

LDC v5 in Mokka issues

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ILD Detector Optimization WG
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recently resolved issues

detector	Component	issue	fix	person	status
Ecal	SEcal02	hits in end caps have bad z values (all +z)		PMF	done
Ecal	SEcal02	first sensitive layer before radiator numerated as 1 lets to troubles in reconstruction code	to split the hits collection or to numerate layer in Ecal starting from 0	PMF	done
field	fieldX01	this field has a detailed non-uniform field in the forward direction that causes the simulation to run 5-10 times slower	go back to old uniform field: Sfield01 – (detailed field only needed for dedicated bg studies)	PMF	done
Hcal	SHcal03	do we want 48 layers ? what are the side effects wrt size of the coil, muonsystem	agreed by Hcal experts to have 48 layers for LOI mass production		done
Hcal	SHcal03	Hcal_back_plate_thicknes set to 2mm – was 50 mm – what's the correct value	leave it for now		done
LCal	Sical01	SimCalorimeterHit.position is stored in zylindrical local coordinates	convert to global cartesian x,y,z	FG	done
LCIO MCPartic le weight	HepLCIOInte rface	the new stdhep files have an event weight that needs to be added to the LCIOEvent	update class HepLCIOInterface accordingly; use LCStdHepRdr from LCIO	FG	done
TPC	tpc05.cc	current code produces hits every maxStep size (5mm), ie. not on measurement surfaces which causes problem for TPCDigitize/LEPTracking	modify driver to create hits on measurement surfaces by introducing tube like volumes along pad rows (+ maxStep size) – created tpc08 subdetector model	SA	done
x-angle	HepLCIOInte rface	if a boost for the crossing angle is applied, it is not applied to the MCParticles in the LCIO output file	fixed in PrimaryGeneratorAction	FG	done

overview: open issues

see next slides

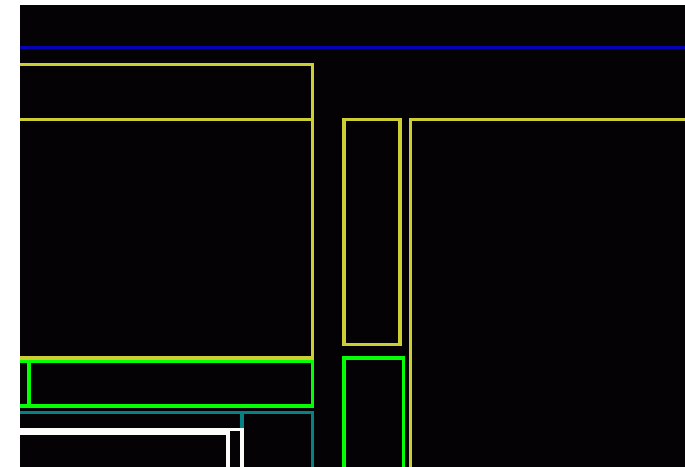
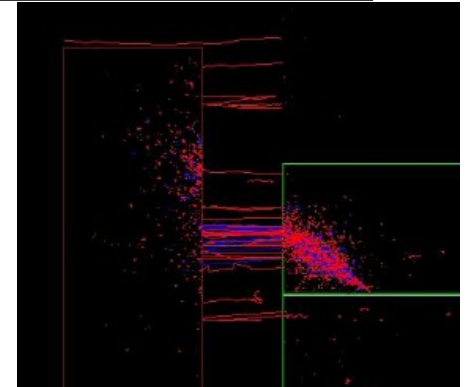
detector	Component	issue	fix	person	status
beam energy spread	HepLCIOInterface, PrimaryGeneratorAction	do we need the possibility to scale the generated particles to account for beam energy spread ?			open
Ecal	SEcal02	change orientation of the slab direction in endcap		PMF	open
Hcal		store digitization parameters needed for gear in Mokka db as model parameters ?	Hcal_cell_size		open
Hcal/Ecal	Shcal03, SEcal02	should the Hcal ring be part of the barrel – do we need an extended Ecal endcap (if so – how large ?)	need decision from calorimeter groups		open
Lcal	Scal01	the outer radius is too large wrt, LDCv5 (220vs350) related to outer part of lcal/inner part of ecal endcap			open
LCal	Scal01	missing outer part of the Lcal - round Lcal in box hole of ecal endcap ?			open
SIT	sit01	change in layout requested by Silc		MV	open
TPC	DB	need to include tpc08 in LDC01_05Sc		PMF	open
Hcal	SHcal03	the gear for the endcap has 48(42) layers plus 1 with negative thickness + 5 additional layers	due to Hcalring: need additional Gear parameter (Mokka), section for this – depends on decision about extended Hcal barrel...	KH FG (Gear)	in progress

StdHep interface

- the existing whizard files don't seem to have the **beam energy spread** included
- -> this could be corrected in Mokka when reading in the stdhep file
 - get positron and electron energies from gaussian distribution around mean
 - recompute energy in cms and scale particle energies accordingly
 - apply combined boost of x-angle and beam E differences
- **is this important ?**
- **do we need it ?**
- **if so, who does it ?**

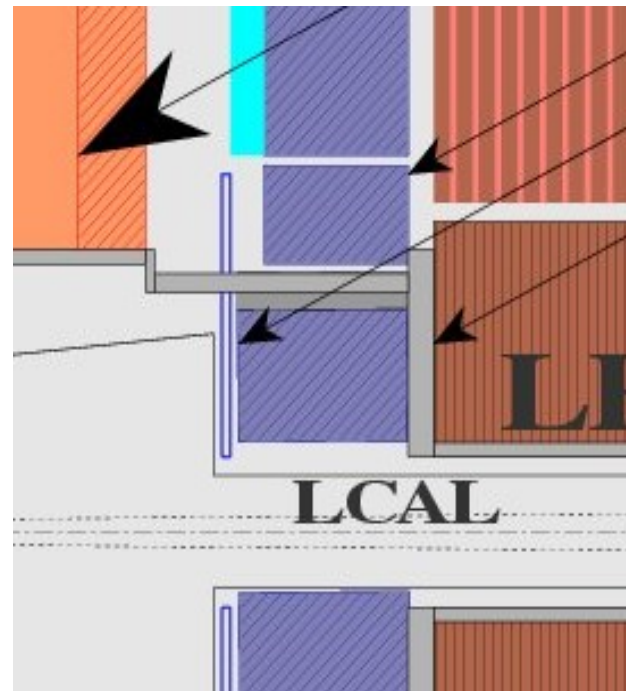
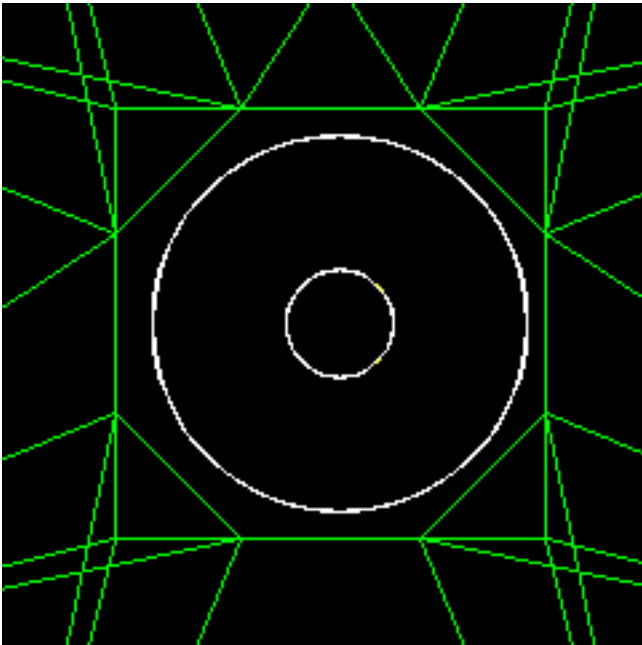
Ecal endcap/ Hcal ring

- extended Ecal endcap proposed at Valencia
- currently implemented :
- only slightly extended endcap + Hcal ring
- Hcal ring needs treatment in SW
- endcap like additional calorimeter
- in LDCv5: extended barrel
- first few layers cut out to leave room for ecal
- **need decision now !**
- **options**
 - leave Mokka as is and adopt rest of code
 - leave ecal endcap and extend Hcal barrel
 - -> simplest solution
 - implement larger extension of ecal and modify Hcal barrel driver



Lcal

- current Lcal in Mokka has only inner, cylindrical part sitting in a box like opening of the Ecal endcap
- acceptance leak
- there should be an outer part filling the cap
 - -> is this Ecal or Lcal
 - if Ecal than current Lcal too large !
- do we need to change this
- if so – who can do it ?



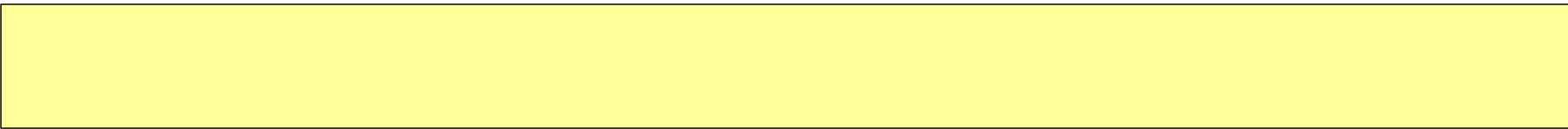
minor (?) technicalities

- Ecal endcap has wrong orientation of the slabs
 - -> Paulo working on this
- Hcal need cell size for digitization (3cm) in Mokka database as model parameter
 - needed to get proper Gear file for reconstruction from Mokka
- include tpc08 driver in DB model LDC01_Sc
- change of SIT layout requested by Silc
 - what are the details of these changes ?

LDCPrime

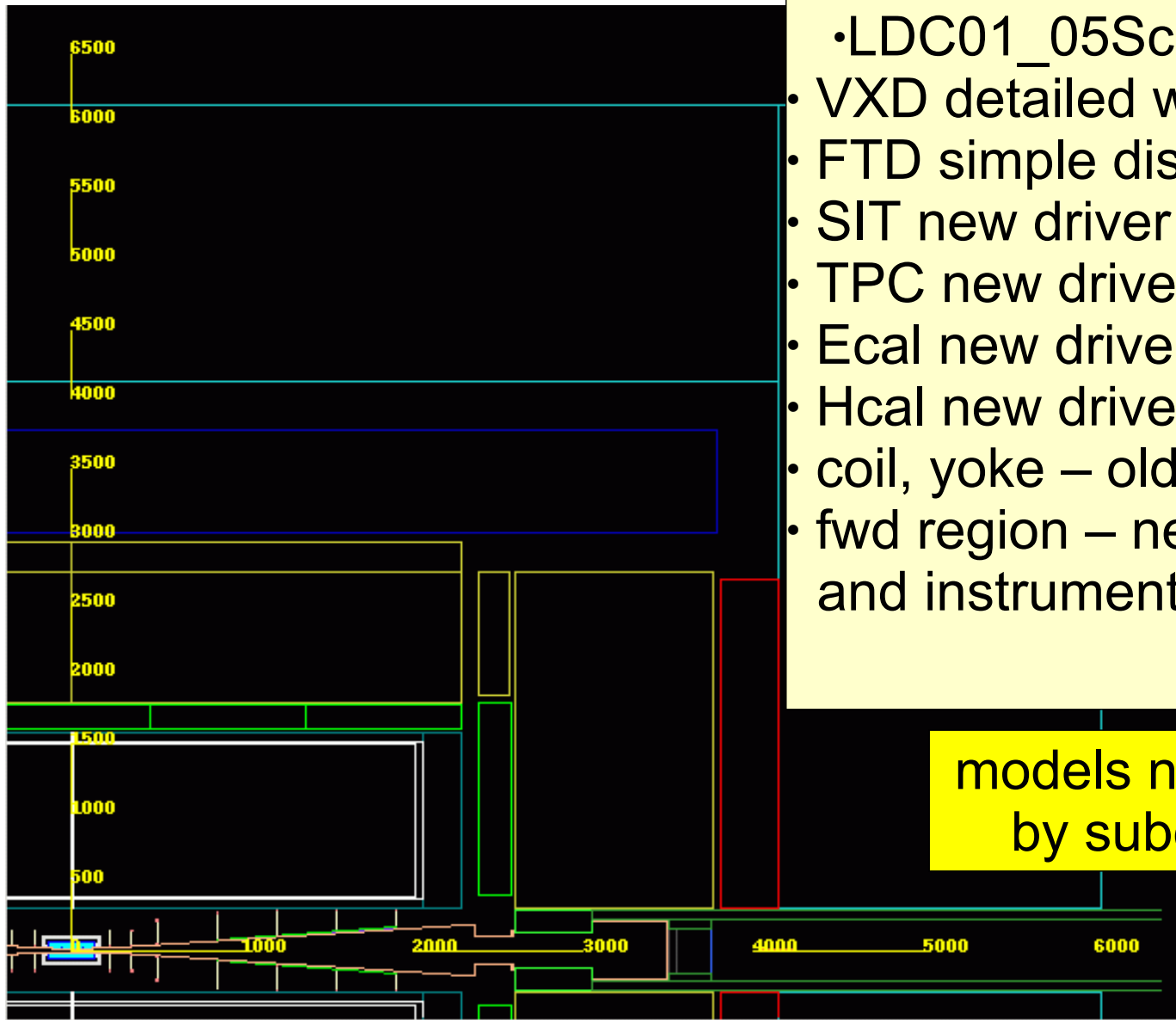
Sub-Detector	Parameter	GLD	LDC	GLD'	LDC'
TPC	R_{inner} (m)	0.45	0.30	0.45	0.30
	R_{outer} (m)	2.00	1.58	1.80	1.80
	Z_{max} (m)*	2.50	2.16	2.35	2.35
Barrel ECAL	R_{inner} (m)**	2.10	1.60	1.85	1.82
	Material	Sci/W	Si/W	Sci/W	Sci/W
Barrel HCAL	Material	Sci/W	Sci/Fe	Sci/Fe	Sci/Fe
Endcap ECAL	Z_{min} (m)***	2.80	2.30	2.55	2.55
Solenoid	B-field	3.0	4.0	3.50	3.50
VTX	Inner Layer (mm)	20	16	18	18

- LDC01_05Sc is a scalable model
- once it is frozen we should create an LDCprime01 model with the appropriate parameters
- -> can test both models in parallel



additional material

LDC01_05Sc detector model



- LDC01_05Sc (Paulo M.d.Freitas)
- VXD detailed w/ ladders
- FTD simple discs (material !?)
- SIT new driver – proper material
- TPC new driver w/ max step size
- Ecal new driver w/ fibres, rings,...
- Hcal new driver incl. endcap ring
- coil, yoke – old drivers
- fwd region – new with proper mask and instrumented LCal

models needs to be checked
by subdetector experts !

experts for detailed checks

- VTX
 - someone from LCFI (C. Lynch, K. Harder, B. Jefferey)
- FTD, SIT
 - M. Voss, H. Li
- TPC
 - S.Aplin
- Ecal
 - D.Ward
- Hcal
 - A.Lucaci
- Lcal
 - ??