

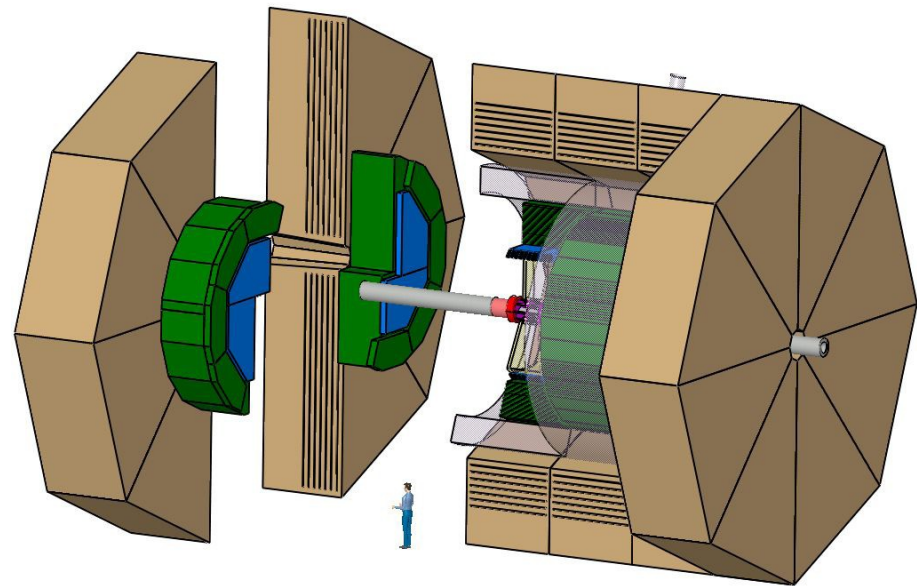
LDC v5 in Mokka issues

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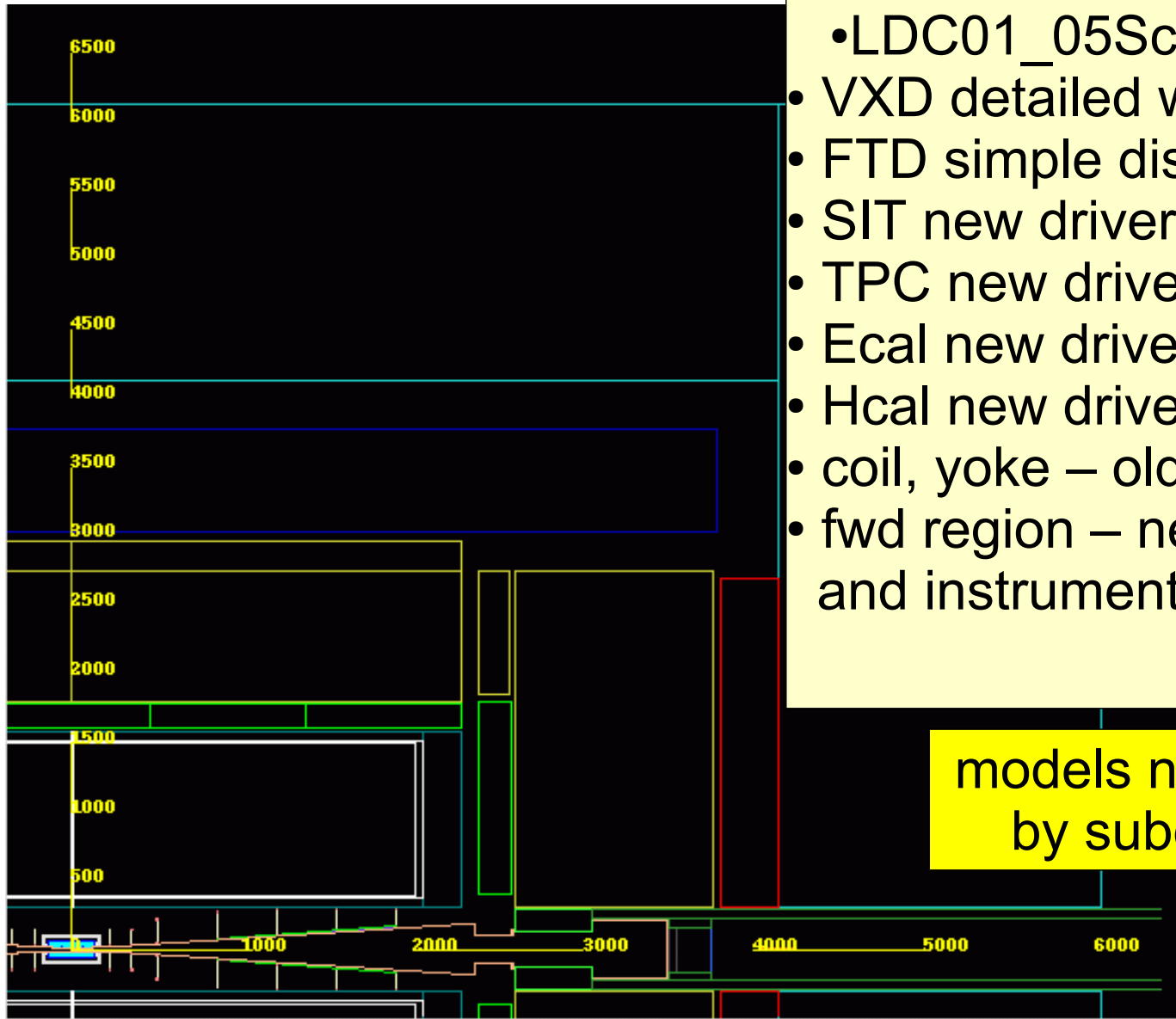
ILD Detector Optimization WG
Phone Meeting, November 21, 2007

Outline

- introduction
- status LDC01_v05Sc
- known issues
 - TPC
 - Ecal
 - Hcal
 - Lcal



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
 - ??

Mokka model browser

Mokka Detector Model Database Browser - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www-flc.desy.de/ldcoptimization/tools/mokkamodels.php?model=LDC01_05Sc

LCIO ilcsoft simulation/geant4 Google DESY IT Group MyHome LEO English/German ... CMake Cross Platfor...

Mokka Detector Model Database Browser

LDC01_05Sc Select

Detector Model "LDC01_05Sc"

<i>Description</i>	LDC baseline version 5
<i>Status</i>	unstable

Detector Concept "LDC Extended"

<i>Description</i>	The LDC detector concept, extended in length
<i>World Box</i>	7500 x 7500 x 12600 mm ³ (octant)
<i>Tracker Region</i>	$r < 1700$ mm, $l_j < 2500$ mm
<i>Calo Region</i>	$r < 2854.85521187$ mm, $l_j < 3415.5$ mm

Subdetector "vxd01"

<i>Description</i>	The realistic vertex detector geometry based on TESLA TDR
<i>C++ Driver</i>	SVxd01 (superdriver for vxd01)
<i>MySQL Database</i>	vxd01
<i>Parameters</i>	TUBE_central_inner_radius , TUBE_central_thickness , VXC_active_silicon_thickness , VXC_crvostat_option , VXC_end_electronics_thickness , VXC_inner_radius , VXC_ladder_number , VXC_outer_radius , VXC_support_ladder_material , VXC_support_ladder_thickness
<i>Build Order</i>	20

Subdetector "sit01"

<i>Description</i>	New sit implementation by Hengne Li from LAL
<i>C++ Driver</i>	si_t01
<i>MySQL Database</i>	sit01
<i>Build Order</i>	30

Subdetector "SFtd02"

<i>Description</i>	FTD superdriver with new z positions
<i>C++ Driver</i>	SFtd01 (superdriver for ftd00)
<i>MySQL Database</i>	ftd02
<i>Parameters</i>	TUBE_opening_angle
<i>Build Order</i>	40

Subdetector "SEca02"

<i>Description</i>	A scalable LDC Ecal driver without database, just parameters.
<i>C++ Driver</i>	SEca02
<i>Parameters</i>	Ecal_Alveolus_Air_Gap , Ecal_Slab_shielding , Ecal_Slab_copper_thickness , Ecal_Slab_PCB_thickness , Ecal_Slab_gluo_gap , Ecal_Slab_ground_thickness , Ecal_barrel_number_of_towers , Ecal_Barrel_half , Ecal_guard_ring_size , Ecal_front_face_thickness , Ecal_support_thickness , Ecal_lateral_face_thickness , Ecal_fiber_thickness , Ecal_Si_thickness , Ecal_radiator_material , TPC_outer_radius , Ecal_Tpc_gap , Ecal_radiator_layers_set1_thickness , Ecal_radiator_layers_set2_thickness , Ecal_radiator_layers_set3_thickness , Ecal_cells_size , Ecal_cables_gap , Ecal_endcap_center_box_size , Ecal_endcap_extra_size , Ecal_nlayers1 , Ecal_nlayers2 , Ecal_nlayers3 , Ecal_Slab_H_fiber_thickness
<i>Build Order</i>	90

Done

check details of Mokka models online:
<http://www-flc.desy.de/ldcoptimization/tools/mokkamodels.php>
 (tool by A. Vogel)

TPC

- tpc05.cc is a new driver that has a max step length of 5mm, i.e. you get at least one SimTrackerHit space point along the particle's path every 5mm
- introduced to fix a problem with old drivers that did not have enough hits for curlers that travel a long path within a pad row
- causes problems in digitization when hits are mapped on to pad rows (eg. 6mm high) resulting in possible artifacts (no suitable digitizer exists)
- **solution: modify TPC driver, such that for a given pad row height one gets spacepoints at the measurement surfaces plus additional hits (max step) for curlers**
- **-> work inprogress (S.Aplin)**

Hcal

- proposal to have 48 layers (compare to 42 in DOD)
 - agreed and implemented
- results in Hcal_backplane_thickness 2mm as opposed to 50 mm
 - -> is this an issue, concern ?
- the additional HcalRing causes problems in gear:
 - needs to be treated as standalone calorimeter module
 - -> work in progress;
 - K.Harder – Mokka
 - F.Gaede - Gear

Ecal

- all endcap hits where mapped to +z endcap
 - -> fixed by P. Mora in cvs HEAD
- new sensitive layer before first absorber causes problem in digitization and reconstruction (PFA)
- should have additional collection for these hits (not to be used for clustering – only for entry point)
- quick workaround: introduce layer number 0 for this layer and adapt digitizer (and PFA) accordingly
 - -> to be implemented in Mokka (P.Mora)
 - -> adapt code in MarlinReco,... (?)

Field

- current LDC01_05Sc has very detailed realistic field in forward region (final focus,...) needed for background studies
- causes huge performance penalties for geant4 tracking – 5-10 times slower than plain homogenous field
- we have to switch back to simple field Sfield01 for mass production
 - -> change in Mokka DB (P.Mora)

Lcal

- hit positions are stored in cylindrical coordinates – using `SimcalorimeterHit::position` which is supposed to be in x,y,z
- -> fix Mokka driver (?)
- current Lcal in Mokka has only inner, cylindrical part sitting in a box like opening of the Ecal endcap
- there should be an outer part filling the cap (missing hits in forward region)
- -> who can fix this ?

StdHep interface

- the new stdhep files from whizard have an event weight assigned that is not copied in the LCIO event (LCIO v01-09 will have an `LCEvent::getWeight()` method)
- copy weight to LCIO if available
- -> in progress (F.Gaede)
- current version of Mokka has duplicated classes from LCIO for reading stdhep (`LCStdhepRdr`, `IStdHep`) that are out of synch...
- make sure LCIO versions are used when build with LCIO
- -> in progress (F.Gaede)

gear - MokkaGear

- Mokka writes out the gear file with geometry needed for reconstruction in Marlin
- FG: last talk on SW status:
- -> when running the latest Mokka version you get a “ready to use” gear file
- however this is not the full story:
 - some information is not available at simulation time in Mokka
 - e.g. digitization parameters, such as Hcal cellsize(1cm vs. 3cm) or TPC pda layout:
 - either fix these parameters in Mokka DB (for mass production)
 - or run mergeXML from Gear to adapt file for reconstruction

coordination, communication

- currently essentially all communication on LDC01_05Sc and its issues done through reply to mails with somewhat arbitrary list of people
- -> M.thomson will set up mailing lists for the ILD optimization group that focus on special aspects of ILD optimization:
 - ild-mokka-discussion
 - Mokka specific, geometry description
 - ild-physics-simulation-discussion
 - (generator issues, physics samples)
 - ild_software-discussion
 - all framework tools, reconstruction,...
- when should we have the next patch releases of Mokka and 'freeze' LDC01_05SC ?