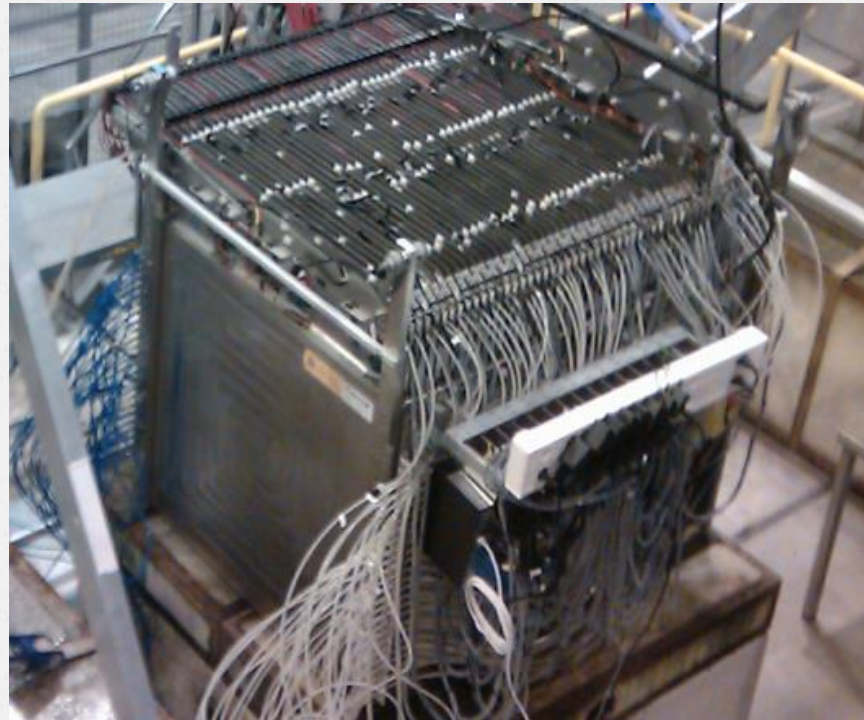




SDHCAL
mechanics and integration
status

I.Laktineh

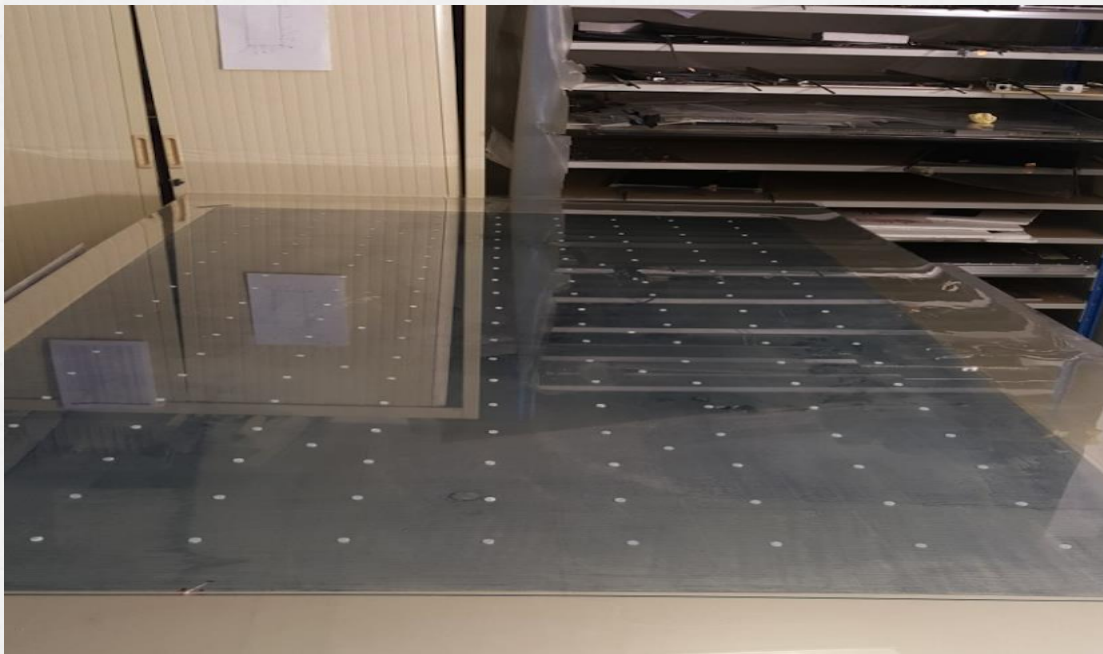
SDHCAL technological prototype was built in 2011



48 layers of 1x1 m² GRPC inserted in a self-supporting
a mechanical structure

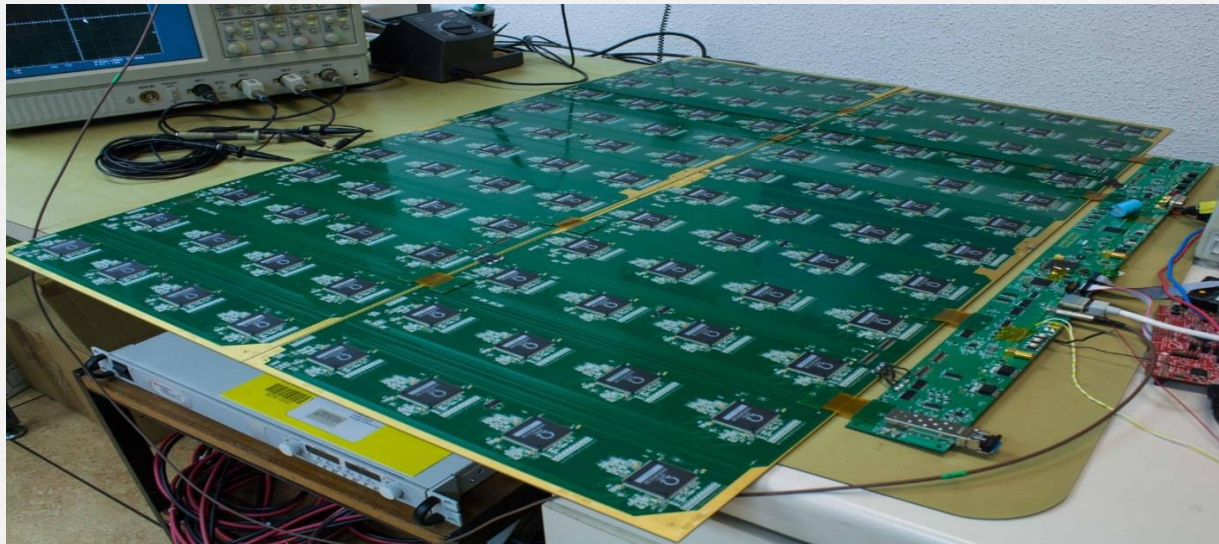
Hot news

First 2x1 m² RPC chamber was successfully built with a new gas circulation system



Hot news

New generation of SDHCAL electronics for the module0 prototype fulfilling the ILD requirements prototype is being tested



Hot news

Mechanical structure of the Module0 prototype was successfully assembled with EBW



Hot news

Mechanical structure of the Module0 prototype was successfully assembled with EBW



SDHCAL Barrel

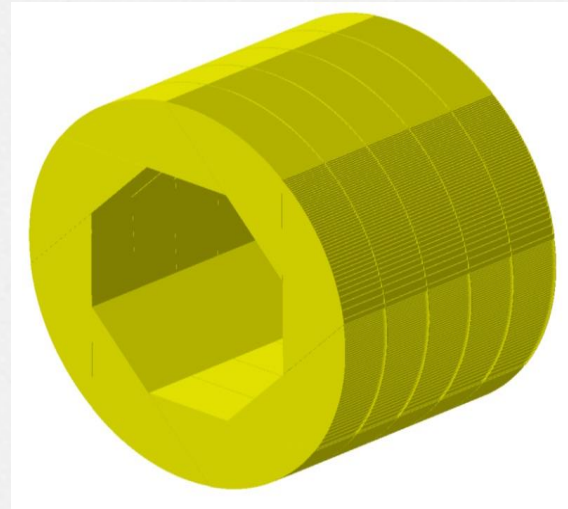
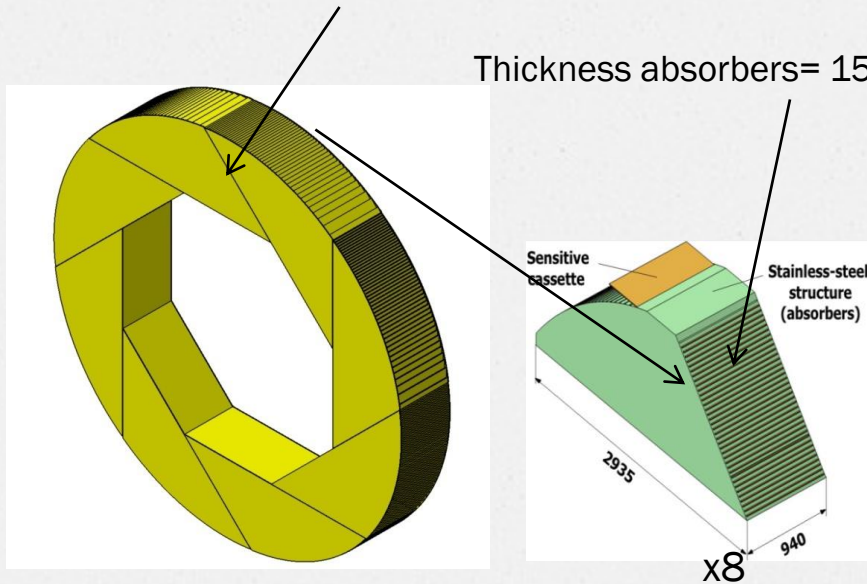
Thickness wheel face = 10 mm

Ext. Diameter 6770 mm

Int. Diameter 4116 mm

Length 4700 mm

Thickness absorbers = 15 mm



Stainless steel 1 wheel (8 mod.)

5 wheels

Weight (t): 88 t

440 t

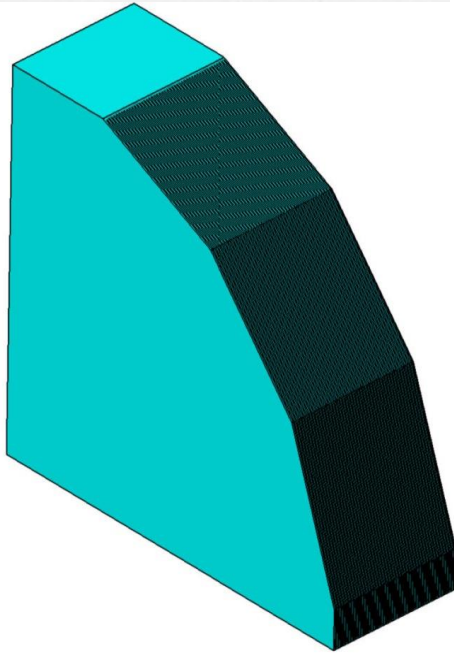
Detectors W. (t): 36.8 t

184 t

Total Weight (t) : 124.8 t

624 t

SDHCAL Endcap

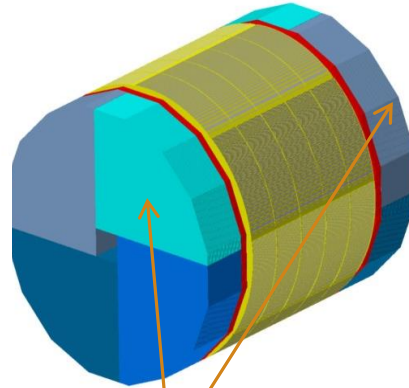


One module

Module Weight : 50 t

Detectors weight : 22.5 t

Total weight : 72.5 t

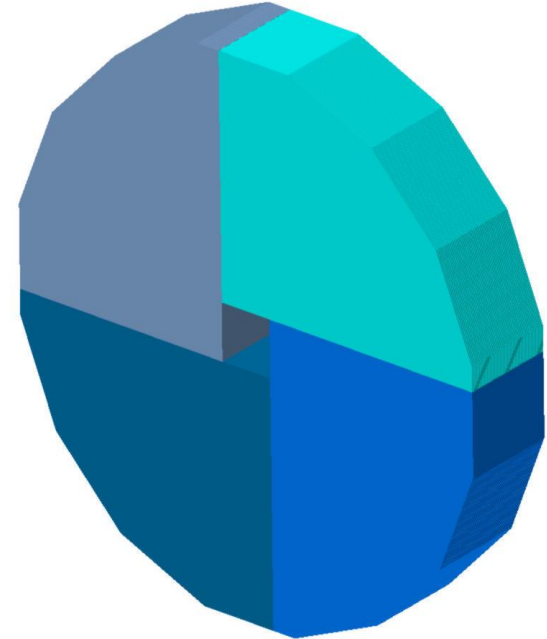


2 endcaps

Material : stainless steel

8 sides -> 16 sides

Encap : 48 detectors



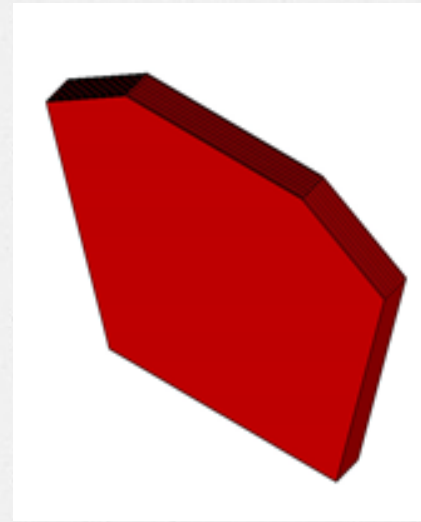
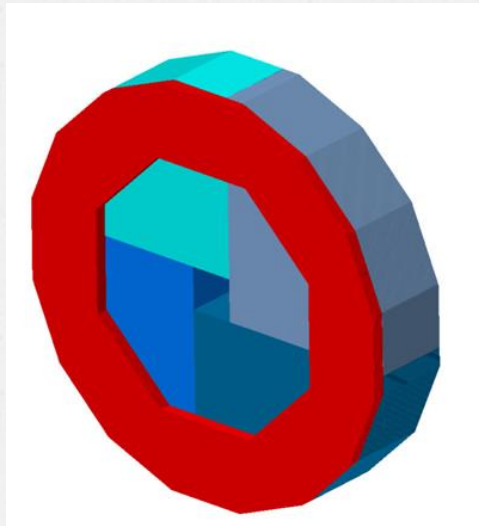
One endcap made of 4 modules

Endcap Weight : 200 t

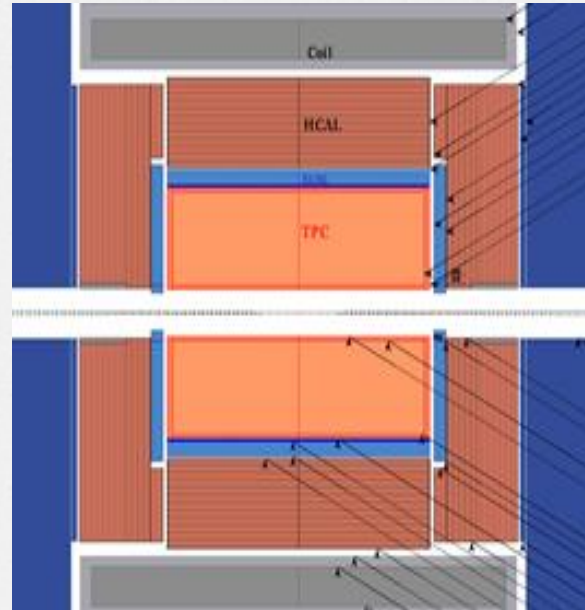
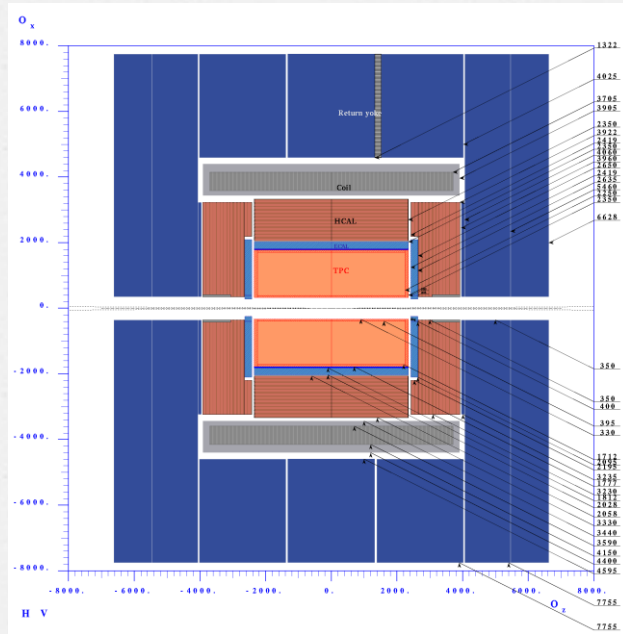
Detectors weight : 90 t

Total weight : 290 t

SDHCAL Ring

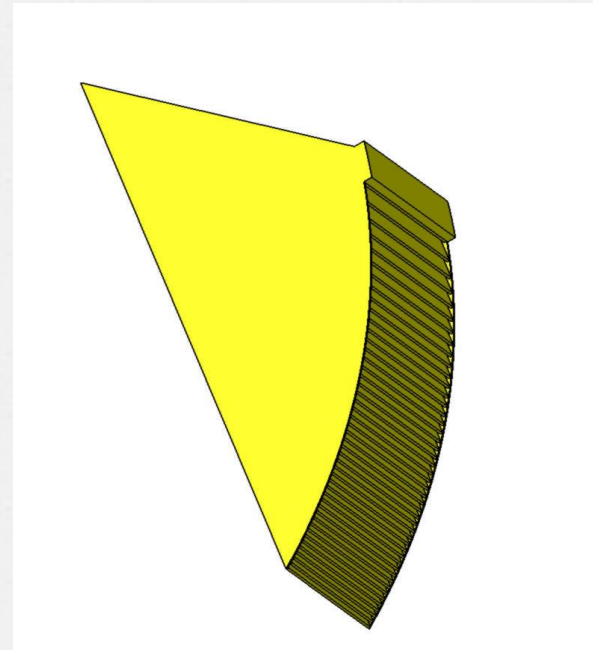
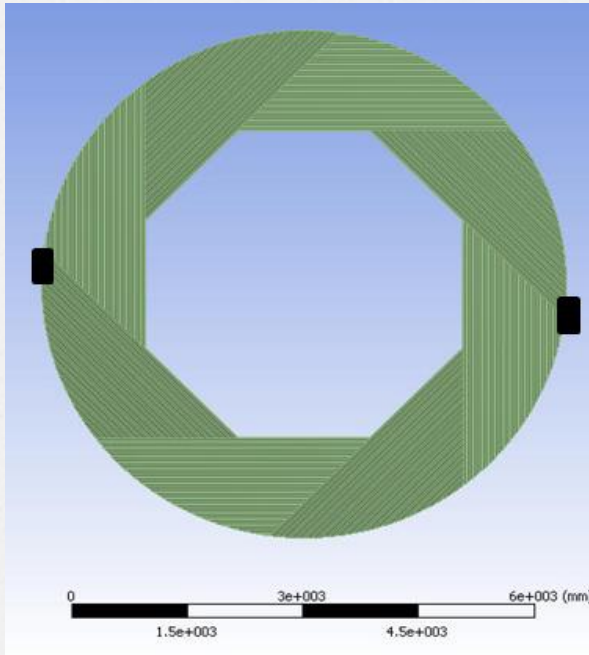


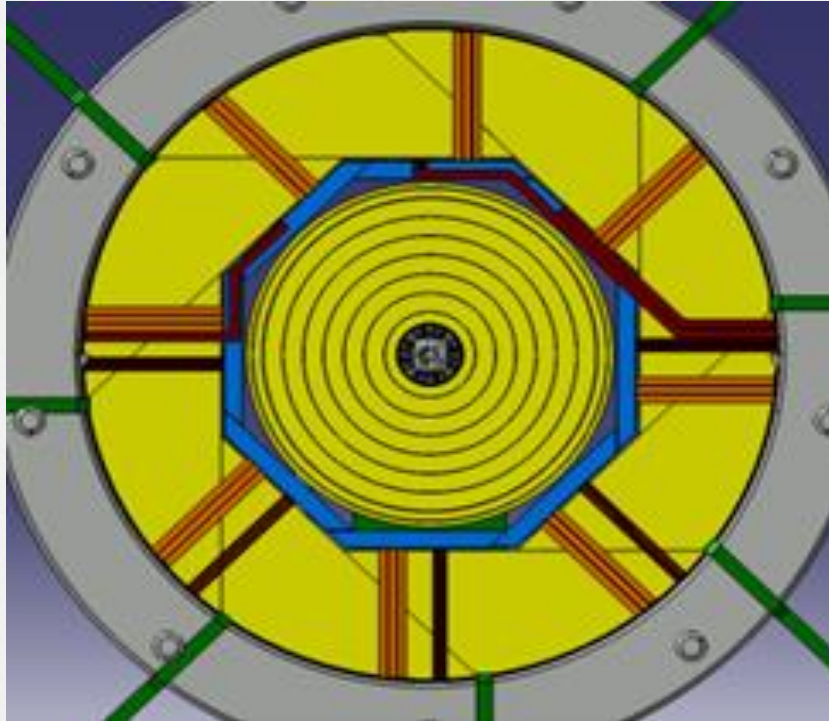
Final design to be completed



The SDHCAL barrel is fastened to the Coil and may support the ECal and TPC. The two endcaps are linked to the Yoke's Endcaps.

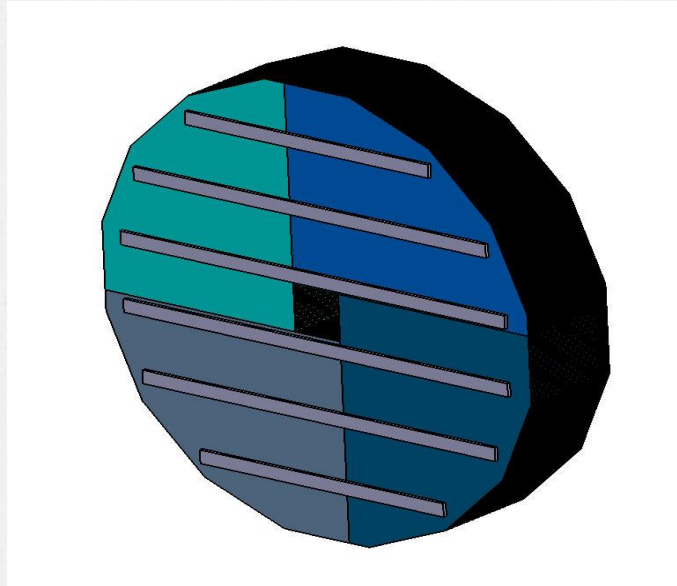
SDHCAL Barrel attachment



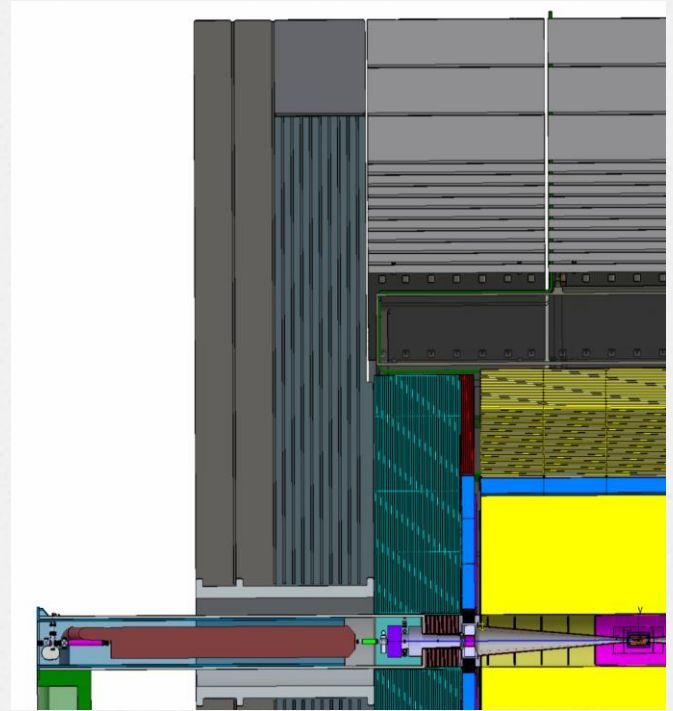
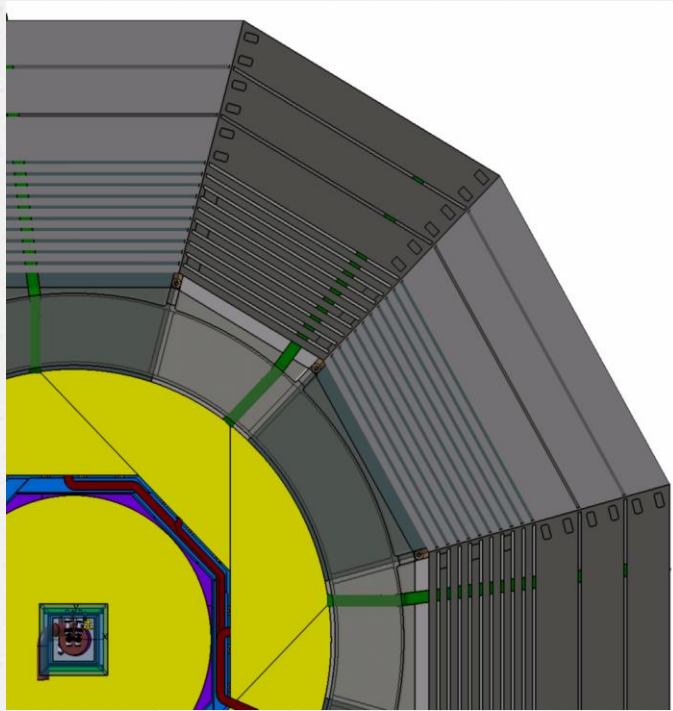


Services from ECAL, TPC can be attached to the SDHCAL lateral face

SDHCAL Endcap attachment

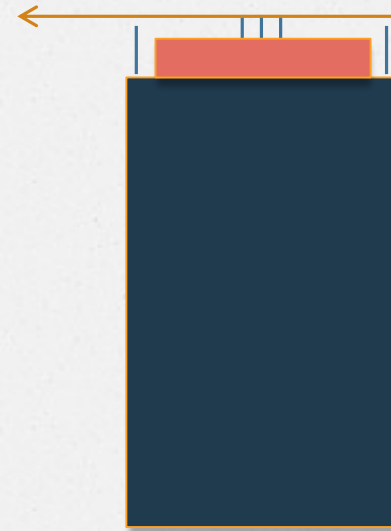
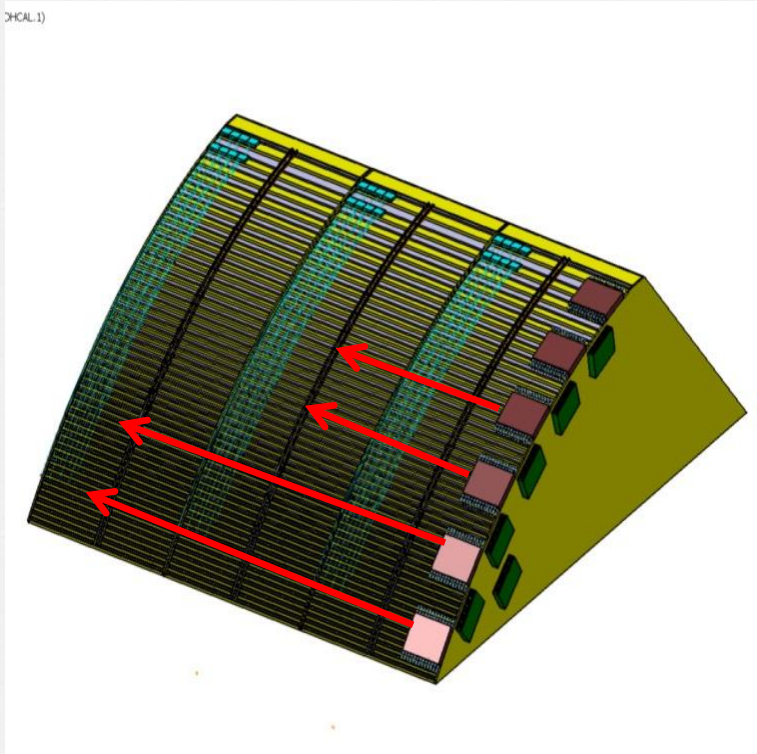


Attaching the SDHCAL Encaps to the Yoke Endcaps is one solution but other solutions should be studied



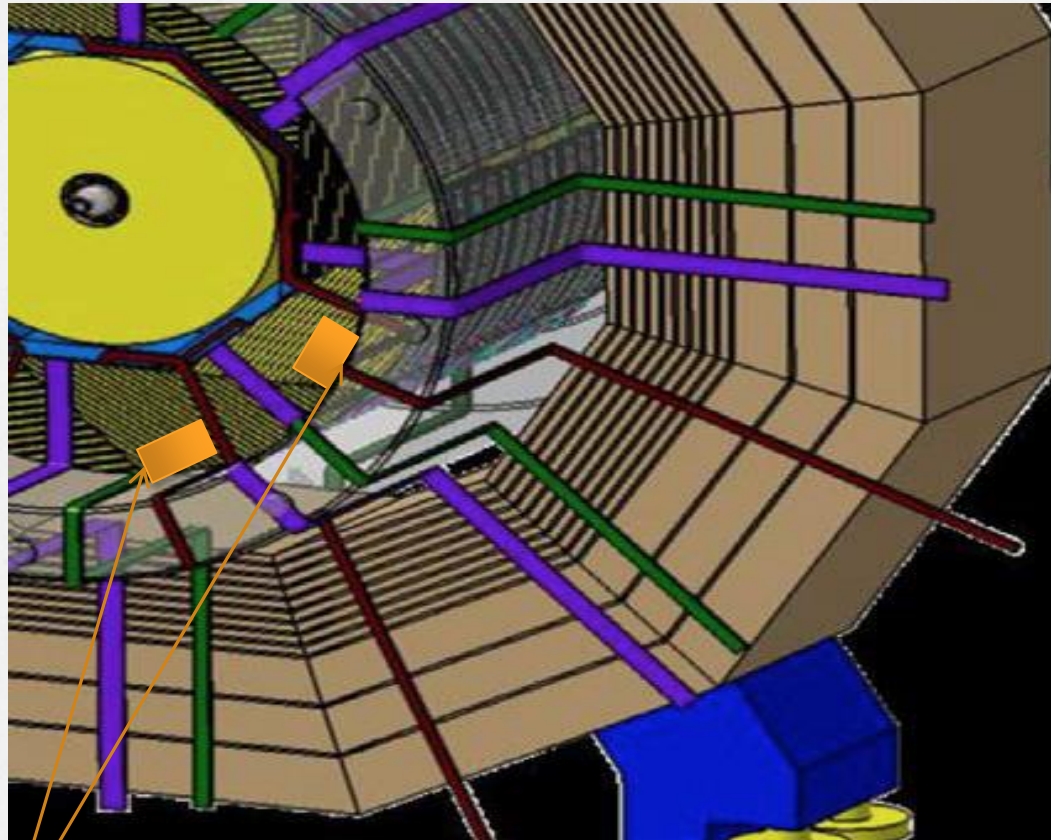
SDHCAL in CAD model

Services

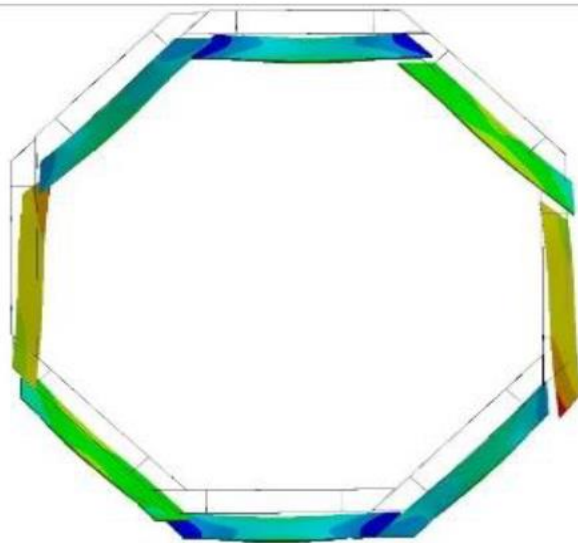


LV, HV, HDMI, gas tubes, cooling tubes

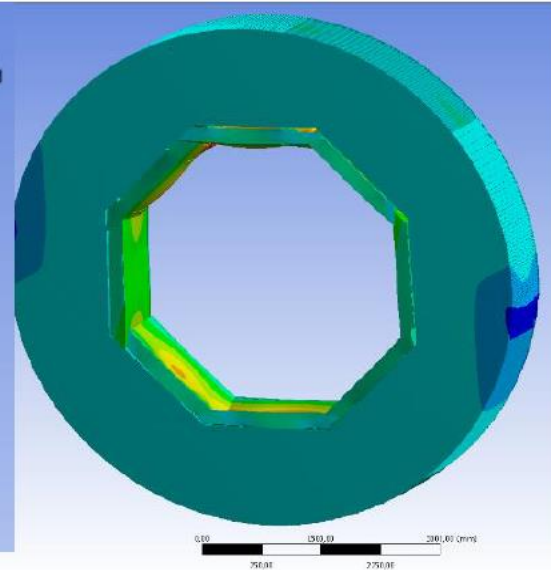
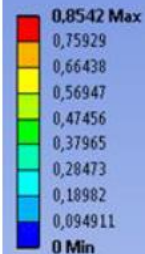
Tubes and cables to be driven parallel to the active layers and panels are fixed on the lateral surface of the SDHCAL



Patch panels will be fixed on the lateral face of the SDHCAL barrel

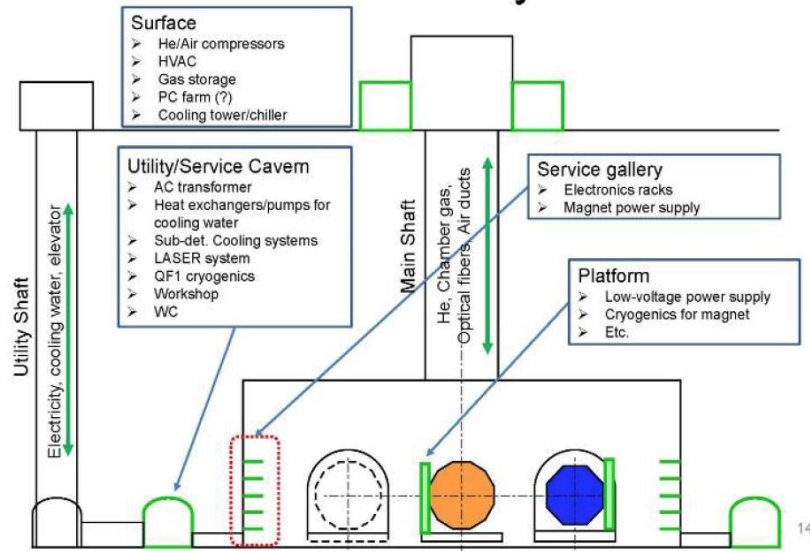


D: Structure statique
Déplacement total
Type: Déplacement total
Unité: mm
Temps: 1
23/01/2017 18:11

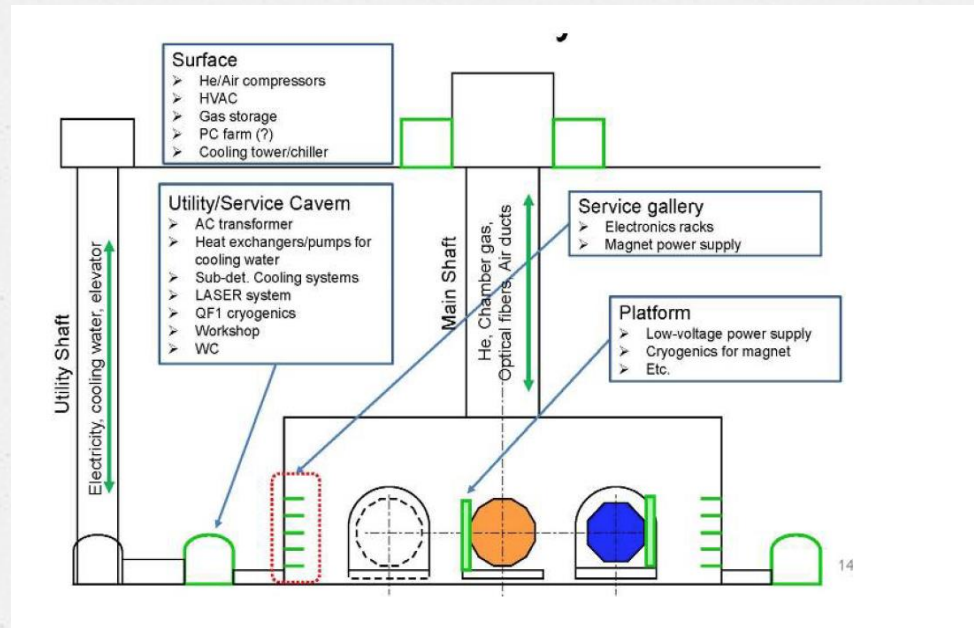


VIDEAU model :

Total displacement **0,9 mm**
Smallest gap between ECAL
modules in phi : **2,31mm**



Sub-detector name		SDHCAL
Number of 19-inch electronics racks	Platform	6
	Service gallery	2
	Utility/Service Cavern (USC)	
Sub-detector cooling system	Floor in USC	1st floor
	WxDxH	4x4x2 m ³
Gas system	Space on surface (WxD)	8x4 m ²
	Space in USC (WxD)	4x4 m ²
	Space on service gallery (WxD)	1x1 m ²
	Space on platform (WxD)	2x1 m ²
Laser system	Space in USC (WxD)	m ²



	Sub-detector name	SDHCAL
P_FE	Power consumption of Front-end Electronics	20 kW
Q_PC	Heat loss in Power Cables	2 kW
e	Efficiency of low voltage power supply	80%
P_BE	AC Power input to Back-end Electronics	8 kW
P_CS	Electric power to drive Cooling System	10 kW
	Type of cooling water for cooling system	Chilled water
P_LV	AC Power input to Low Voltage power supply	27,5 kW
Q_LV	Heat loss in Low Voltage power supply	5,5 kW
Q_BE	Heat loss in Back-end Electronics	8 kW
Q_CS	Heat to be extracted from cooling system	30 kW

Conclusion

- SDHCAL ILD module0 is on progress.
- Mechanical studies have been done for the barrel
- Mechanical studies for the endcaps need to be completed
- Response to earthquakes on SDHCAL needs to be studied