

ND-GAr: ECAL Geometry.

ND-GAr Magnet Engineering Meeting

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DESY
10th July 2020



The ND-GAr Baseline design.

Baseline design as in the ND CDR

- The information these slides are based on the ND-GAr baseline design as written in the ND CDR
- Optimisation of the different sub-detectors is still on-going and evolves quite rapidly
- There is a synergy between some of the sub-detectors requiring us to take not only one sub-detector itself into account but the complex system of the sub-detectors
- Of course, one can design anything!
 - However, the mechanical engineer will tell us if this is possible
 - And the cost will limit also the possibilities
- The ECAL as in the CDR:
 - In between the pressure vessel and the magnet
 - 60 layers of Copper/Sc (2mm/5mm) in an Octagonal Barrel (Endcap)
 - Upstream/Downstream is still under optimisation based on physics (likely less layers upstream, which induces a different weight distribution)
 - Absorber under optimisation also (Lead+Steel (like ATLAS LAr ECAL) is considered as a choice)
 - 5 barrel modules along the drift field in a trapezoid shape / Endcap not yet designed (for now 4 staves)
 - Dead zones/Service areas are not designed yet

Current geometry.

For the common geometry

- Current geometry with all sub-components

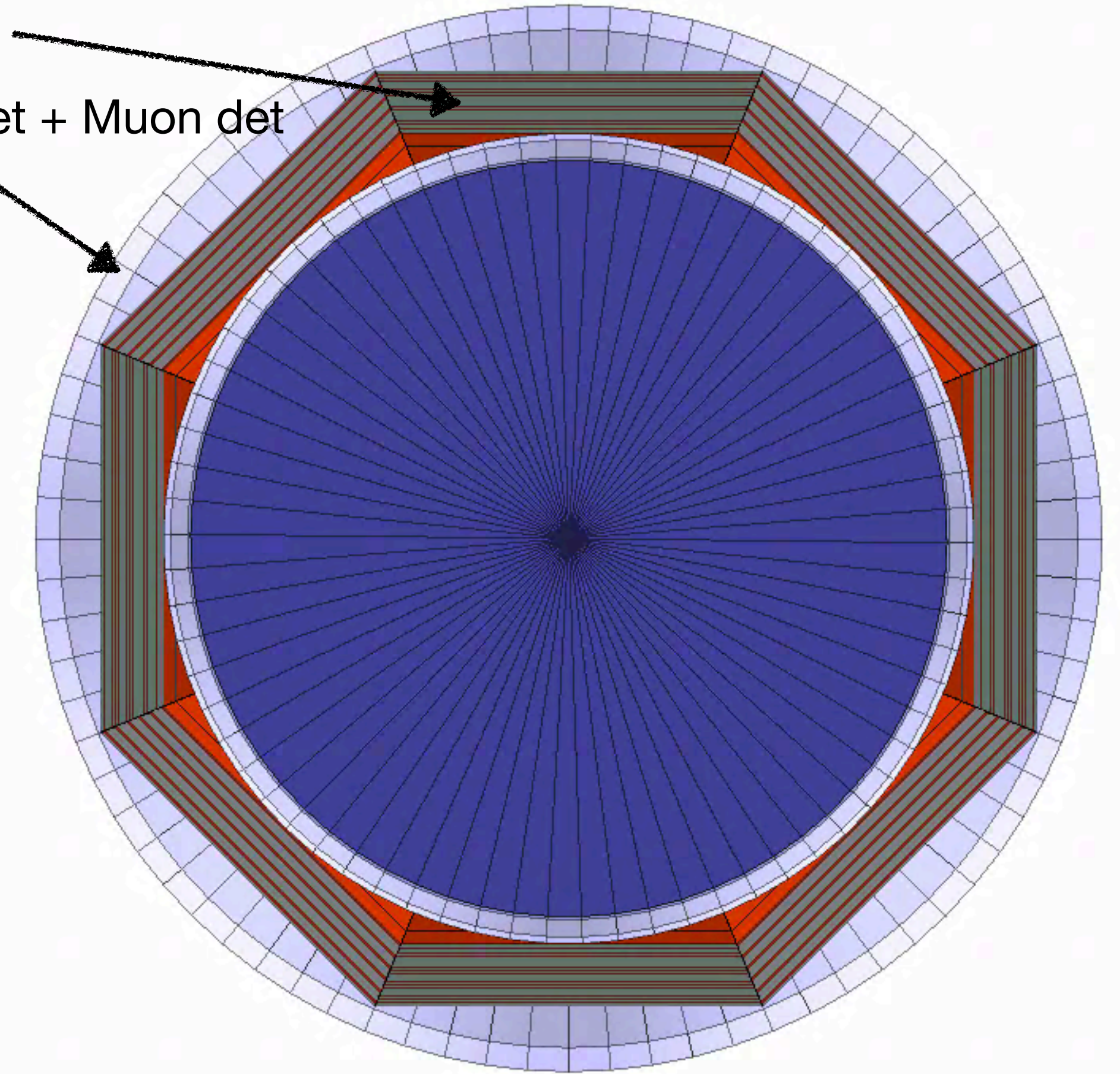
GAr HPTPC

Pressure Vessel

- ECAL

- Magnet + Muon det

Side View

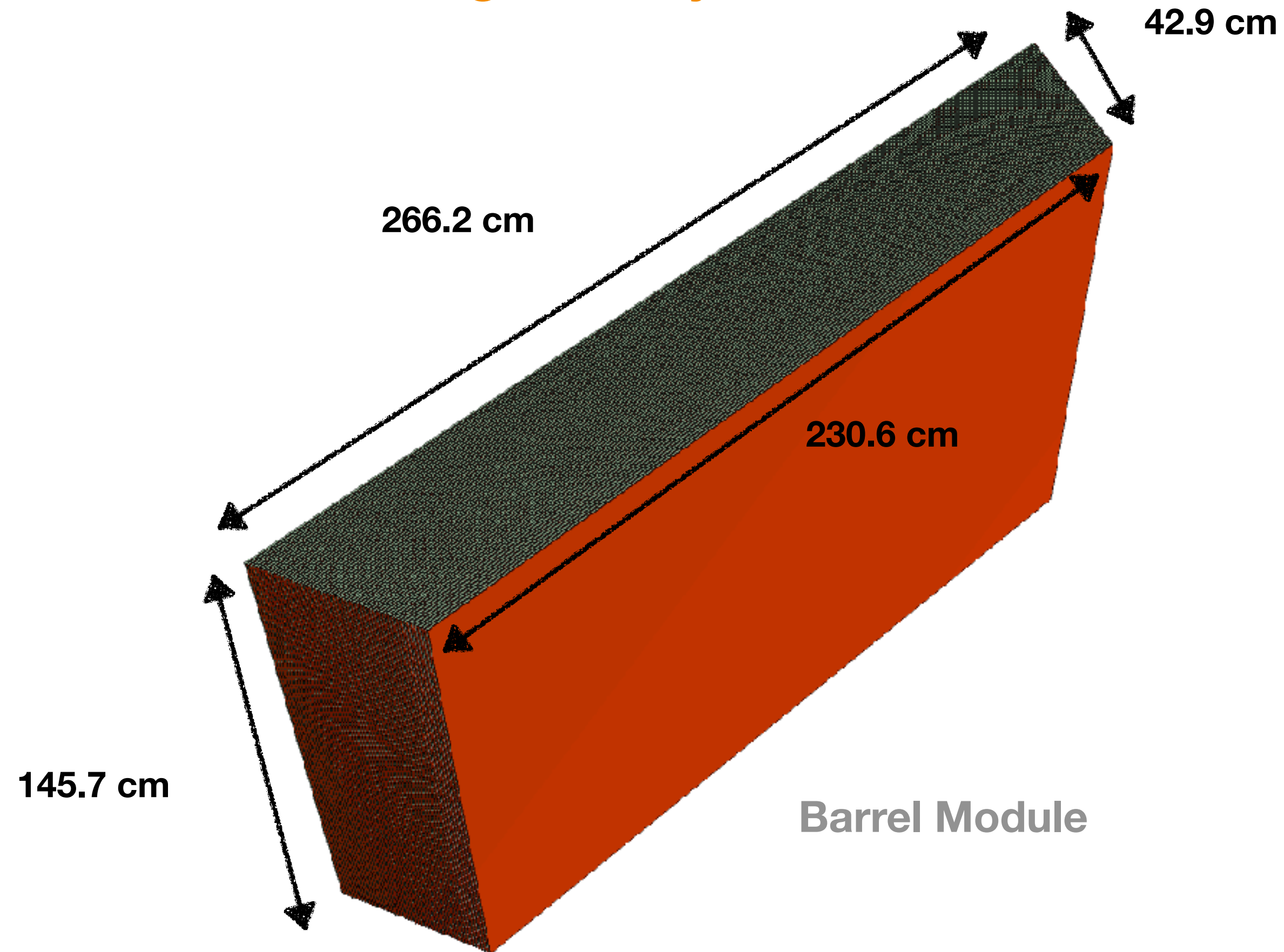


Front View

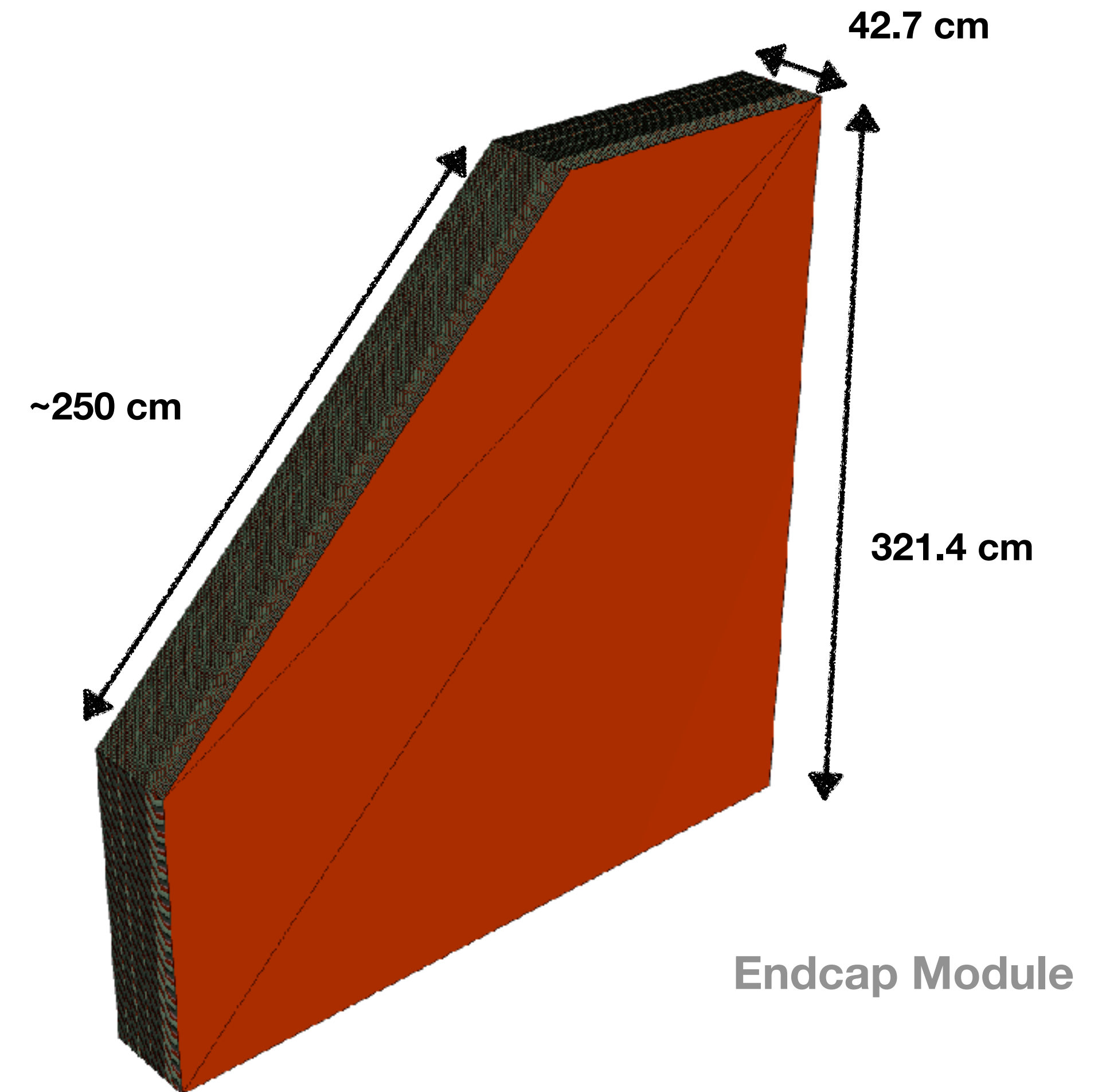
- ECAL Parameters
- Weight: ~203 t Barrel / ~100 t Endcap
- Length: 728.5 cm → too long! (due to pressure vessel / endcaps maybe inside)
- OuterRadius: ~3.2 m

Current geometry.

For the common geometry



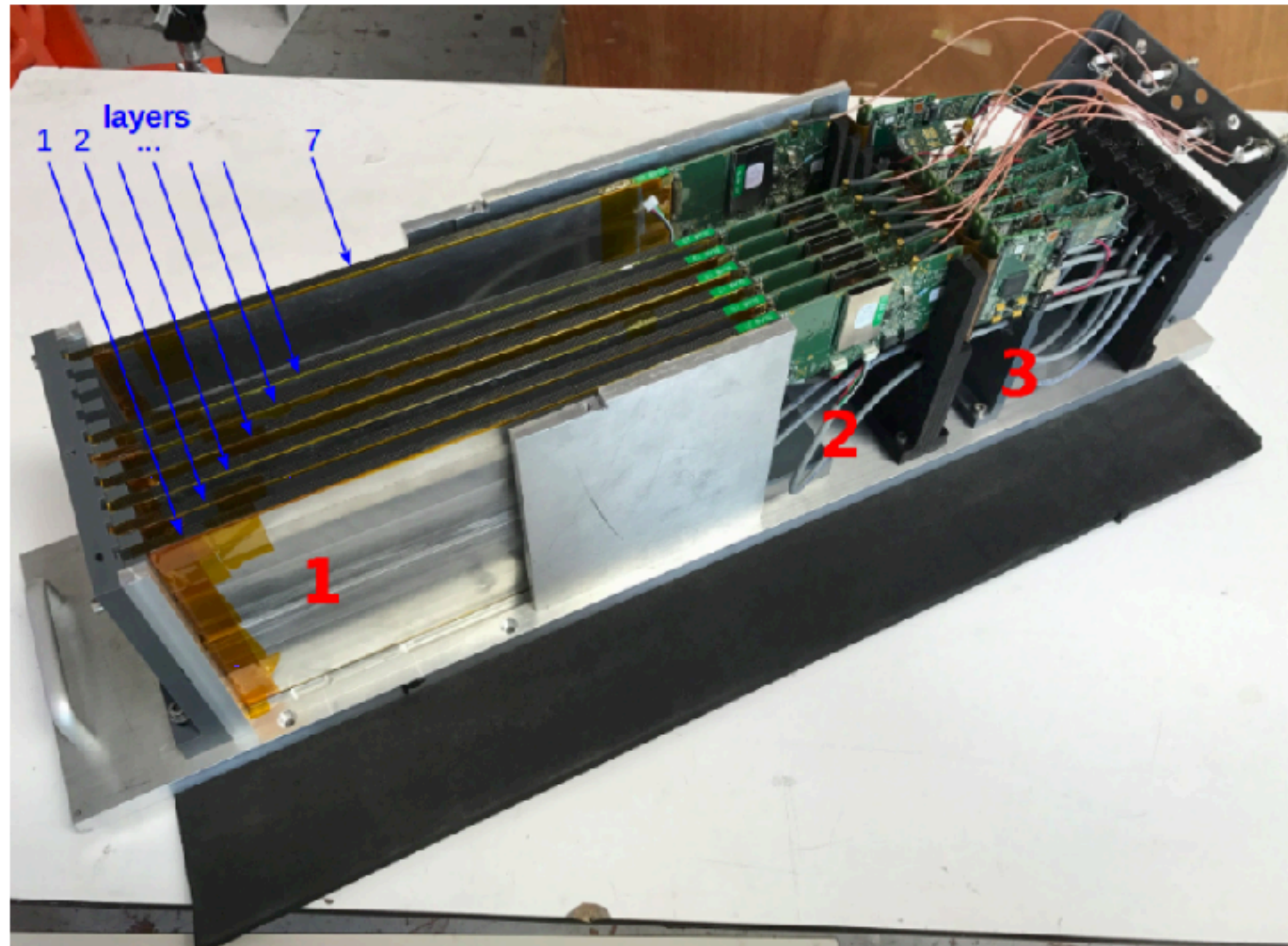
- 5 modules per octant in the x direction
- Total: 40 modules in the Barrel
- Weight ~ 5t



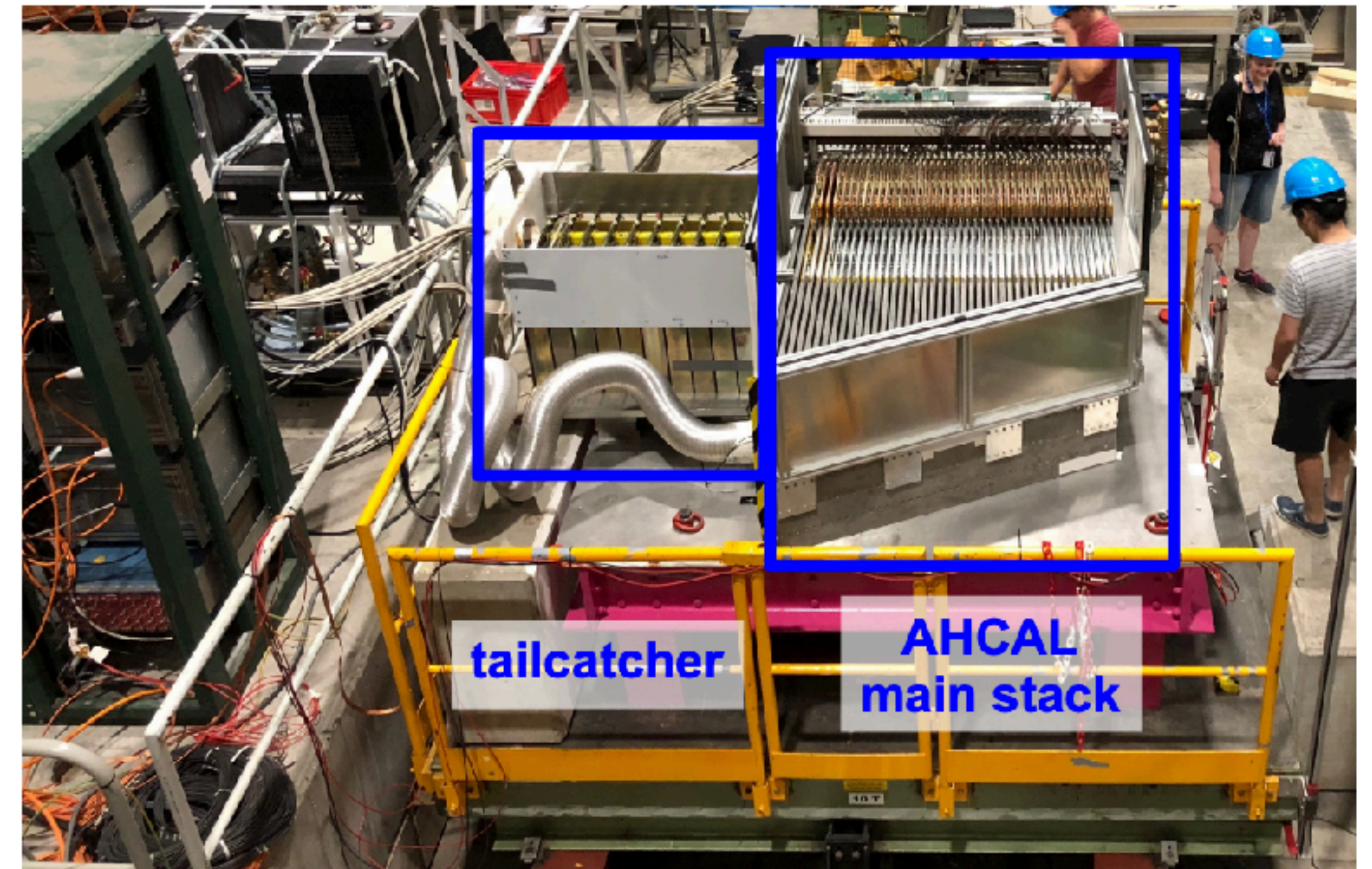
- 4 modules per side
- Need some geometry design optimisation
- Weight ~ 12 t

Real life prototypes.

That could be similar for the ND-GAr ECAL



CALICE SiW-ECAL Style layers (arXiv:1902.00110v2)



CALICE AHCAL Testbeam at CERN 2018 SPS in ILD Steel Stack [\[link\]](#)

Backup Slides.

