LDC v5 in Mokka issues

Frank Gaede
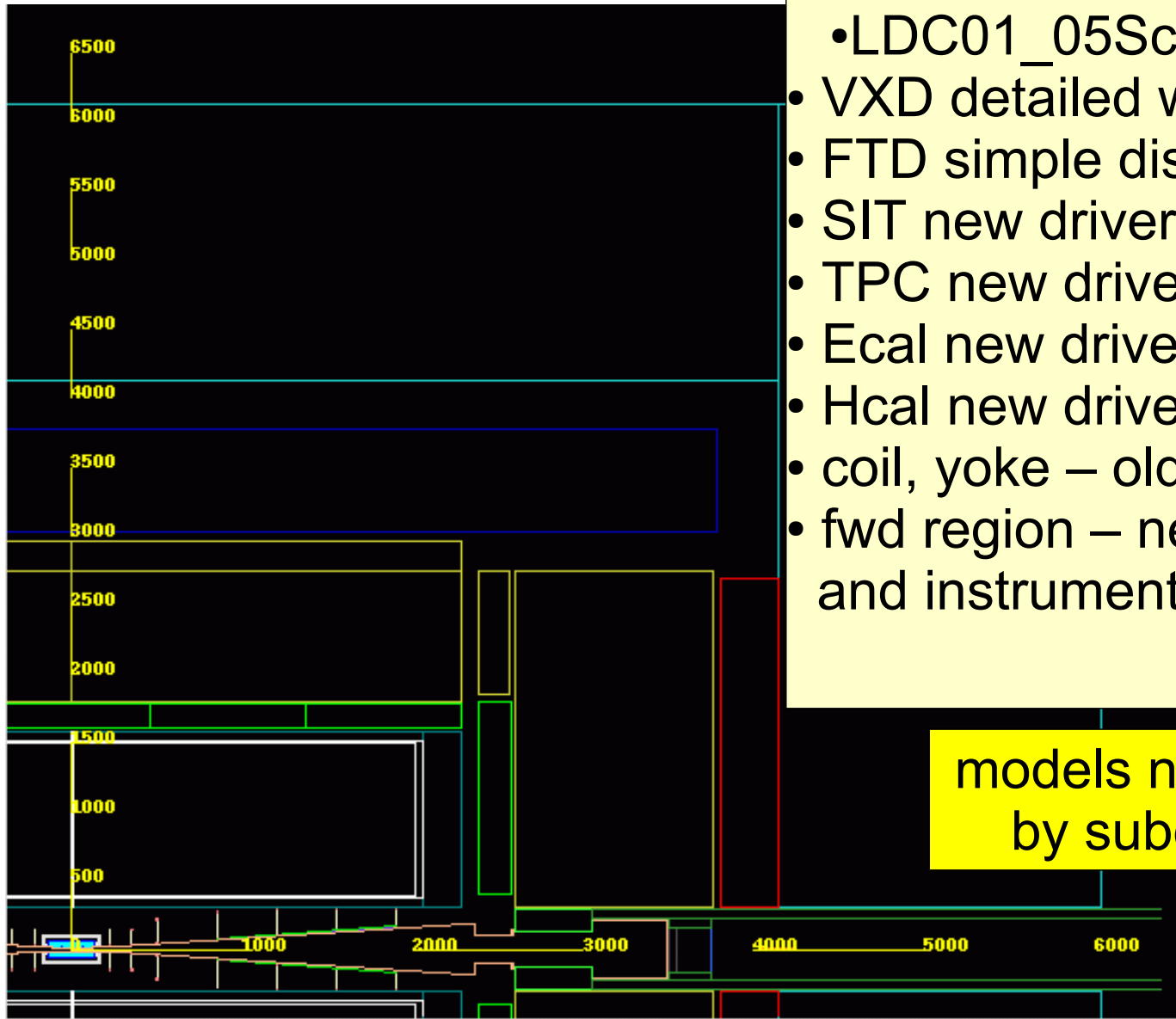DESY
ILD Detector Optimization WG
Phone Meeting, November 21, 2007

Outline

Frank Gaede, ILD Optimization WG Phone Meeting, Nov 21, 2007
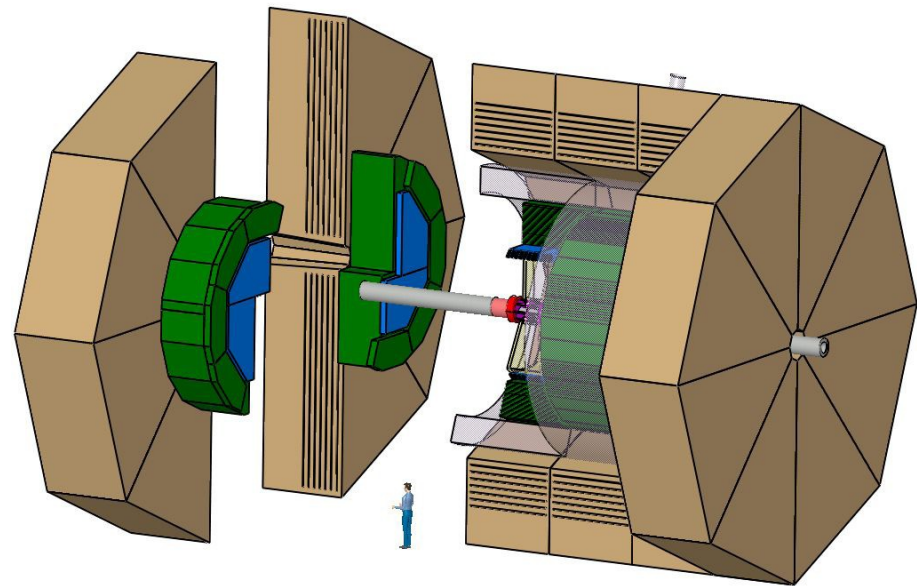
LDC01_05Sc detector model

- •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 !

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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

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

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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)

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Hcal

- proposal to have 48 layers (compare to 42 in DOD)
  - agreed and implemented
- results in Hcal_backplane_thickness 2mm as oposed 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,...) neeed for backgound 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

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coordination, comunication

- 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, physcis samples)
  - ild_software-discussion
    - all framework tools, reconstruction,...

- when should we have the next patch releases of Mokka and 'freeze' LDC01_05SC ?