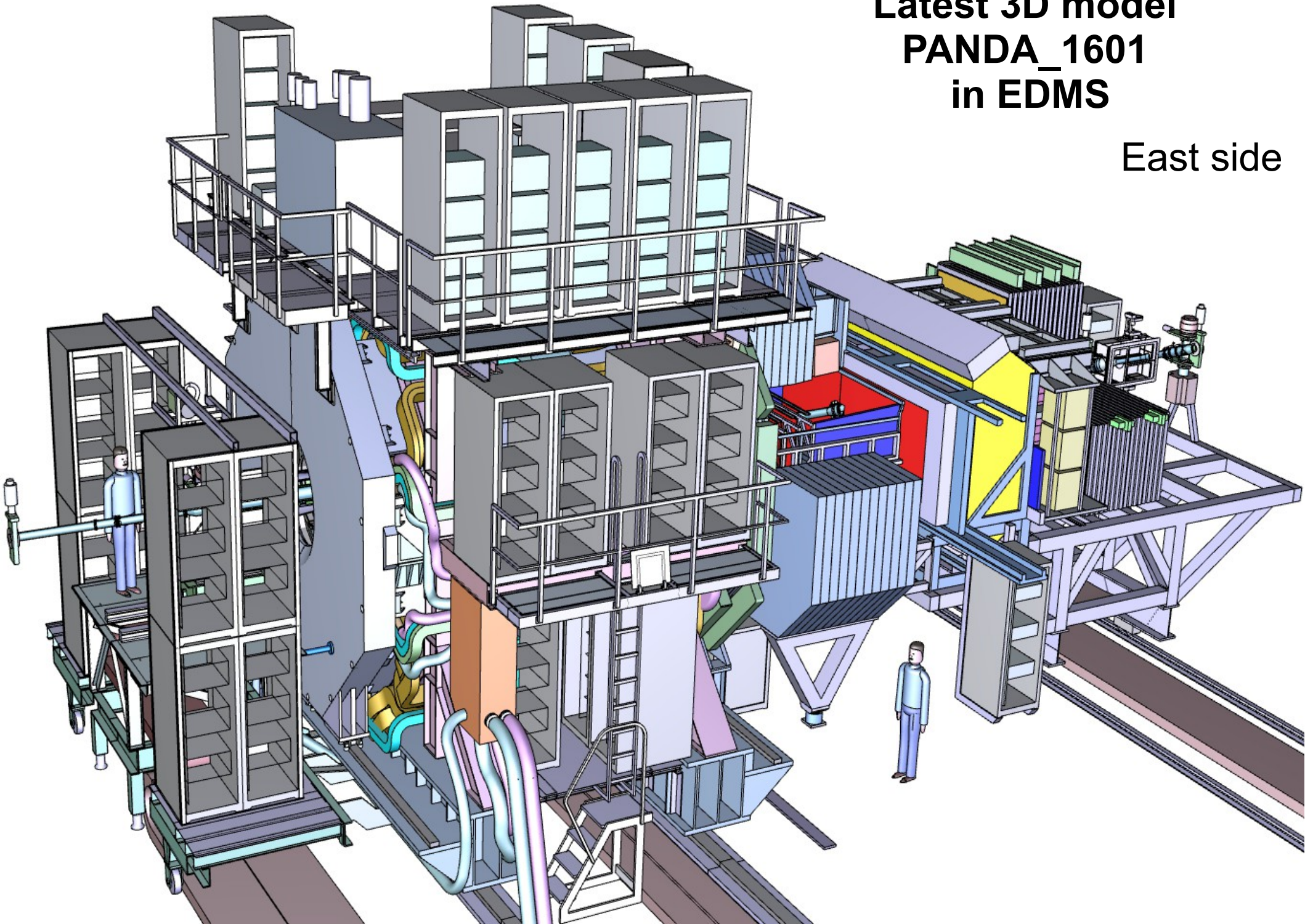


Racks near the detector

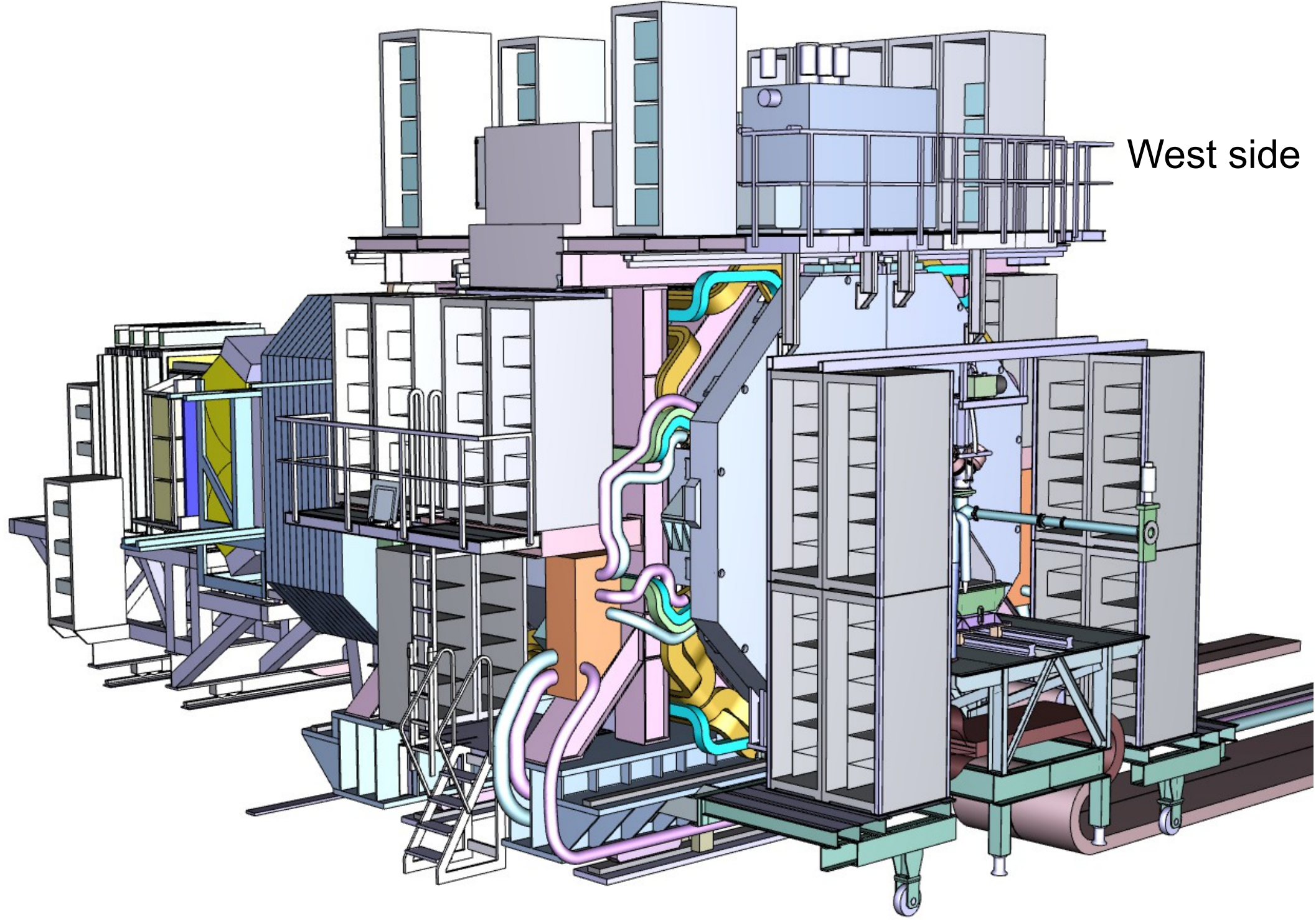
Locations
Content
Cooling

**Latest 3D model
PANDA_1601
in EDMS**

East side



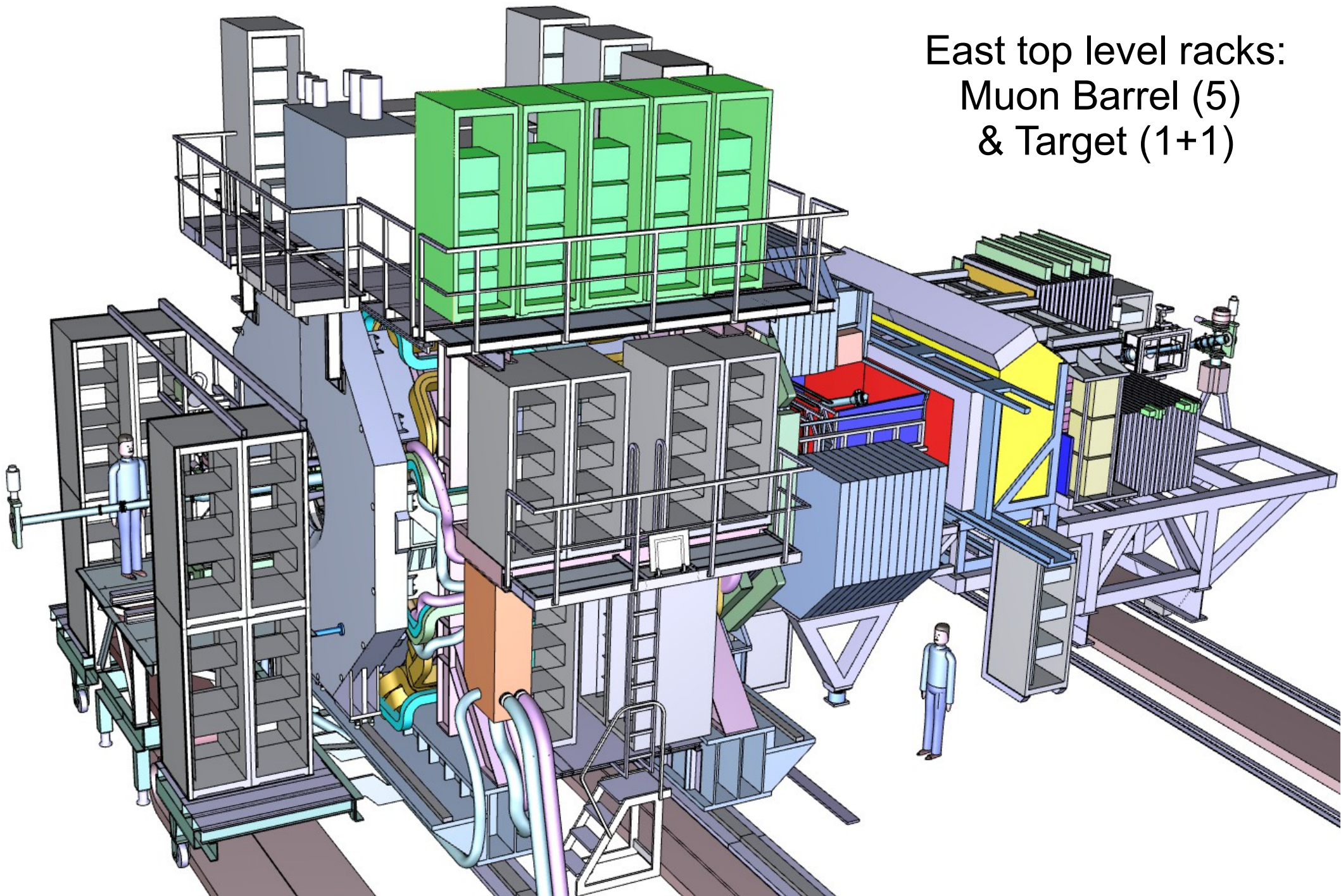
West side



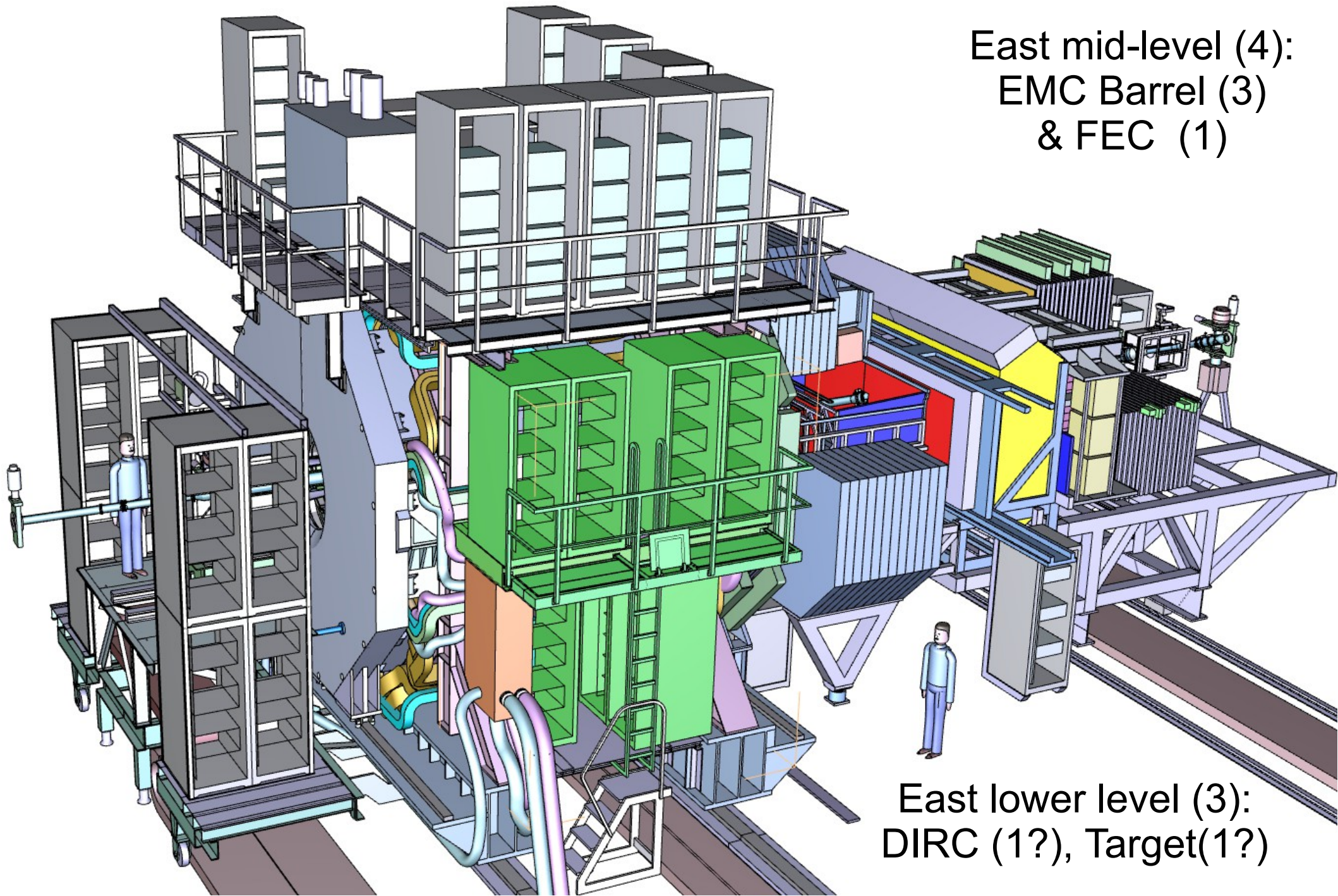
Feedback with figures on racks (Current status)

- **Target (Pellet, Cluster, Beam dump)**
- **Barrel Muon detector**
- **MVD**
- **STT**
- **EMC (FEC, Barrel, BEC)**
- **Barrel DIRC**
- **Forward Tracking**
- GEM
- Si Lambda Discs
- Barrel TOF (SciTil)
- Disc DIRC
- Forward RICH
- Forward TOF
- Forward Shashlyk Cal.
- Luminosity detector
- Endcap Muon detector
- Muon filter
- Forward range system

East top level racks:
Muon Barrel (5)
& Target (1+1)

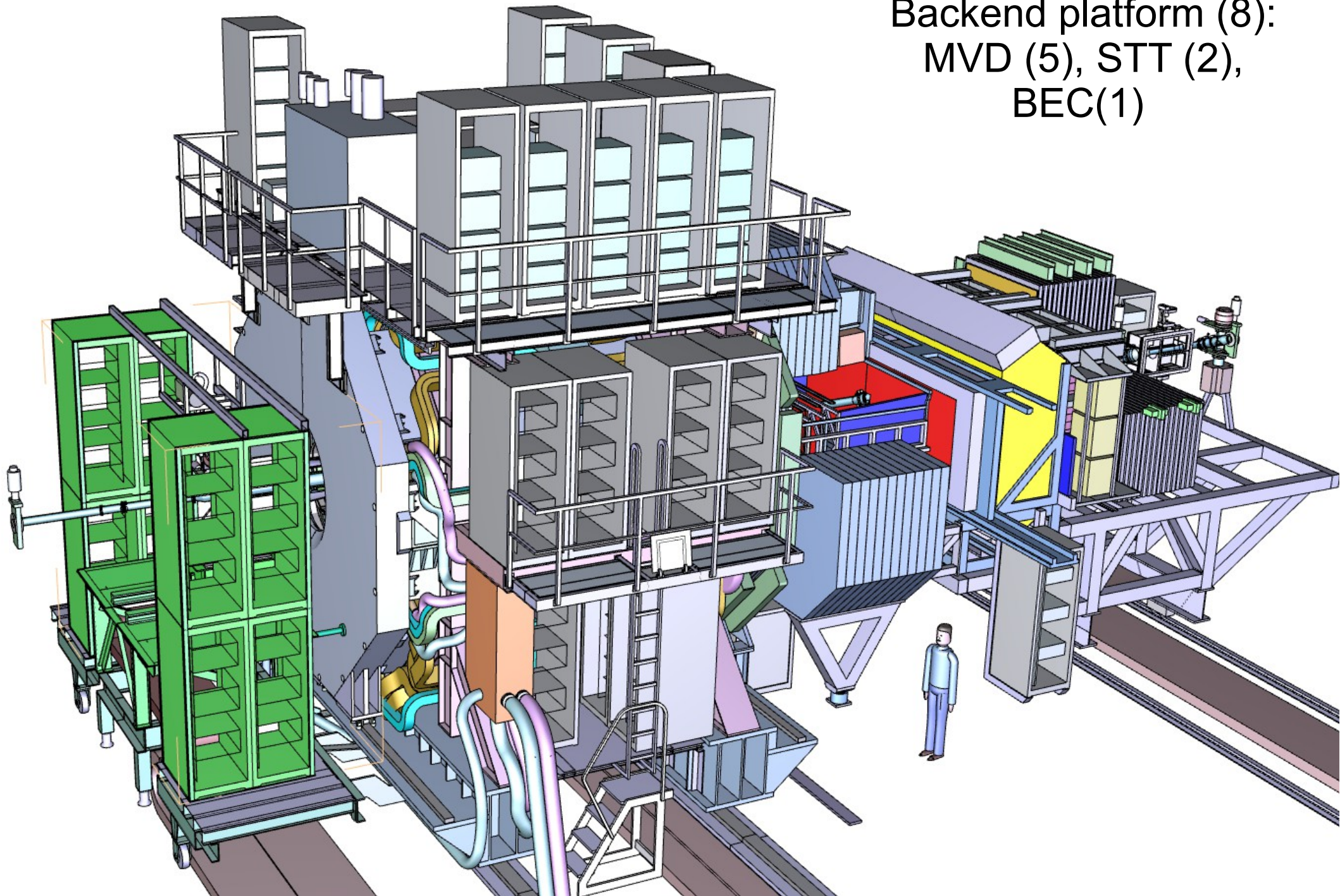


East mid-level (4):
EMC Barrel (3)
& FEC (1)

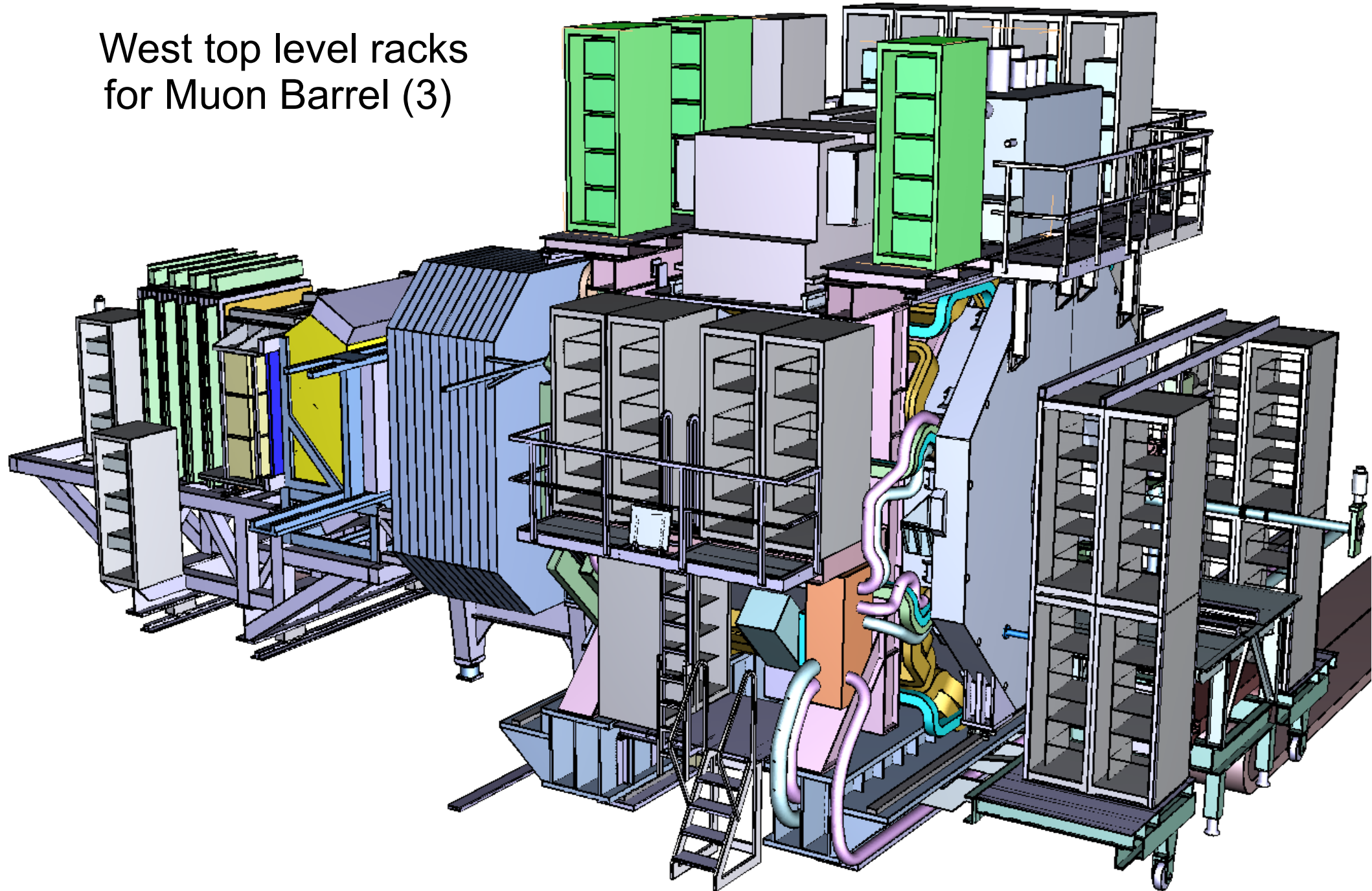


East lower level (3):
DIRC (1?), Target(1?)

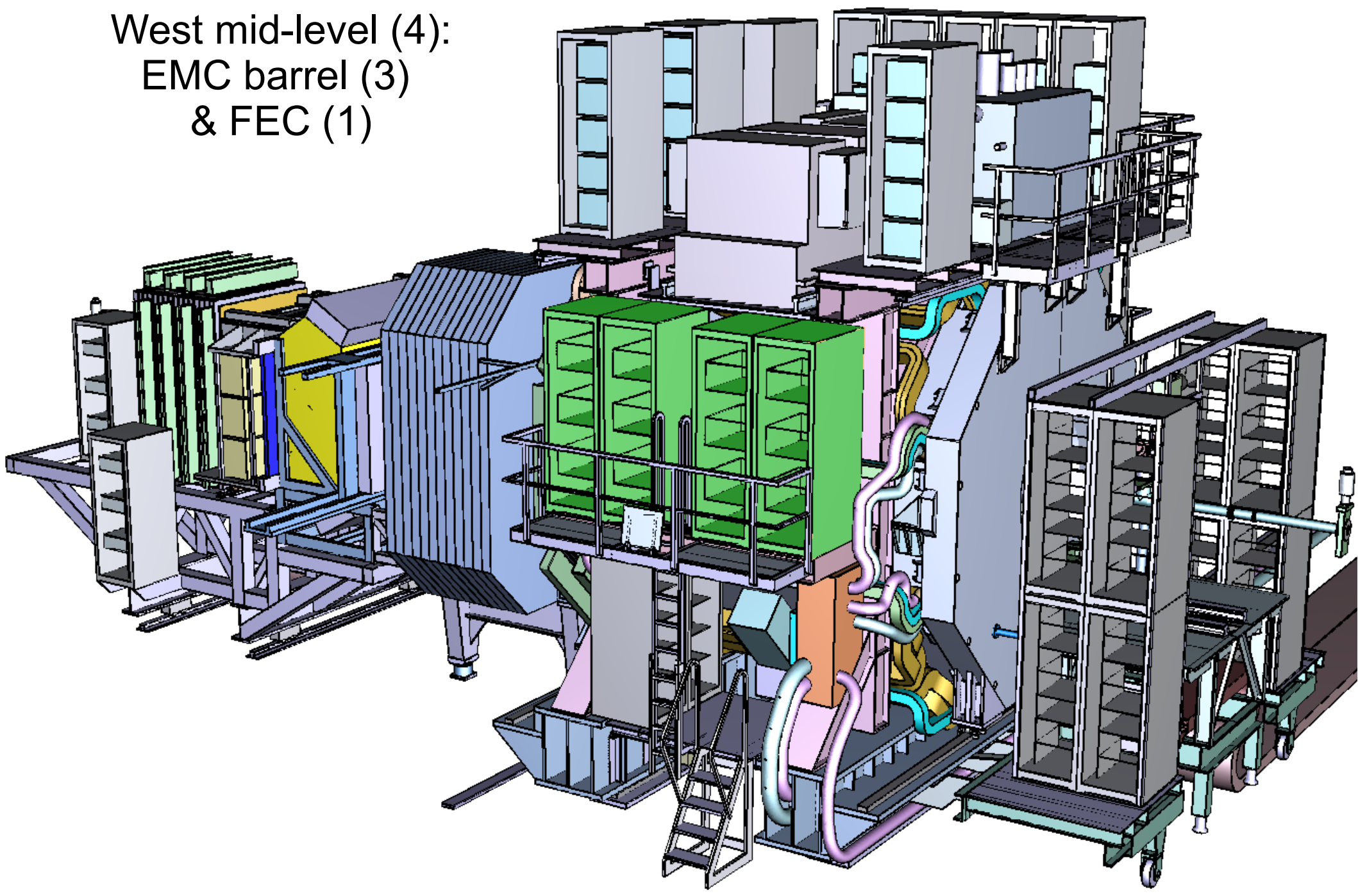
Backend platform (8):
MVD (5), STT (2),
BEC(1)

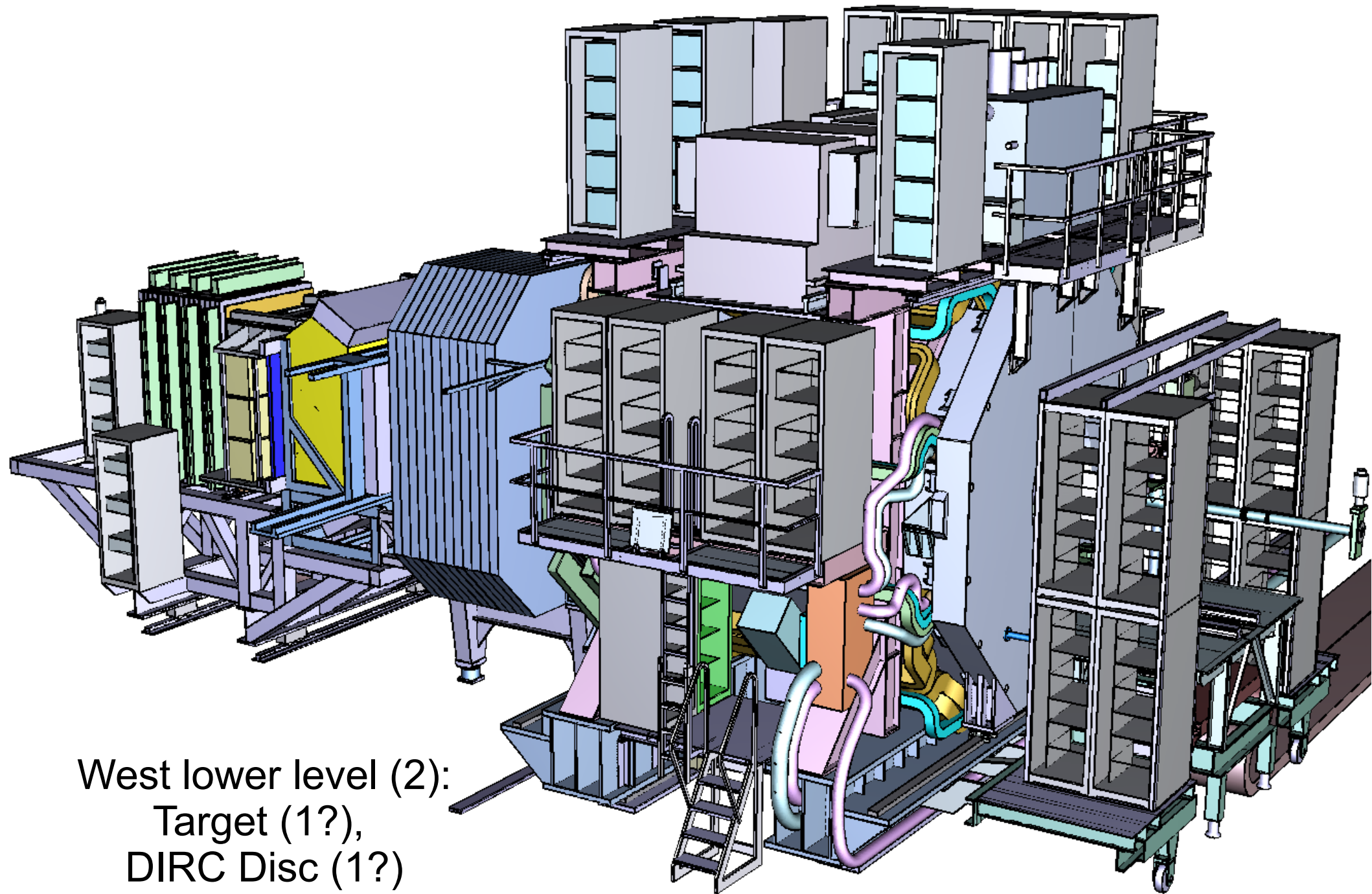


West top level racks for Muon Barrel (3)

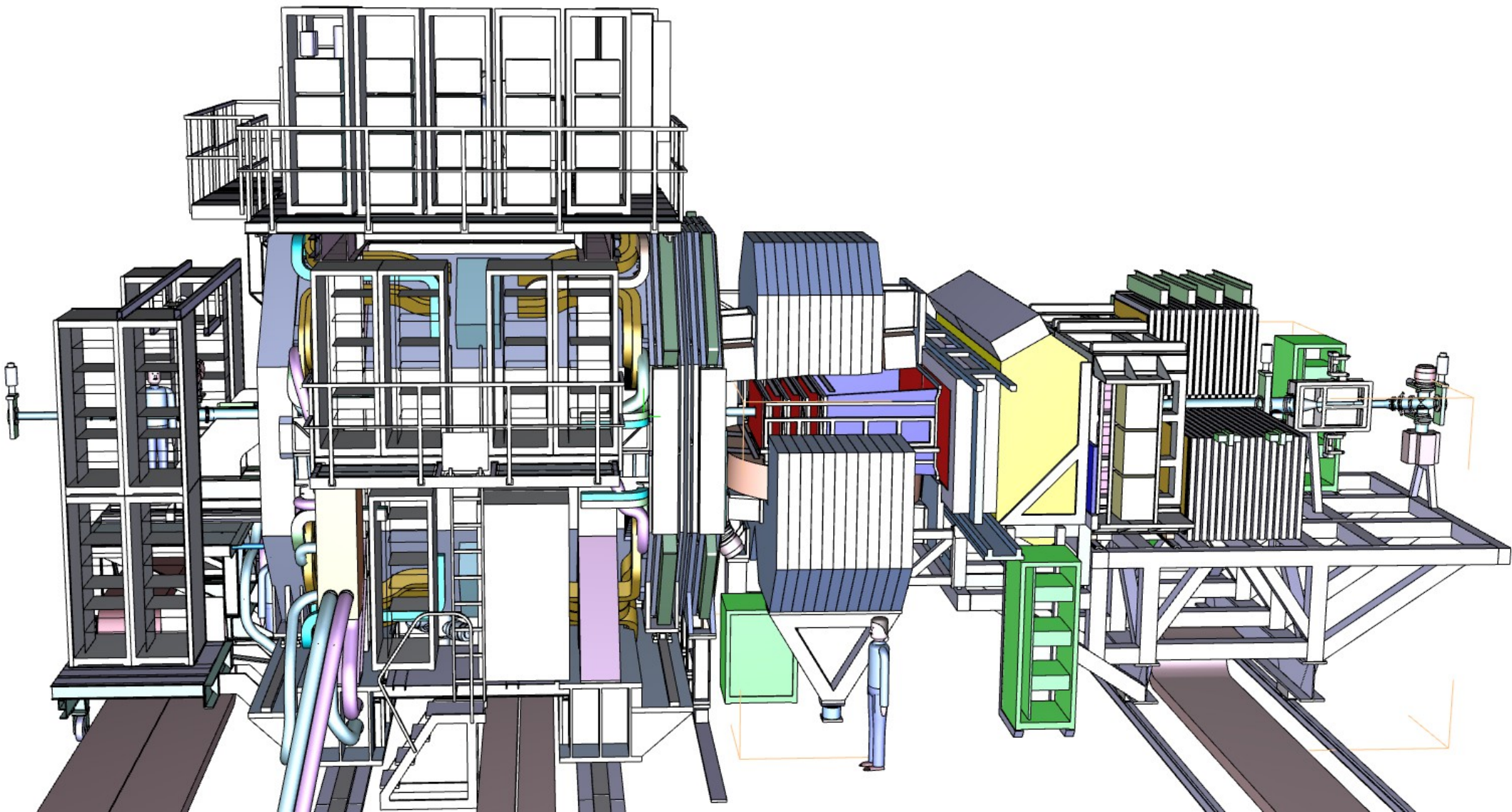


West mid-level (4):
EMC barrel (3)
& FEC (1)





West lower level (2):
Target (1?),
DIRC Disc (1?)



East FS (2): Forward Tracker (2)

Power estimates

System	Number of racks	Total power estimate (kW)
Target Cluster	1	7
Target Pellet	2, 1+1 replacing cluster rack	14
Target beam dump	1, close to pumps	7
Muon detector barrel	8 & 4 tilted VME crates	
EMC FEC	2	8
EMC barrel	6 (estimate 3 x FEC)	24
EMC BEC	1	8
STT	2	2
MVD	5	66
DIRC barrel	2	2
Forward Trackng	2	2

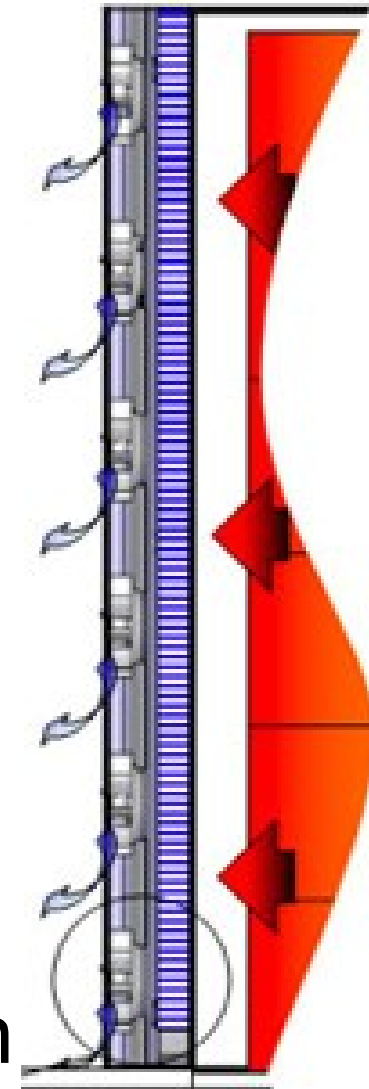
Water cooled racks

- Water cooling racks requires moving the hot air generated by devices towards a heat exchanger and transferred to the cooling water circulated from a central chiller.
- Typically, IT racks are fully enclosed with a passive rear-door heat exchanger since the servers provide the directed hot air flow.

Water cooled racks – Active air flow

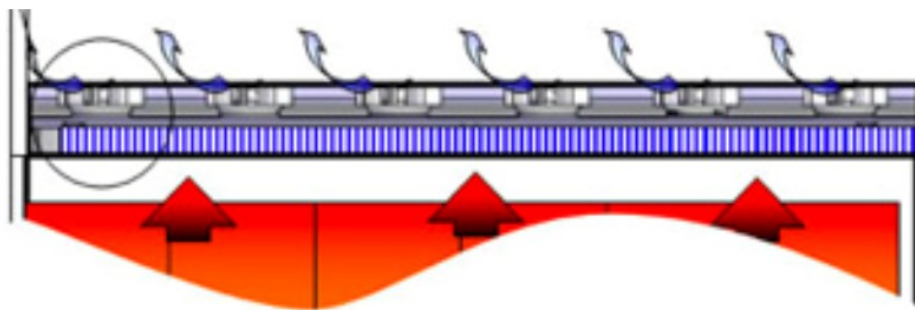
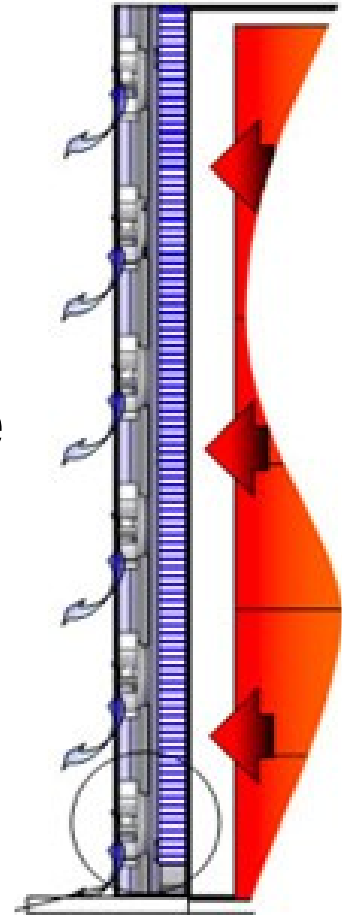


- In our case we need fan-assisted or active rear-door heat exchangers, with fans integrated in the rear-door to transfer hot air onto the heat exchanger.
- Must be conform with cable routing



Water cooled racks – Active heat flow

- In rack we need to ensure that hot air flow is directed towards heat exchanger
- Orientation of boards & crates
- Horizontal heat flow with active rear-door heat exchangers
- Vertical heat flow with modular in-row coolers; over-head coolers as heat exchanger.



Racks near detector - ...

- Work in progress...
- Continue with detailed info and discussions with experts
- Iterative process until we have racks defined
 - Some electronics are prototypes, others tbd.
 - Keep cable connectors & cross-sections in mind
- Stay tuned, until the next update !