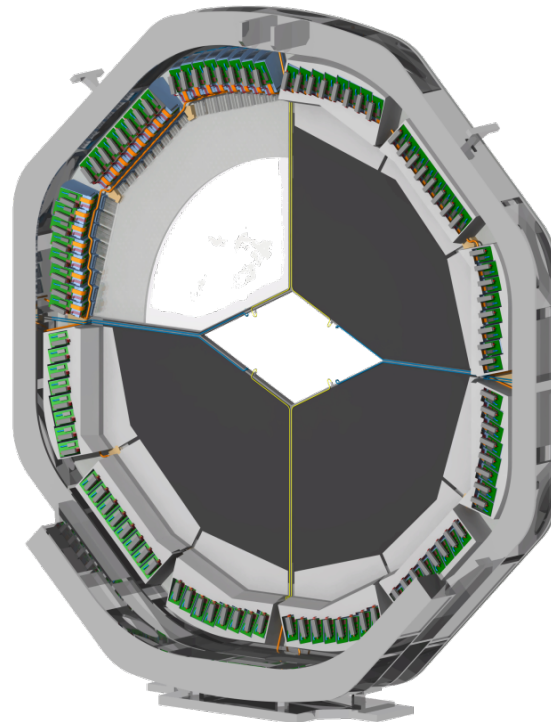


Update on the Mechanical Design of the Endcap Disc DIRC



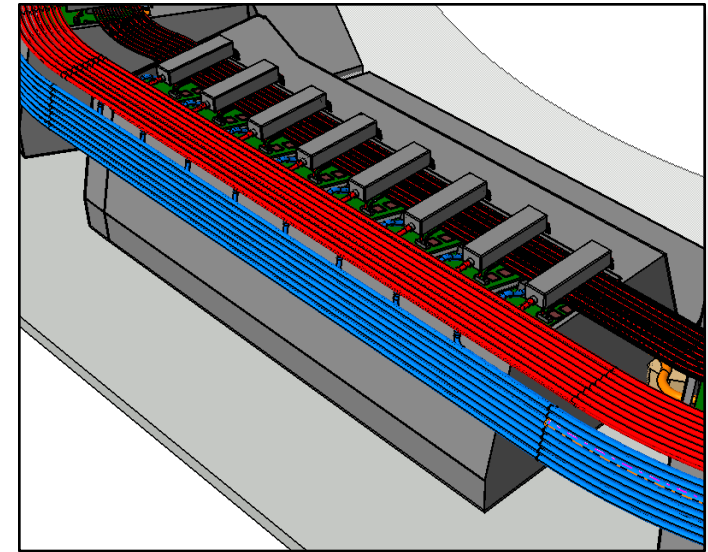
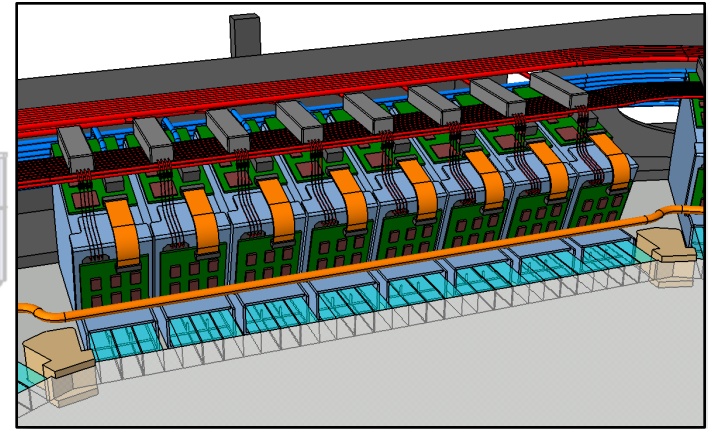
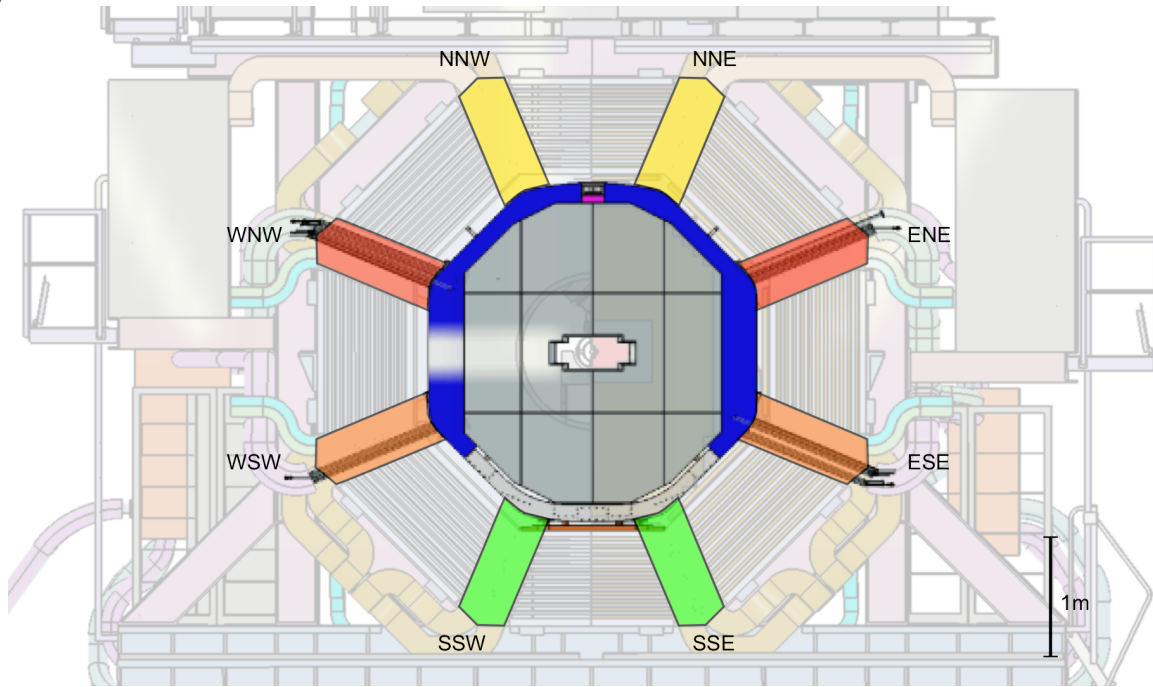
Simon Bodenschatz, Michael Düren, Erik Etzelmüller, Klaus Föhl,
Avetik Hayrapetyan, Mustafa Schmidt, Marc Strickert, Thomas Wasem

14.12.2017

Current Status

- A conceptual design has been developed for the final detector design
- Detailed design has to be done by/in close cooperation with our engineer
(works about 10 % on the project but was mainly occupied with prototype designs in the past)
- Several constraints have to be clarified before the final design stage can be launched to not waste man power (mainly spatial constraints)

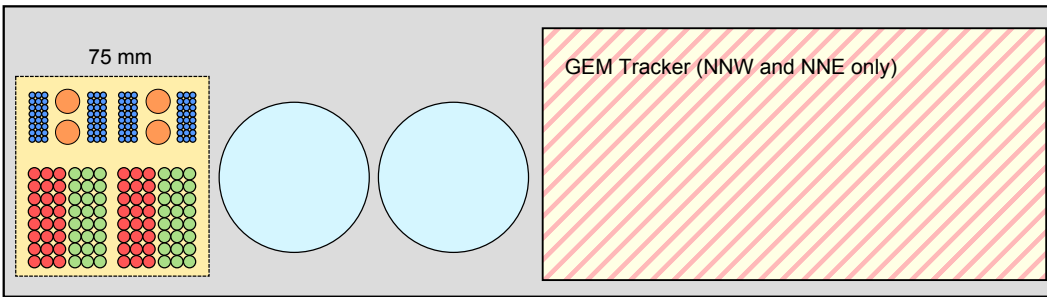
Cabling



420 mm

75 mm

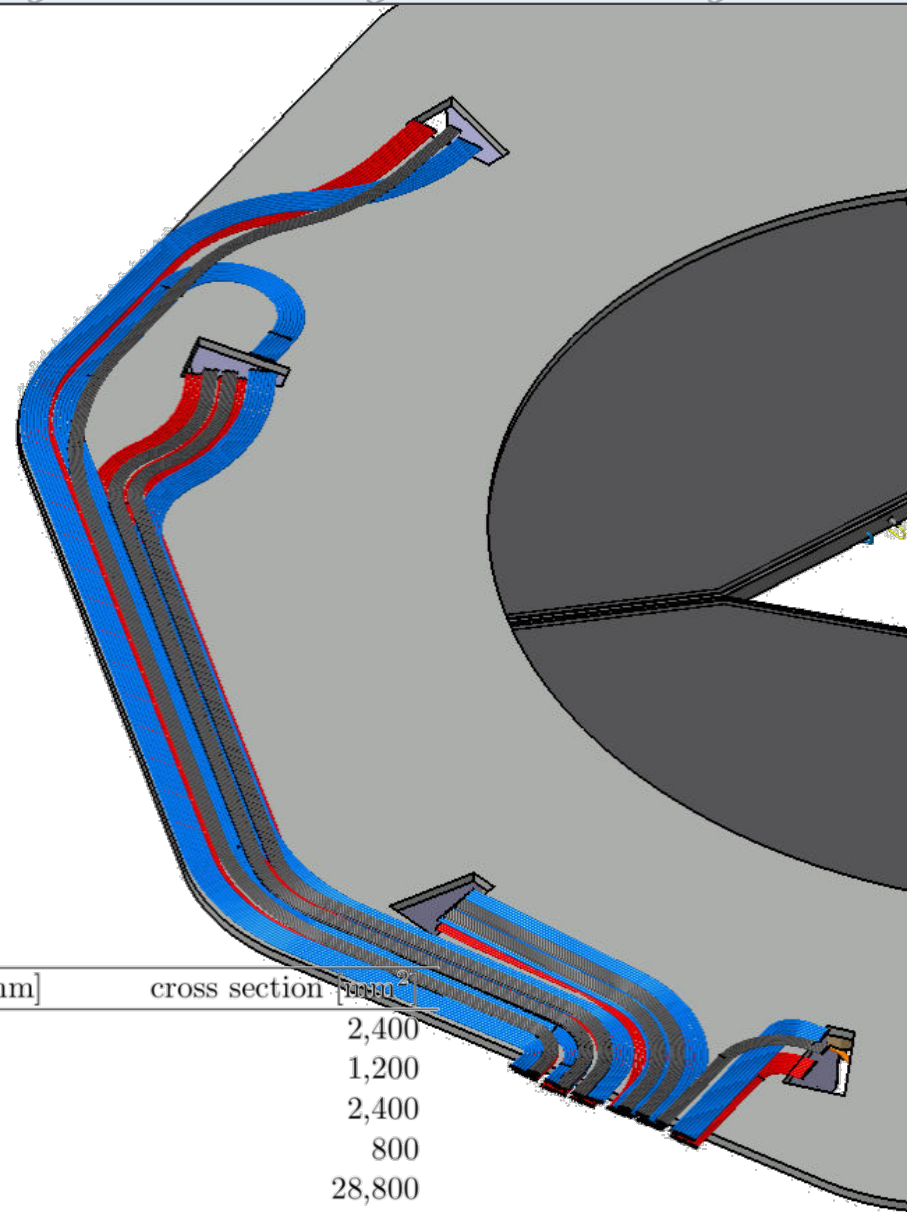
116 mm



- cable tray
- EDD space
- HV cables
- LV cables
- data cables
- dry nitrogen
- FEE cooling

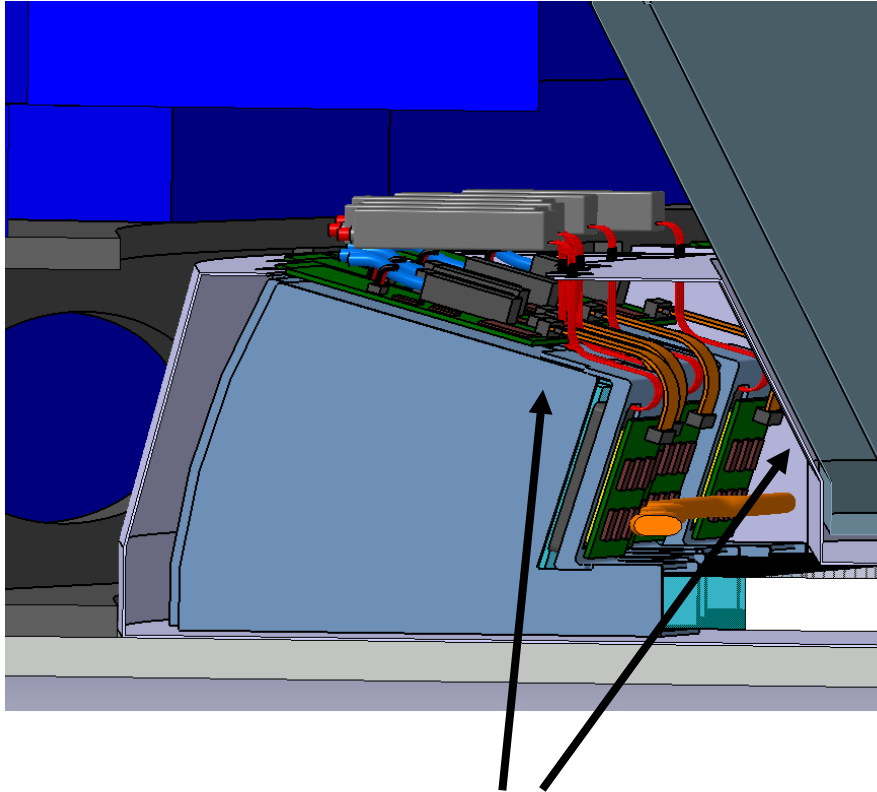
Cabling

- Use mounting plate (MP) to guide cables on the outside of the detector (facing the IP)
- Available space in z 3 cm
- Assembly would become much easier

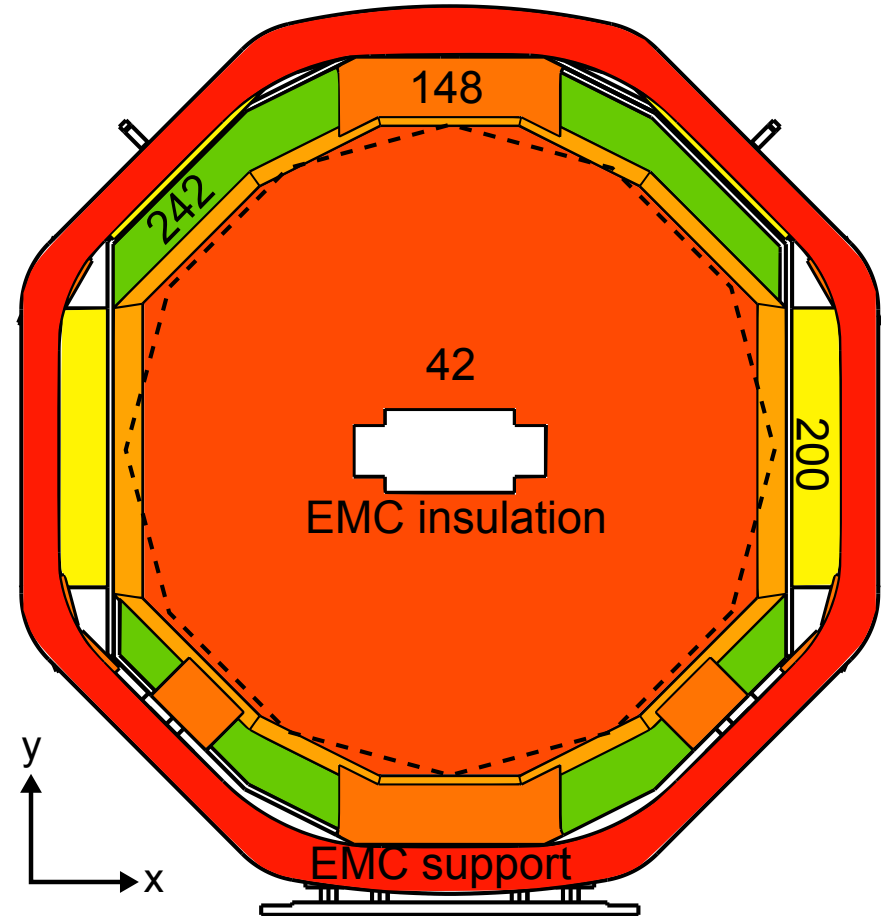


type	connection	number	diameter [mm]	cross section [mm ²]
HV	96 MCP-PMTs	96 coaxial cables	5 mm	2,400
LV	96 ROMs	192 cables	2.5 mm	1,200
data	96 ROMs	96 optical fibers	5 mm	2,400
gas	4 quadrants	8 pipes	10 mm	800
cooling	4 quadrants	8 pipes	60 mm	28,800
laser	4 quadrants	4 optical fibers	5 mm	100

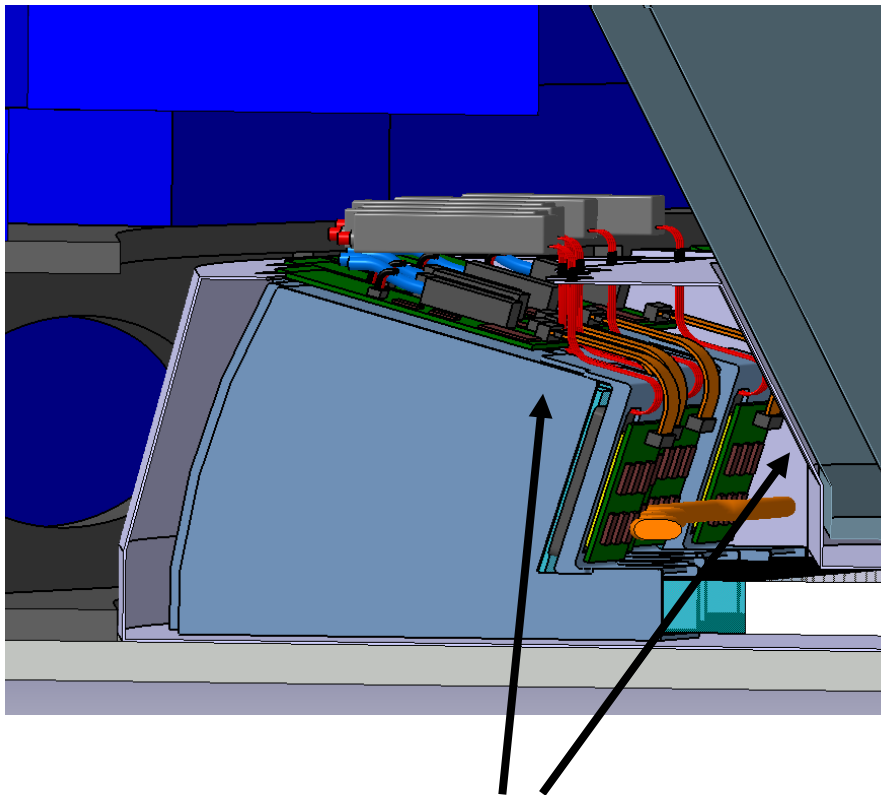
Impact of Endcap Deformation



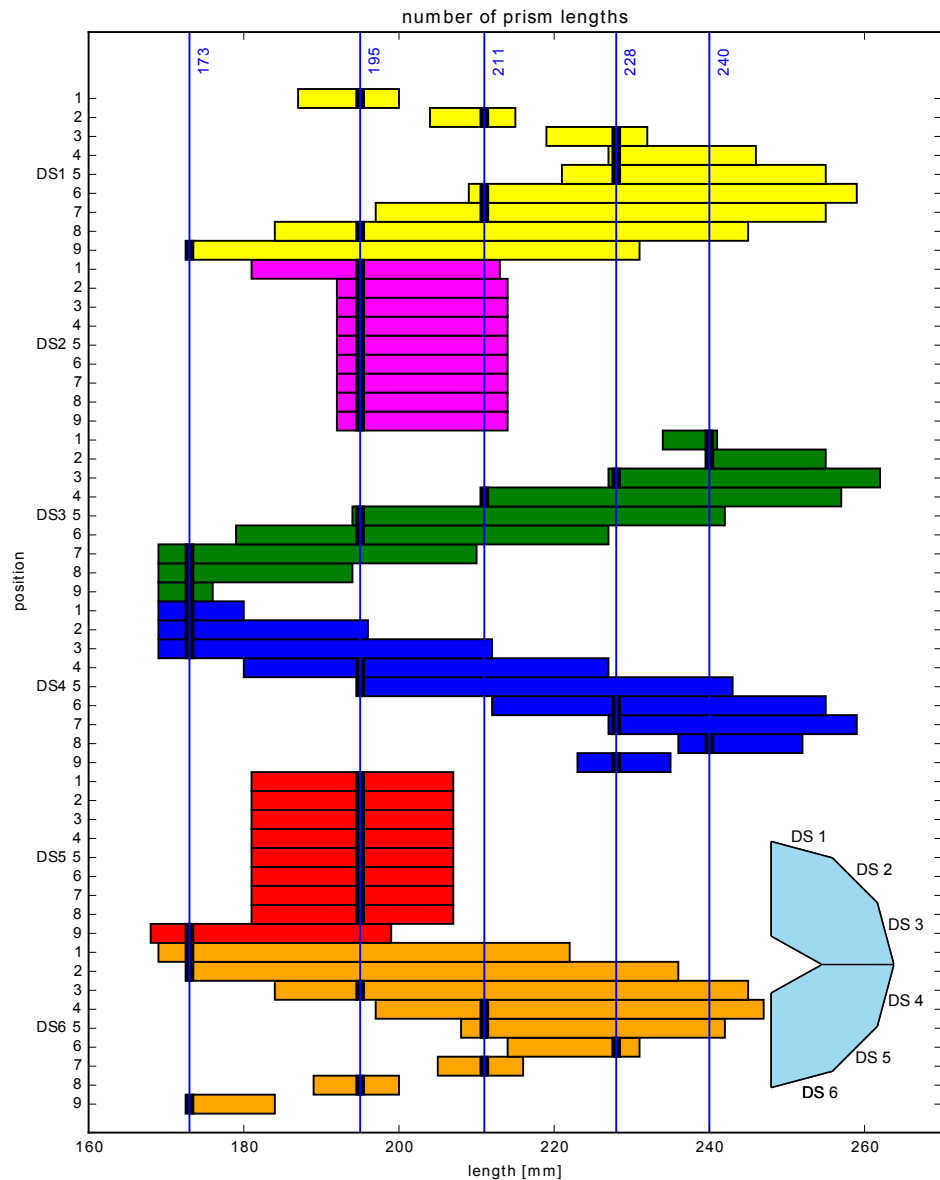
- length of bars/distance between FEL and radiator varies
- geometries of EDD and Endcap EMC are not the same



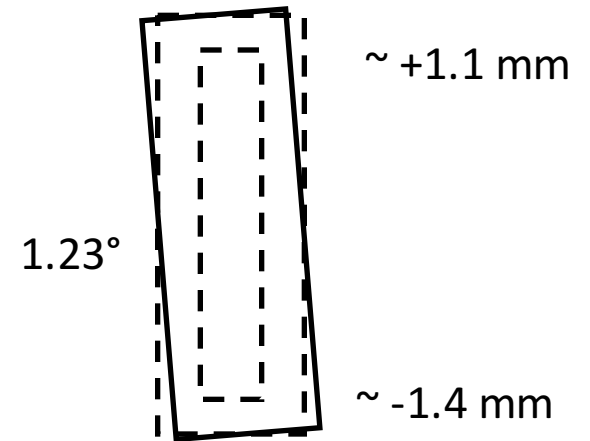
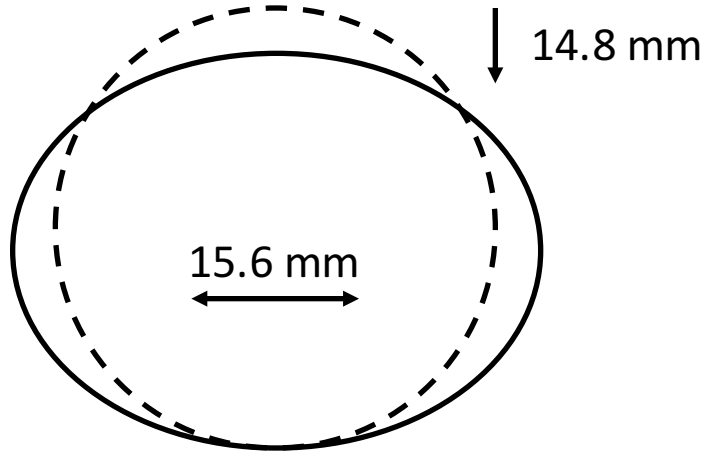
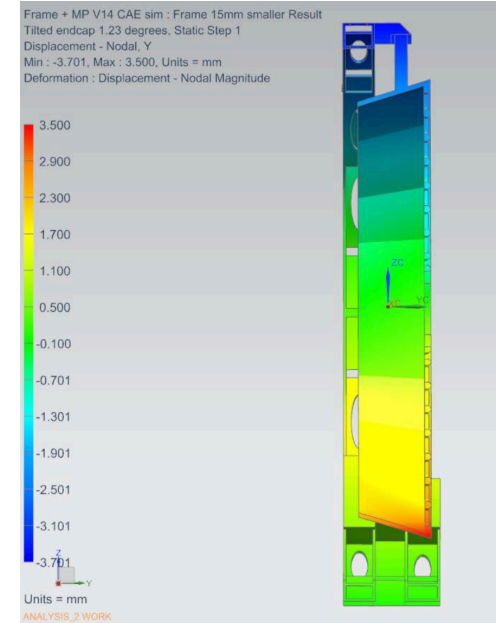
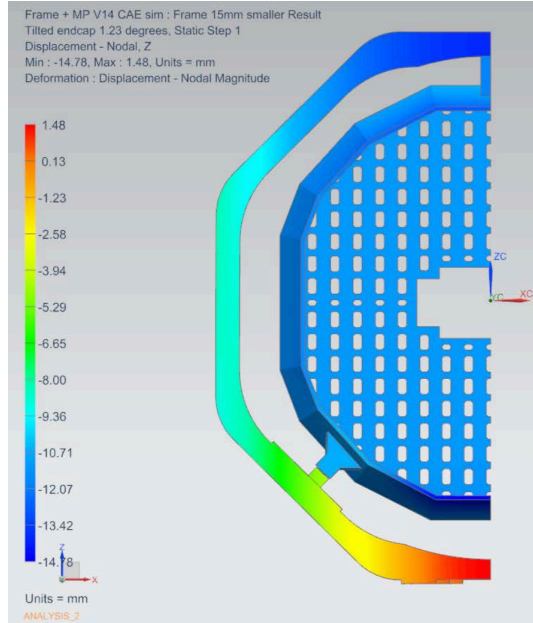
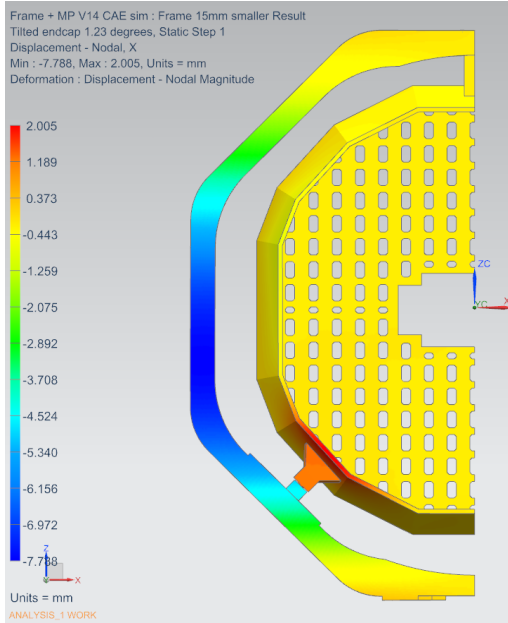
Impact of Endcap Deformation



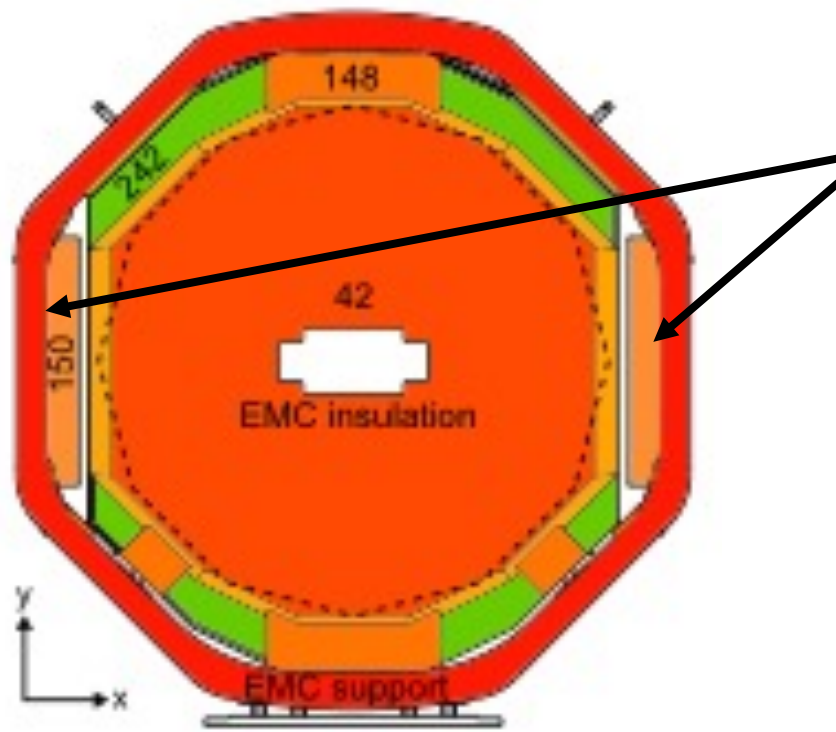
- distance interval will shift if EMC holding structure is loaded
- length of bars has to be determined after Endcap has been equipped with EMC



Impact of Endcap Deformation



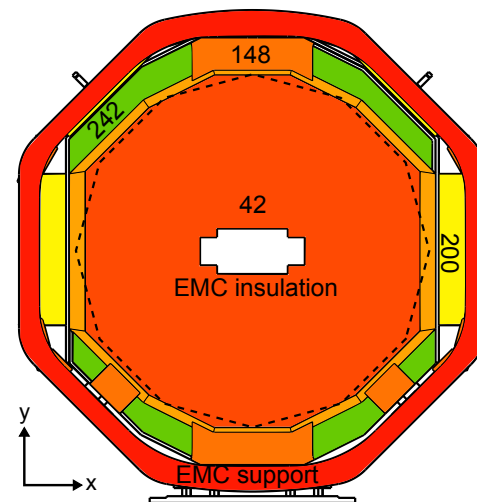
Spatial Constraints - Current Situation



numbers indicate available space in z-direction

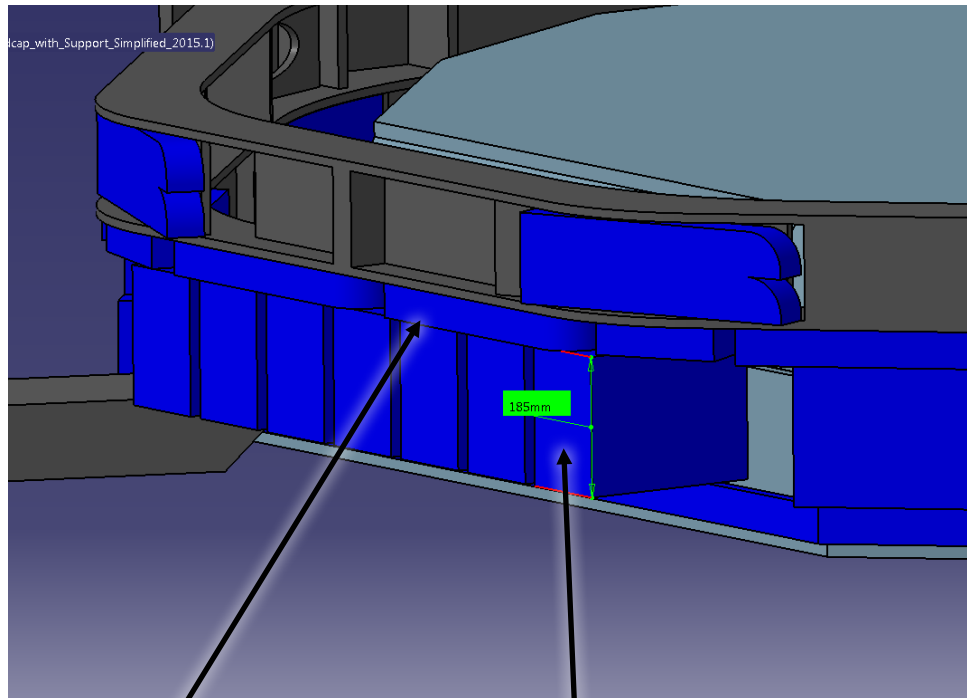
- more space allocated for Endcap EMC Electronics than expected!
- was 200 mm in previous drawings

old



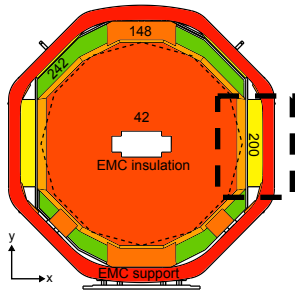
Previous Drawings

previous drawings with dummies

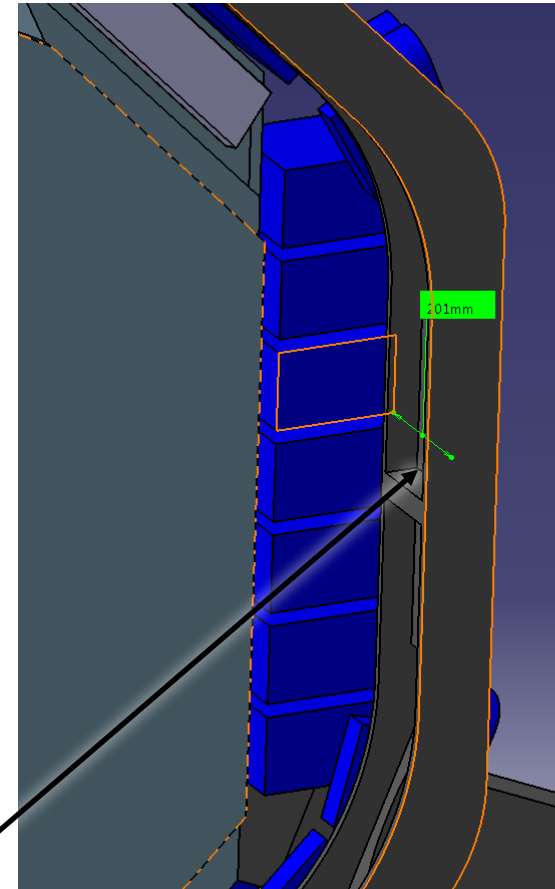


additional 50 mm distance

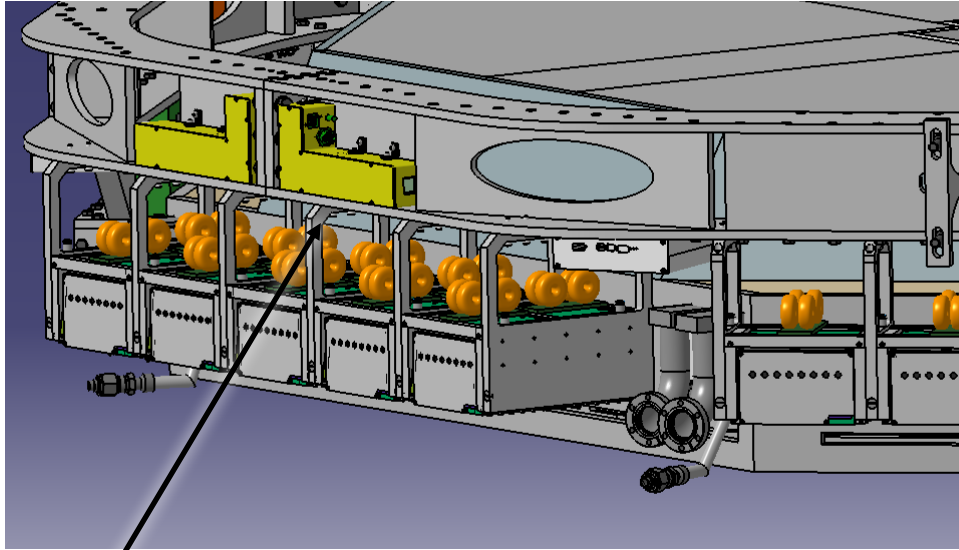
185 mm for box



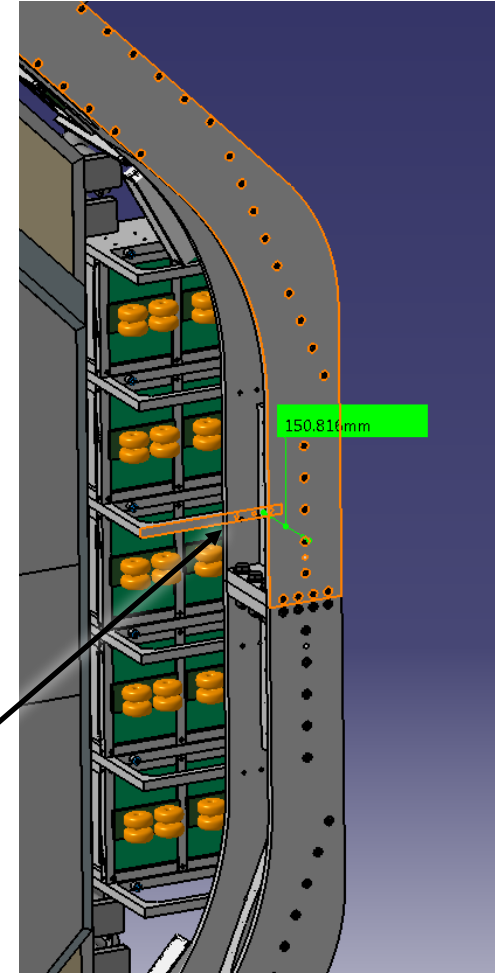
201 mm distance to frame



New Drawings

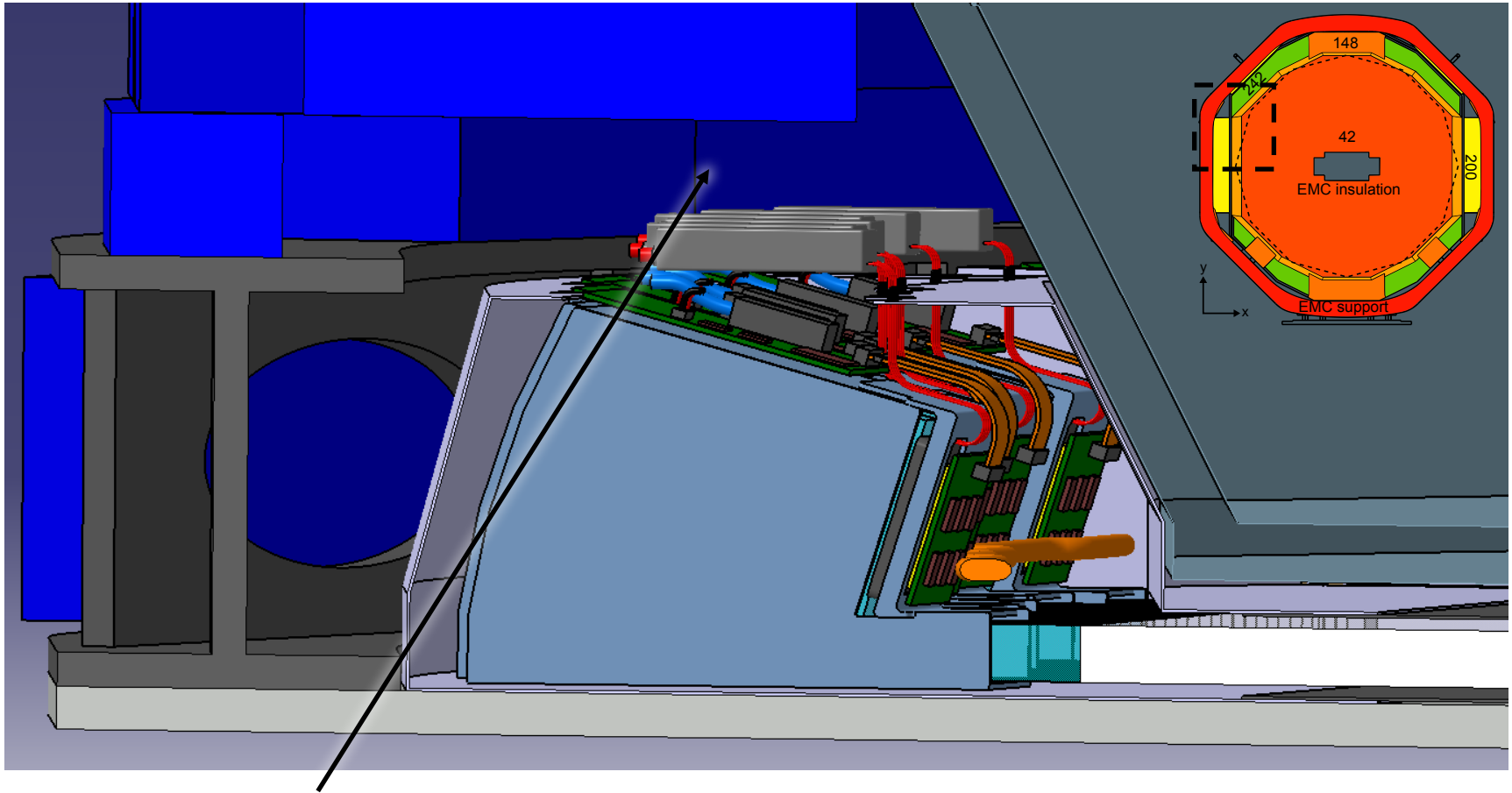


directly connected to frame



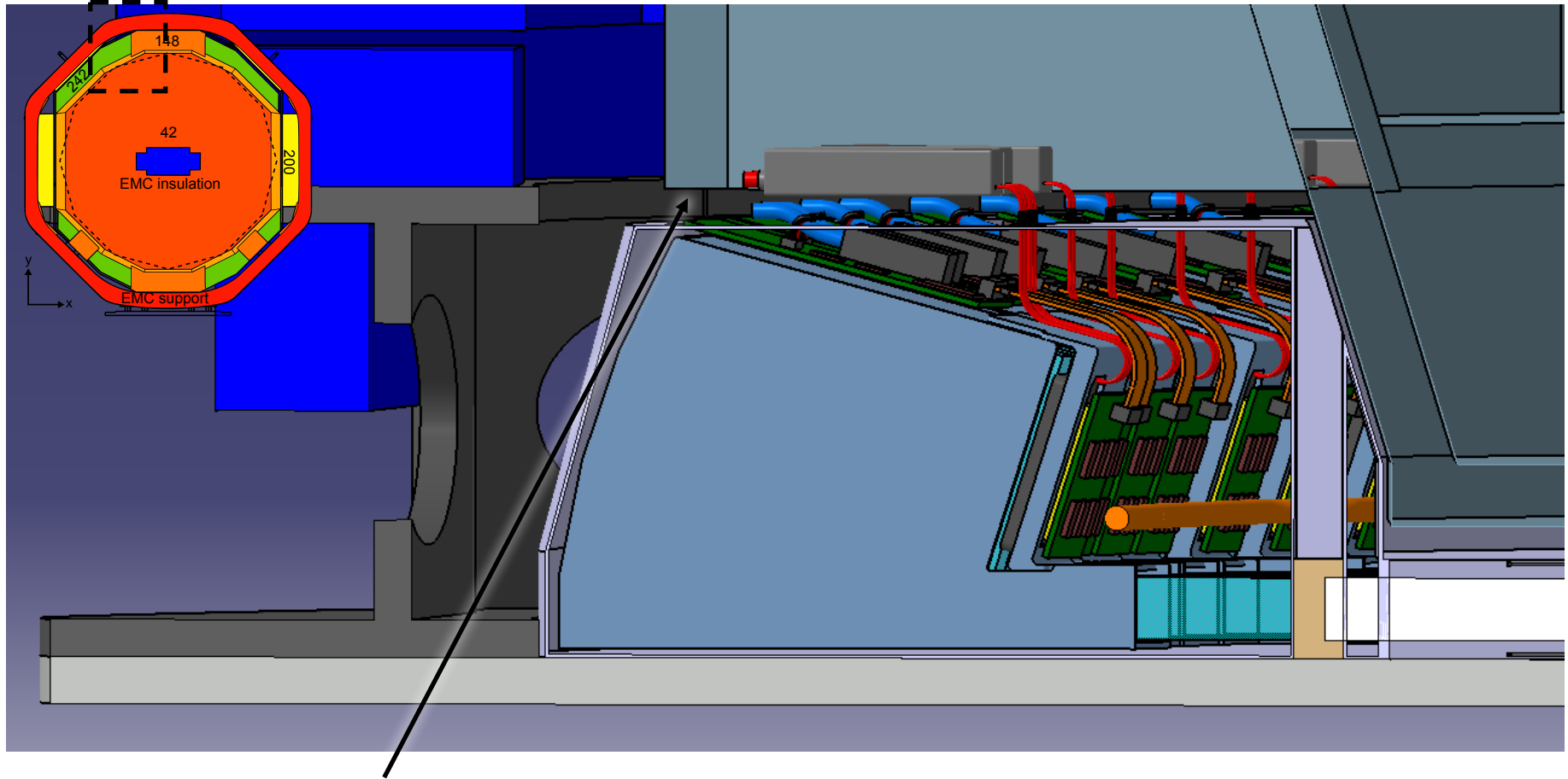
150 mm distance to frame (50 mm less)

Impact on EDD



previously allocated space of 200 mm was sufficient for voltage dividers and space for cabling

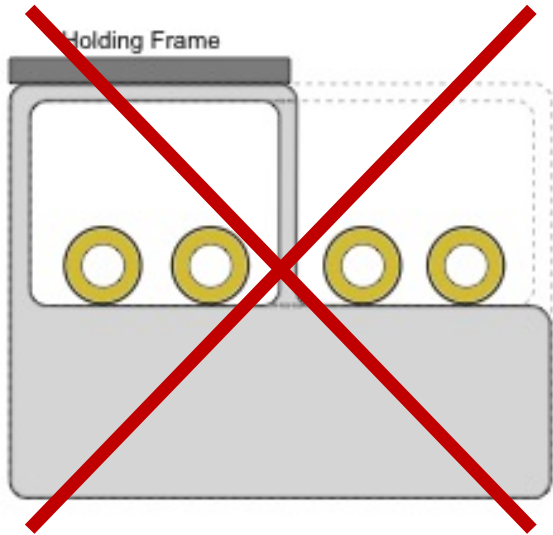
Impact on EDD



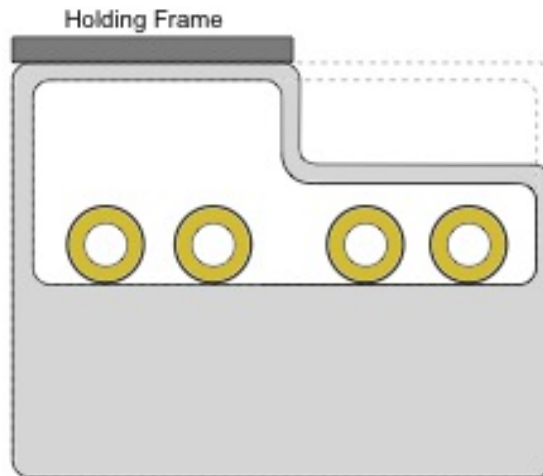
but even then the space was insufficient at 4 locations with only 148

Possible Solutions

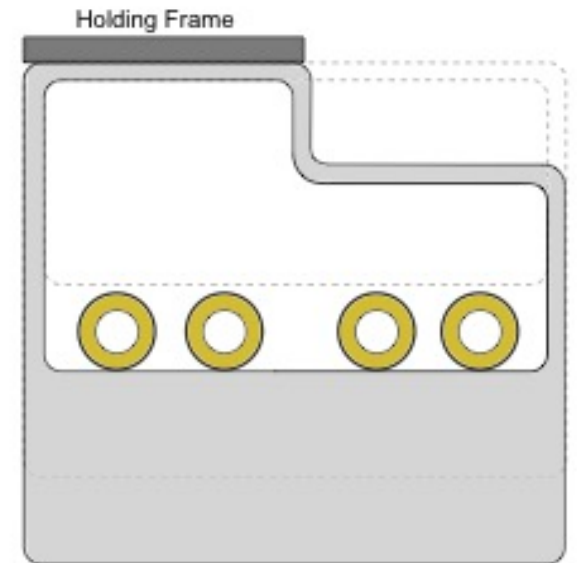
- previously the plan was to place the HV-dividers which do not fit on top of a ROM further outside in the region with 242 mm space along z
- new constraints take away large regions also for guiding cables and cooling
- more space is needed for the EDD!



ruled out by EMC group



???



???

Summary

- If there are no objections part of the cabling will be done on the outside of the detector along the Mounting Plate facing the IP
- Deformation seem to be small enough (impact of a quench?)
- To order correct bar lengths and start with the final design of the readout region a mapping of the dimensions of the loaded endcap is needed
- Request to review the proposed changes to provide additional space in the readout region to host the HV dividers