The new geometry of the ILD muon system in MOKKA

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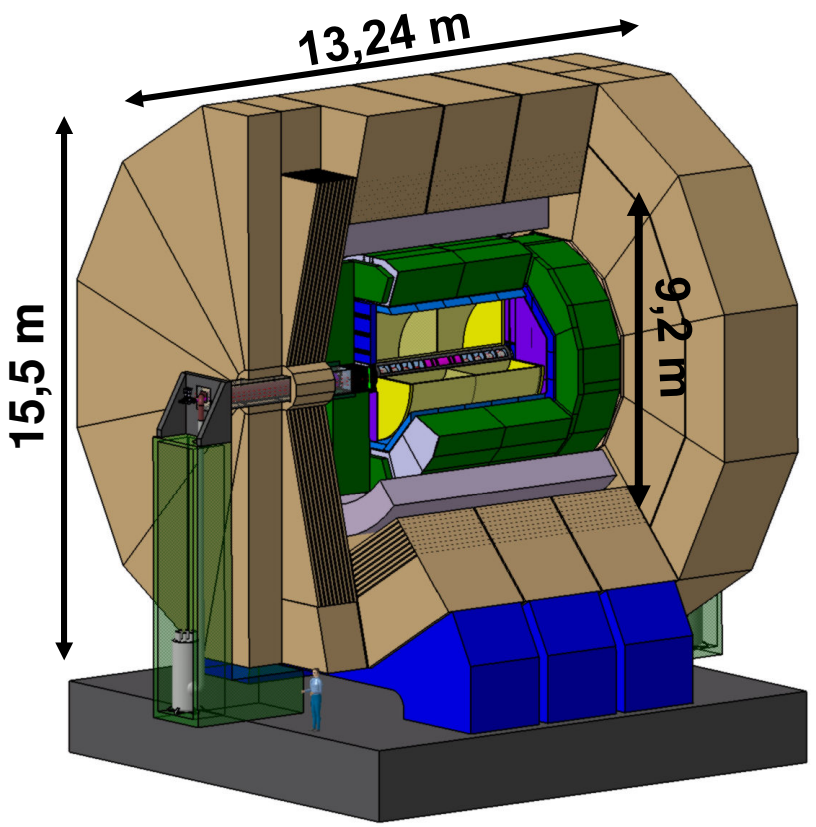
Outline

- The muon system in the ILD detector
- The new geometry for the muon system
- Details of the new design of the sub-components of the muon system
- Conclusions and future plans

The muon system in the ILD detector



ILD detector for the International Linear Collider

The task of the muon system in ILD is the identification of muons, the momentum measurement is performed in the tracker. Muon system, tail catcher.

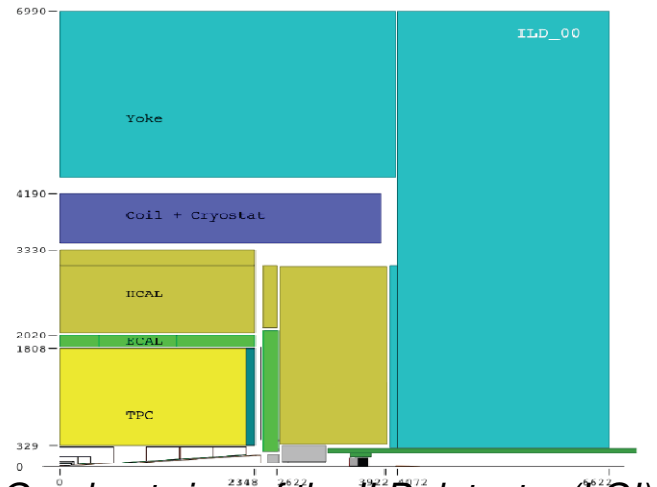
Cryostat
- *Radial size 90 cm*

Coil:
- *Shape 12-fold*
- *Thickness 385 mm*

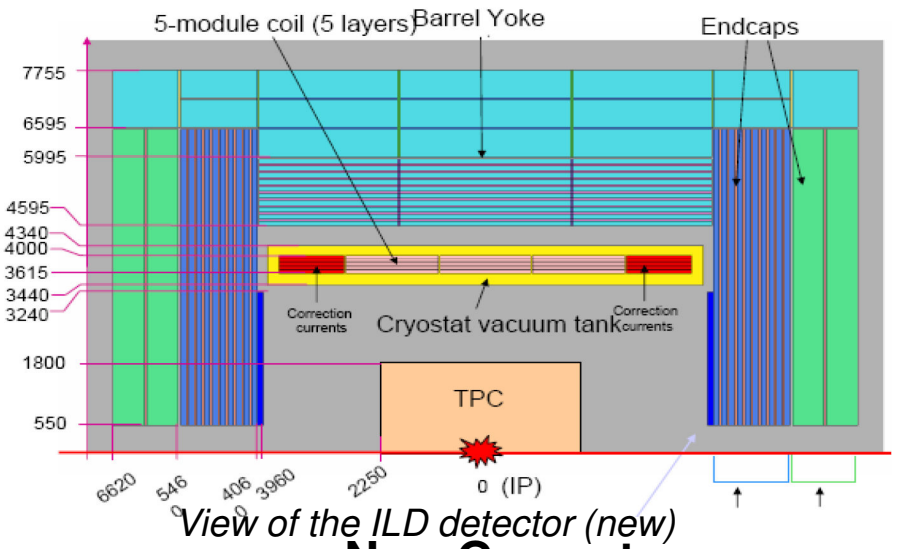
Yoke:
- *Radial size (barrel) : 316 cm*
- *Thickness (end-cap) : 266 cm*
- *Equipment : scintillator strips (0.5 cm) / steel (10 cm)*
- *Segmentation 10 (100mm + 40 mm gap)*

Recent studies about the design of the coil an of the yoke: see U.Schneekloth, Seoul ILD workshop

New geometry of the muon system in ILD



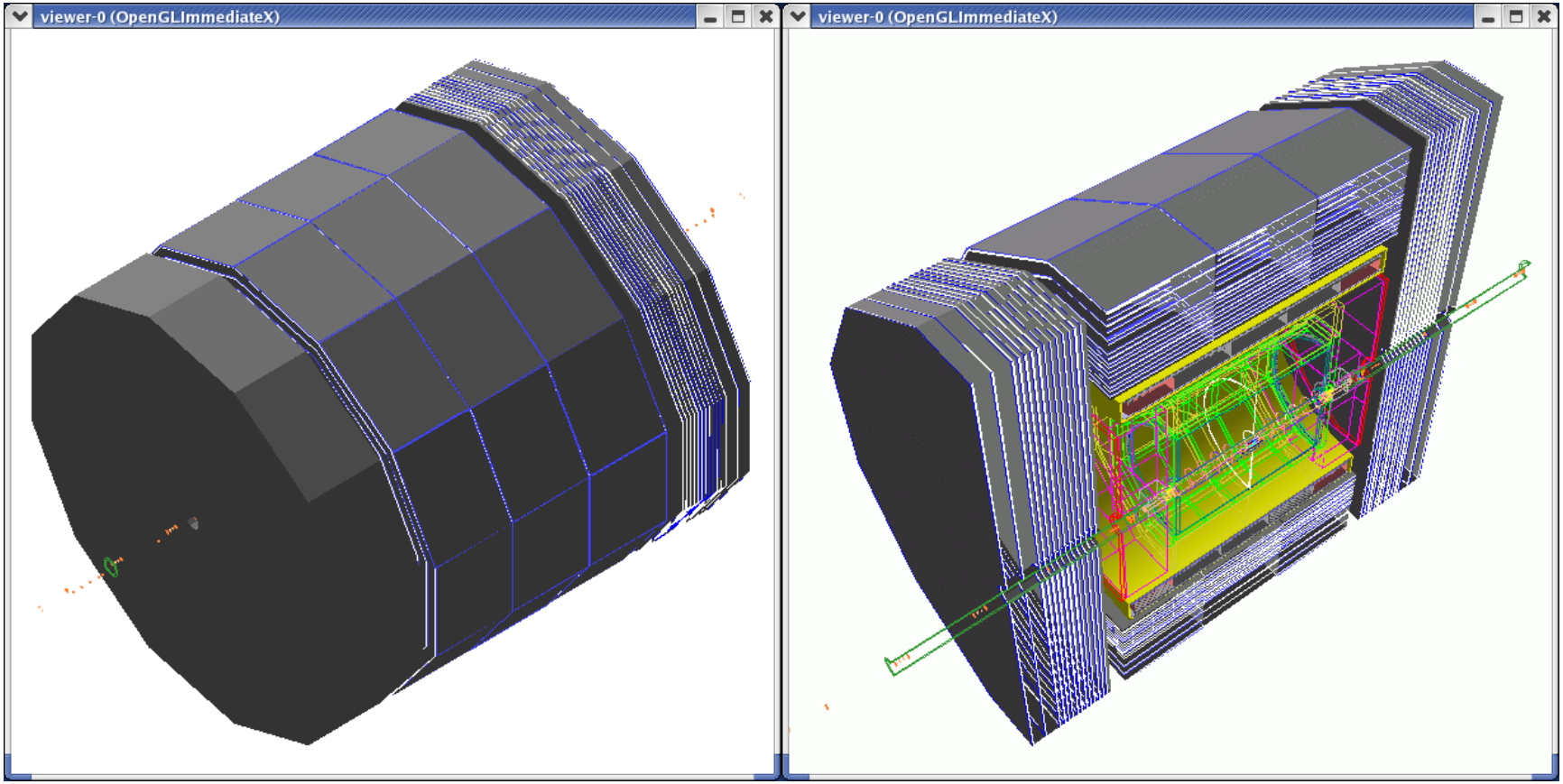
Quadrant view of the ILD detector (LOI)



View of the ILD detector (new)

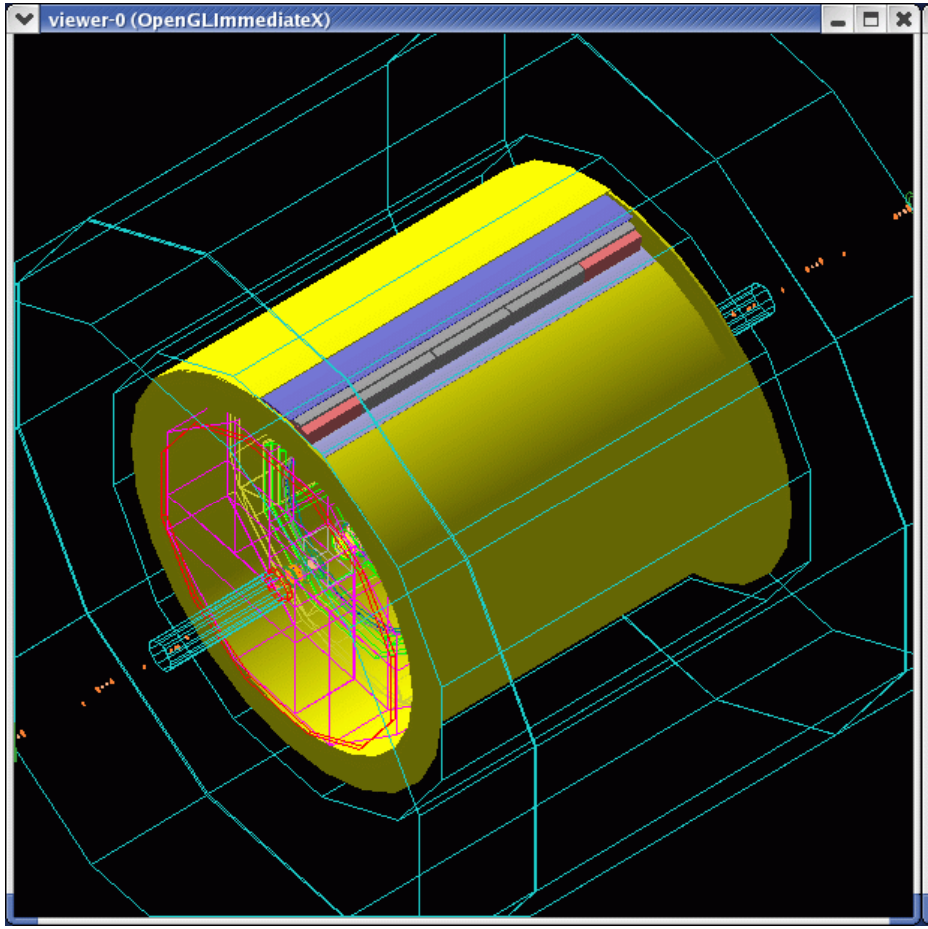
	LOI geometry	**New Geometry**
Cryostat	One block with coil	*stainless steel, outer and inner tank wall, 2 double scintillator layers (0.5 cm) Total radial size: 900 mm*
Coil	Single block Thickness cryostat + coil 750 mm	385 mm thick, mixture of 0.992 Al, 0.048%, Cu, 0.030% NbTi 3 segments + 2 Correction current segments.
Yoke	10 RPC layers/steel abs. + 1 sensitive layer a the end of the barrel	Scintillator sensitive layer/steel abs. Additional 2 sensitive layers in end-cap and barrel

New geometry of the muon system in ILD

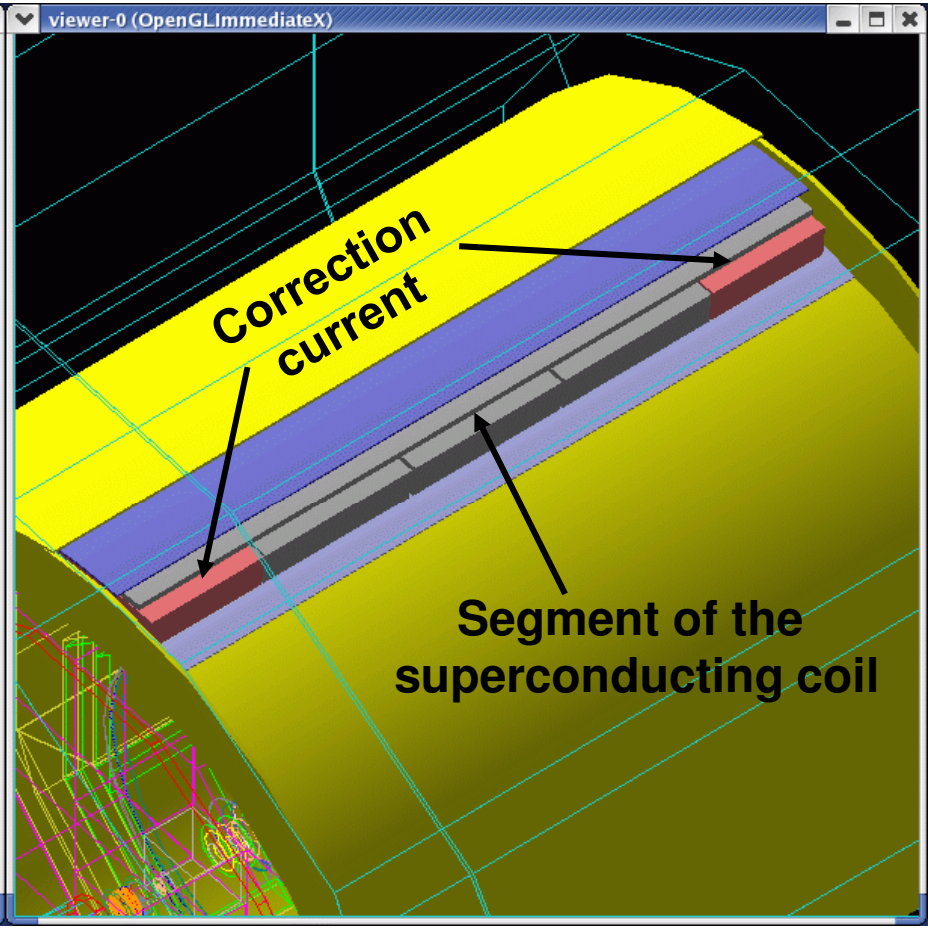


New geometry of the ILD detector in MOKKA. Details of the yoke, barrel and end-caps

The new description of the iron coil

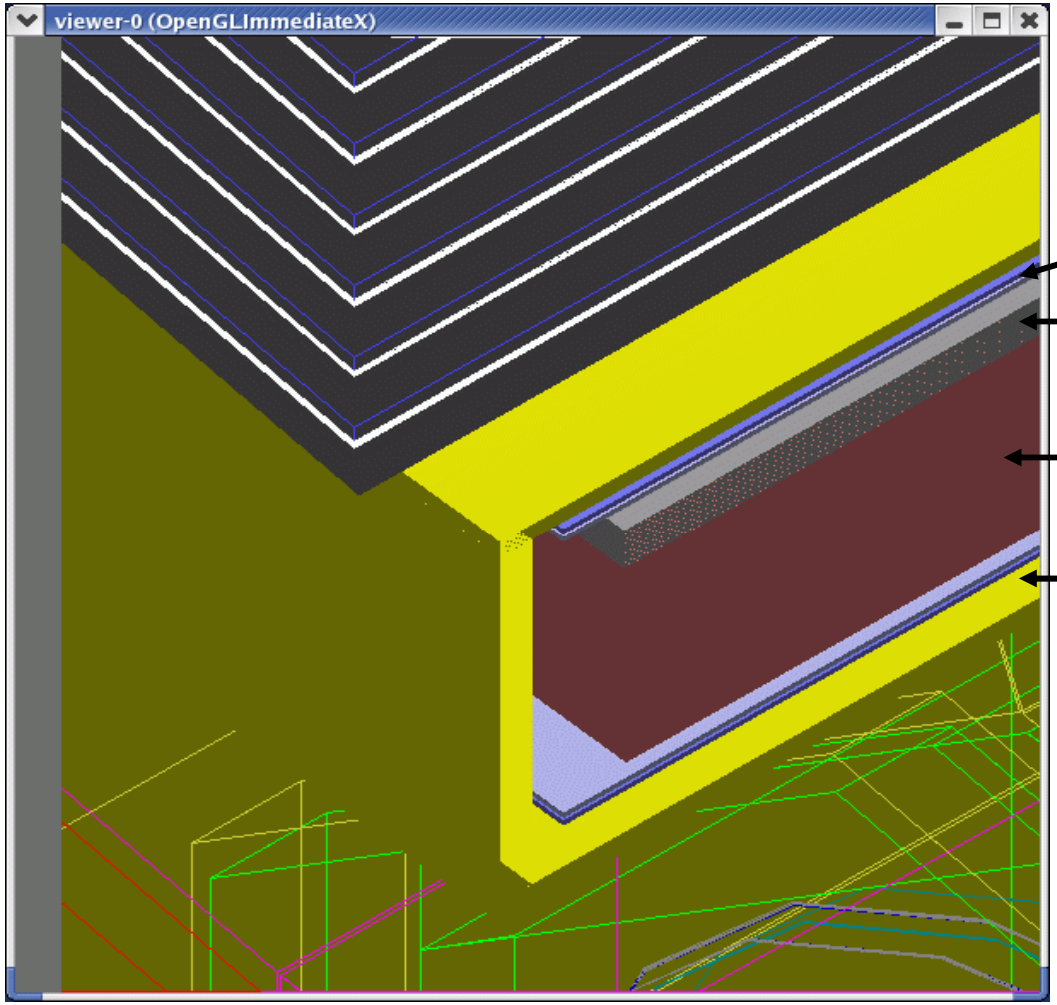


New geometry of the ILD detector in MOKKA: The Cryostat (yellow)



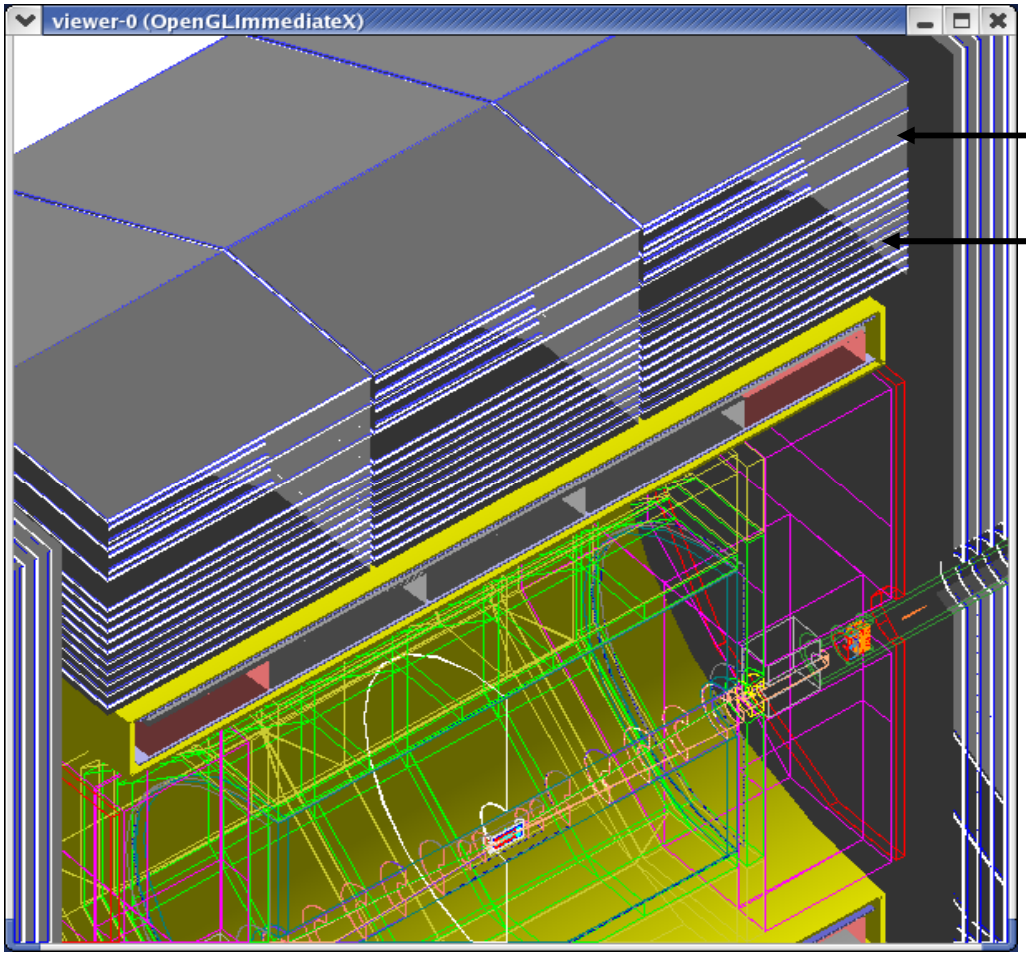
New geometry of the ILD detector in MOKKA: Zoom inside the cryostat

The equipment of the cryostat



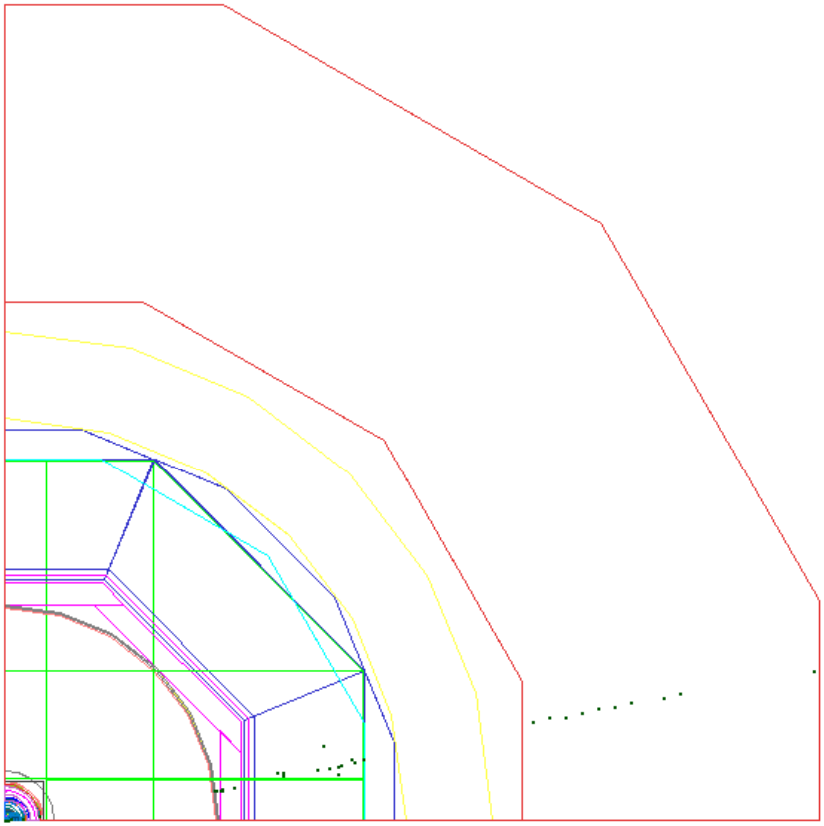
New geometry of the ILD detector in MOKKA.
Zoom inside the cryostat

The yoke

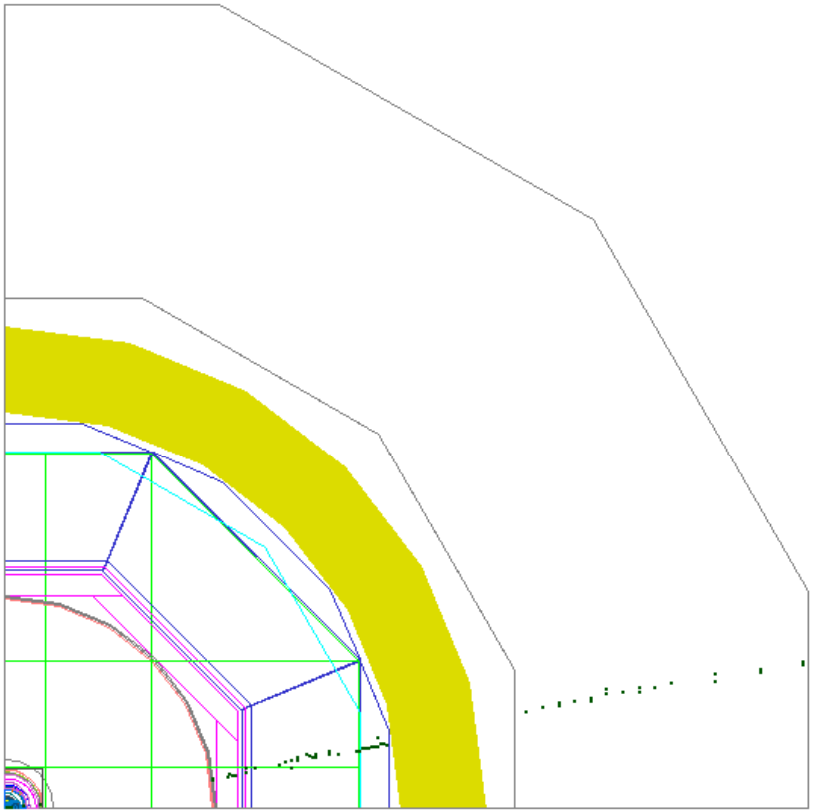


Geometry of the ILD detector in MOKKA. Details of the yoke

Muons in the new geometry



*20 GeV muon simulated in the **old** **LOI -** ILD detector geometry*



*20 GeV muon simulated in the **new** ILD detector geometry*

Conclusions

- A new geometry for the muon system is now available within the simulation framework of the ILD detector (MOKKA)
- The geometry is nearer to the latest studies on the muon system
- More intensive exchange between the muon system design and simulation.

Future plans

- Development of a muon identification techique in ILD, based on the new developed geometry
- Study of the muon identification efficiency in the ILD detectors, both isolated and within jets
- Optimization of the muon system parameters (cells, thickness…) according to the muon identification efficiency results.