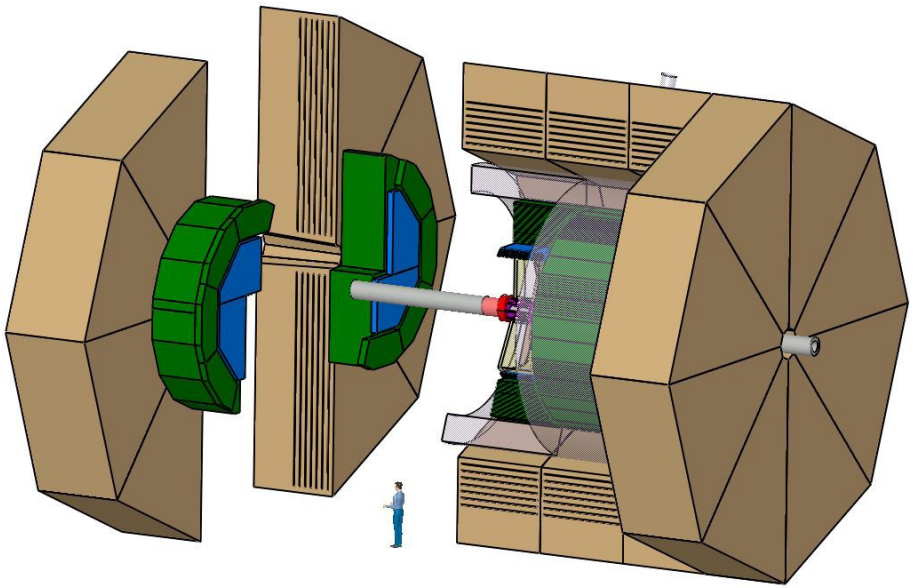
The GLD concept - status of simulation and software

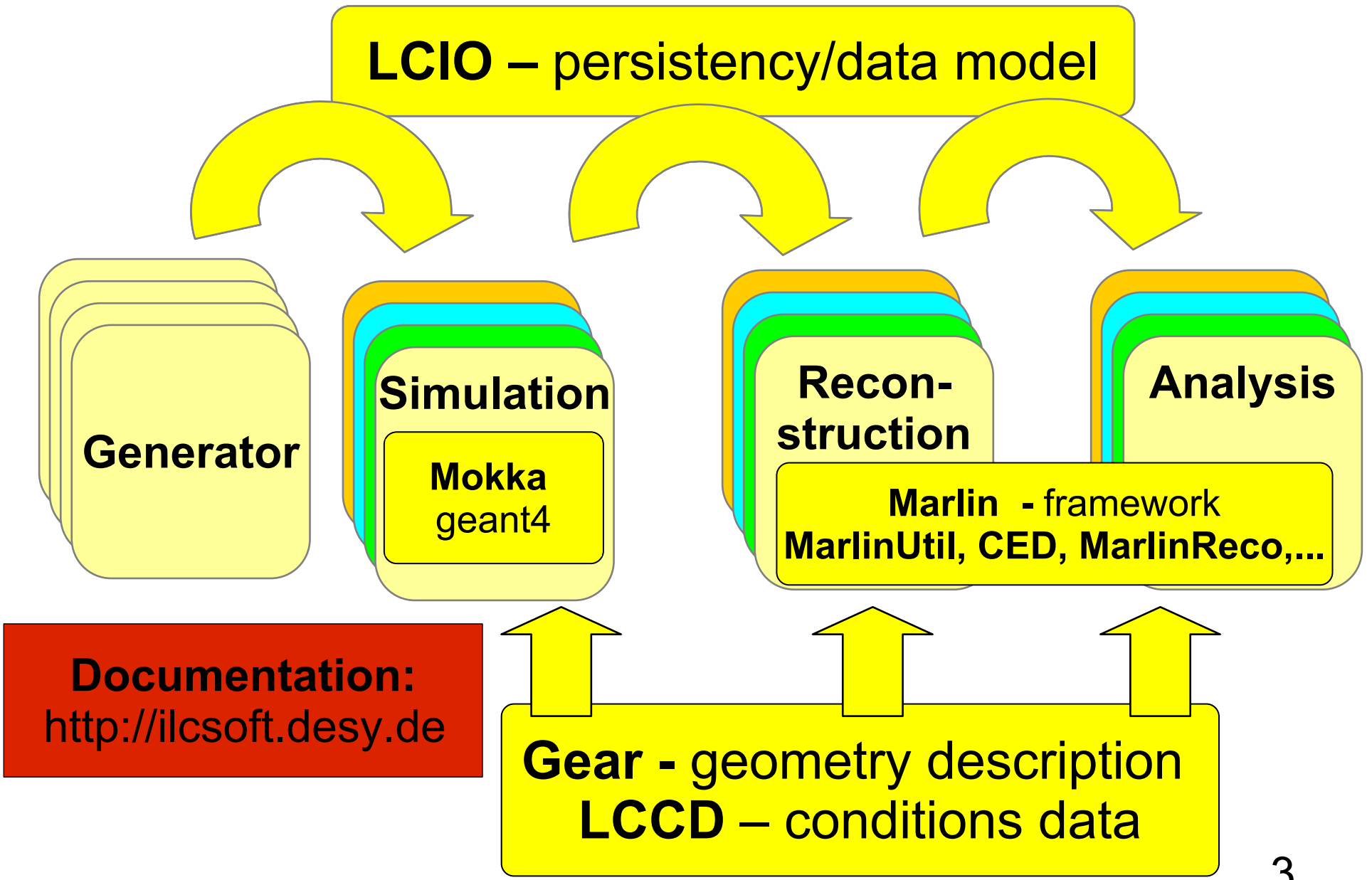
Frank Gaede
DESY
ILD Detector Optimization WG
Phone Meeting, October 31, 2007

Outline

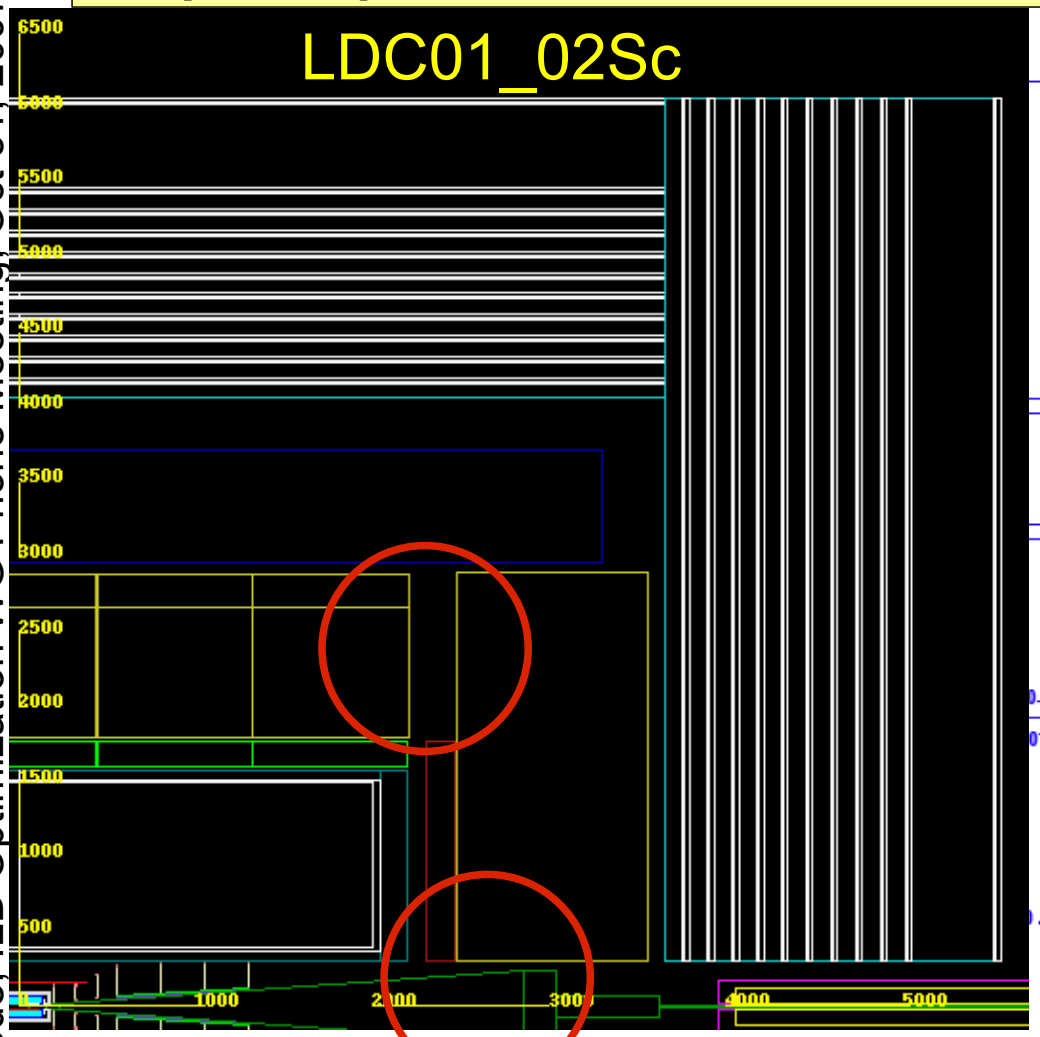
- introduction/overview
- status and recent developments
  - Mokka simulation
    - LDCv05 geometry model
  - core tools
  - MarlinReco
  - grid production
  - summary

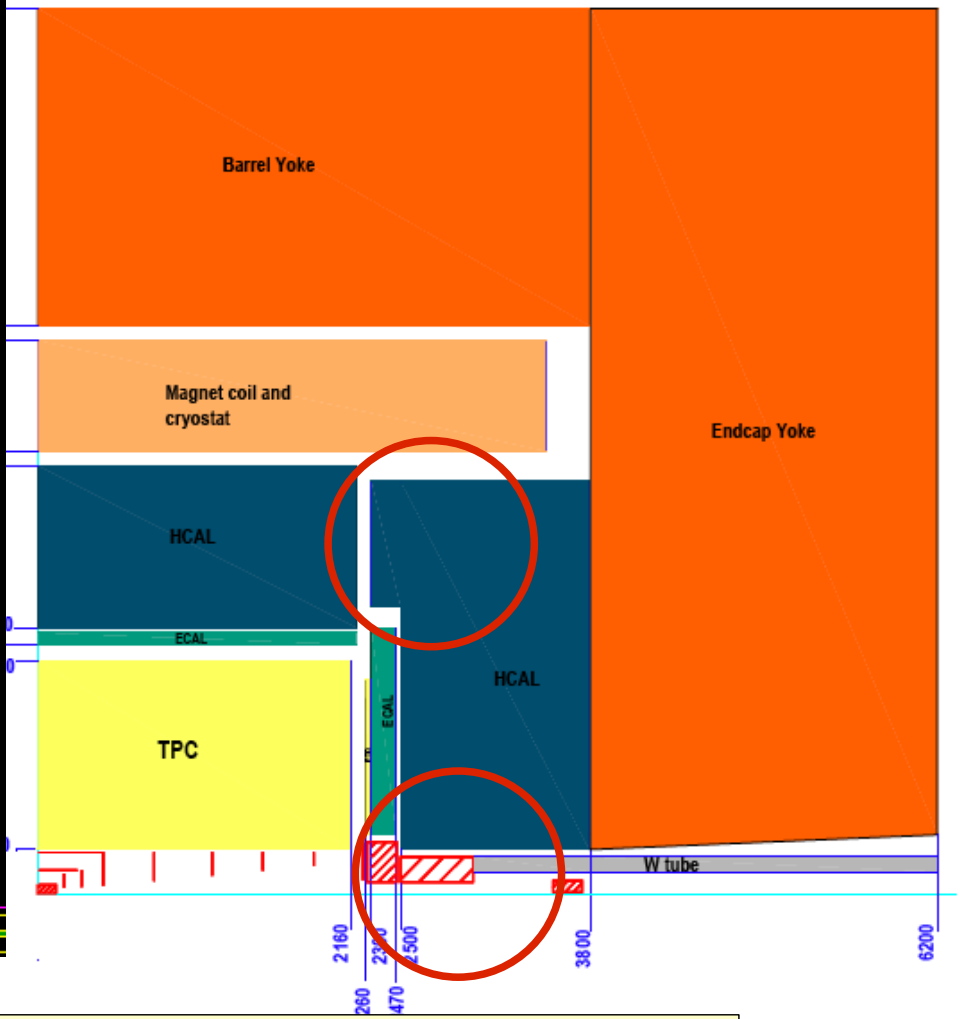


LDC SW-framework



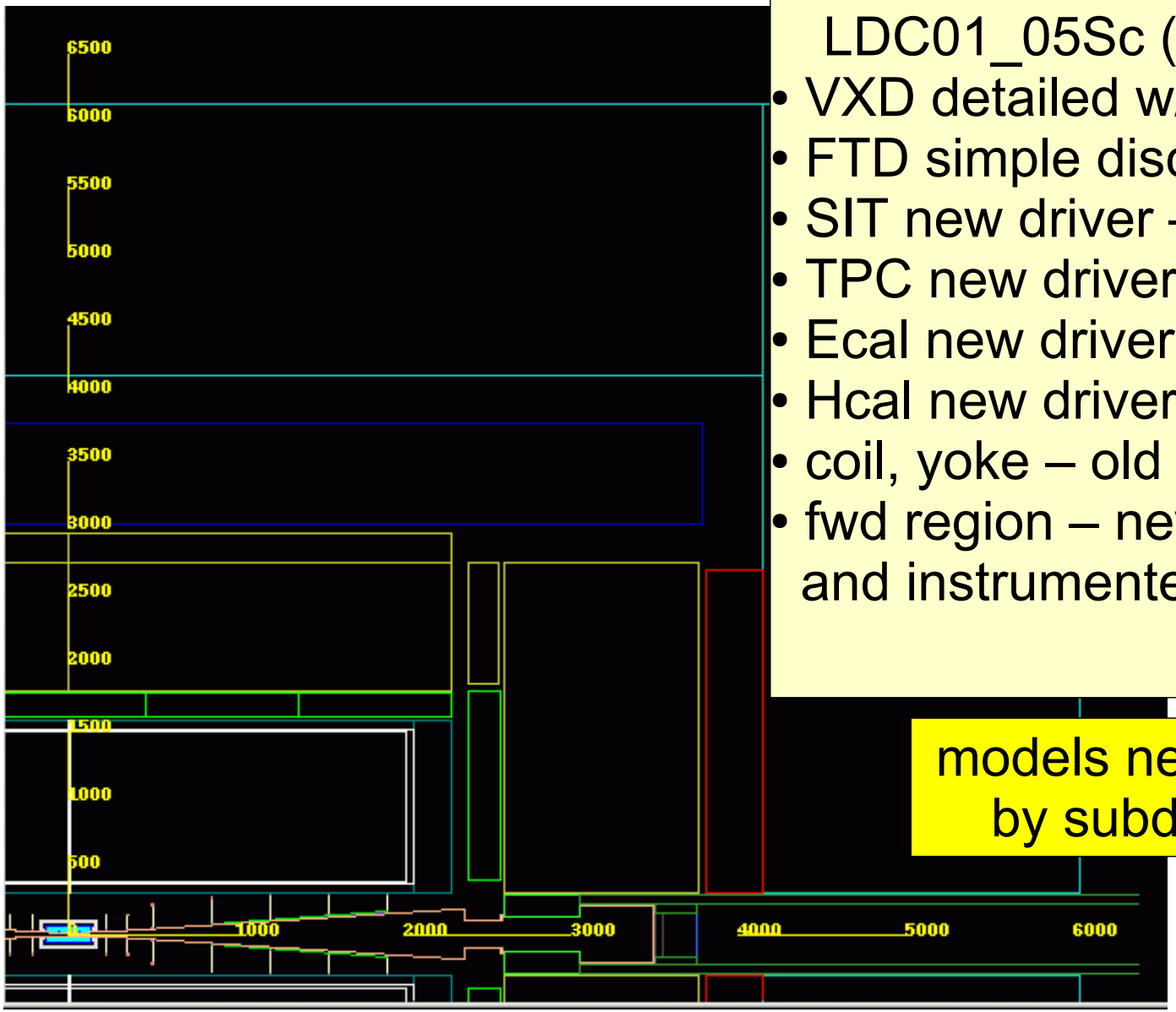
(old) LDC description in Mokka





- **detailed description of LDC (DOD) exists in Mokka**
- some caveats: missing Hcal ring and forward region
- appropriate code exits – need to combine into new model
- **fixed right now for planned MonteCarlo production**

new LDC description in Mokka

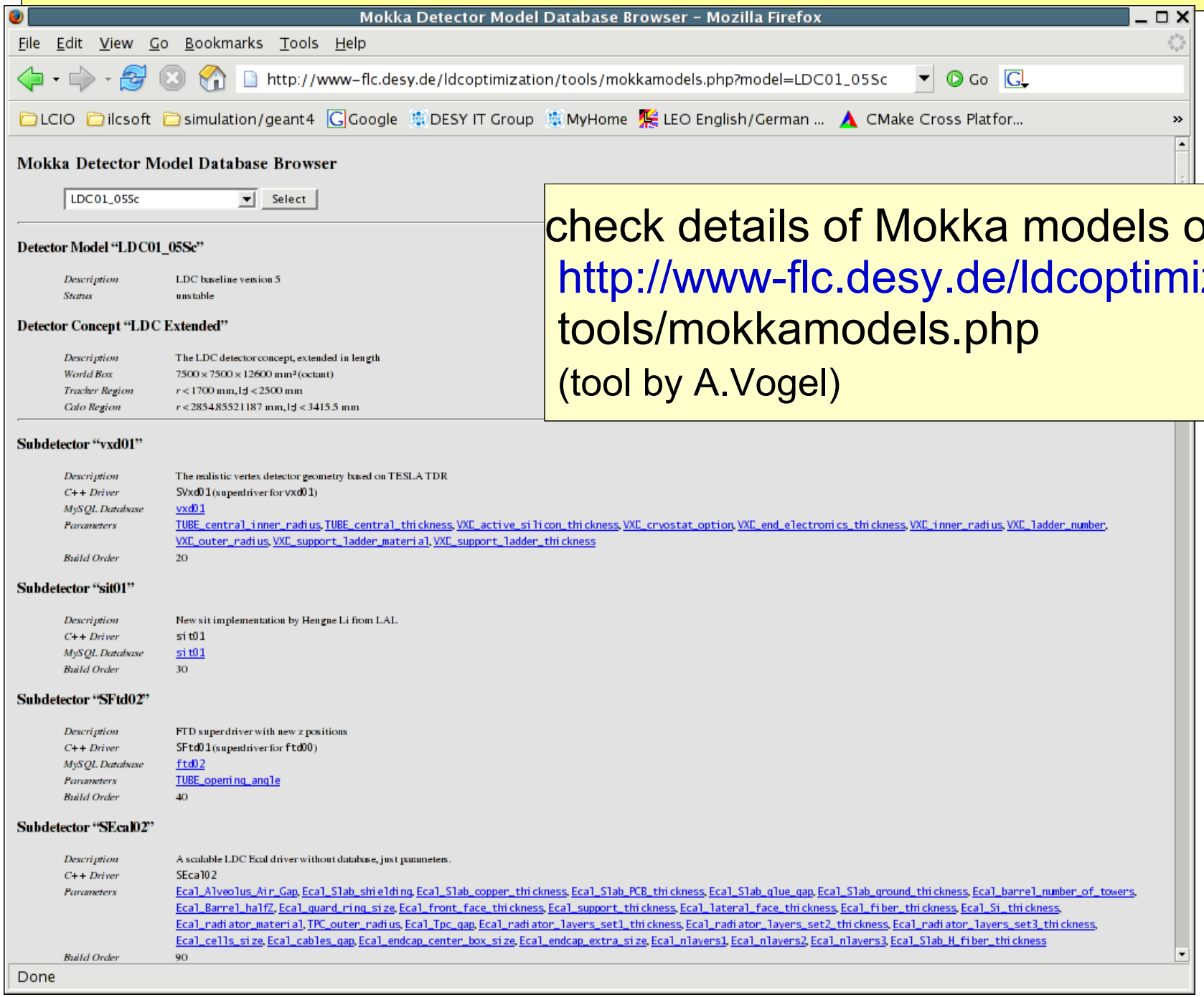


LDC01_05Sc (Paulo M.d.Freitas)

- 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 !

Mokka model browser



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

gear - MokkaGear

- Mokka writes out the gear file with geometry needed for reconstruction in Marlin
- updated MokkaGear to provide current and consistent Gear files (K.Harder, C.Lynch)
  - write out parameters needed in MarlinReco et al
    - including “user defined parameters”
  - fixed typos and inconsistencies
  - removed various Bfield parameters and switched to global <Bfield> tag
  - -> part of latest Mokka release
- MarlinReco is updated accordingly
- -> when running the latest Mokka version you get a “ready to use” gear file

status core tools

- ilcinstall script to install all of LDC software
  - recently extended to include Mokka w/ geant4 installed (and tbeam software except Calice)
  - reference installations – software releases (v01-01) at
    - /afs/desy.de/group/it/ilcsoft/v01-01
  - used for nightly builds (check recent user code)
- all tools switched to new build tool: Cmake
  - easy configuration, shared libs, plugins,....
- LCIO
  - experimental code for direct access to events
    - (create file directory on open())
    - to be released as v01-08-05
  - working on more elaborated I/O format

Marlin - Event Overlay

- new Marlin package Overlay v00-01 (N.Chiapolini)
  - requires Marlin v00-09-09 and LCIO v01-08-04
  - new interface ModifyEvent / modifyEvent(LCEvent* evt){}
- provides LCIO event overlay for simulated data:
  - SimCalorimeterHits
  - SimTrackerHits
  - MCParticle
- overlay additional LCIO background files:
  - fixed # bg-events / main event
  - # bg events from poison distribution
  - one run of bg-events per main event
- optionally merge events by collection (to be released)
  - different event streams
  - needs LCIO direct access

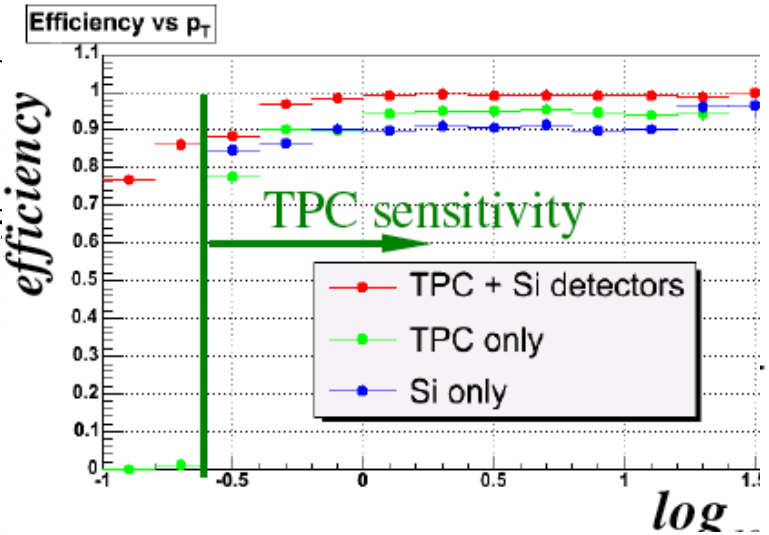
MarlinReco - Tracking

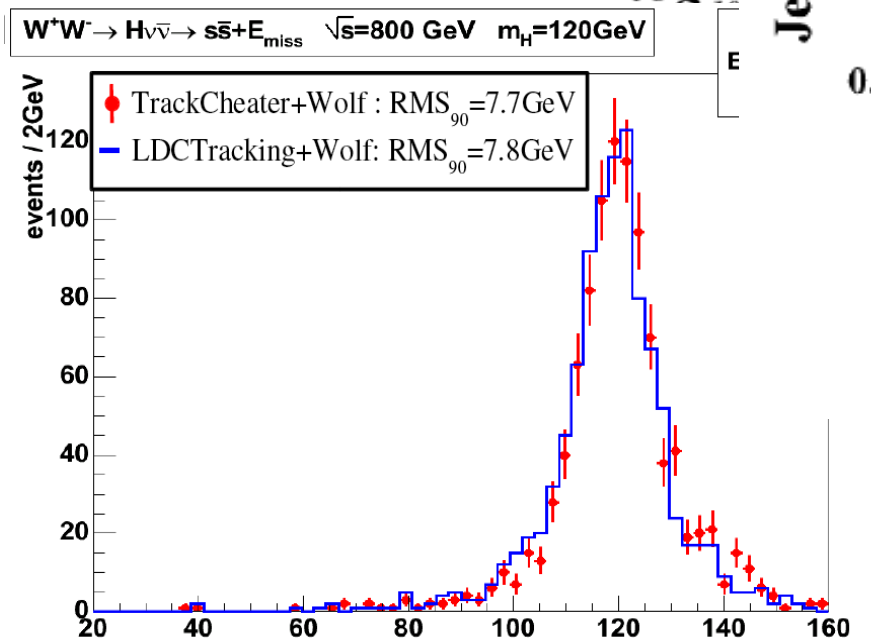
- FullLDCTracking improved recently (A.Raspereza)
- combine standalone silicon tracks with TPC tracks
- various fit options
- (optionally) detailed Silicon digitization
- coherent use of global B-Field (gear)
- bug fixes
- detailed documentation
  - in API doc & users manual for tracking

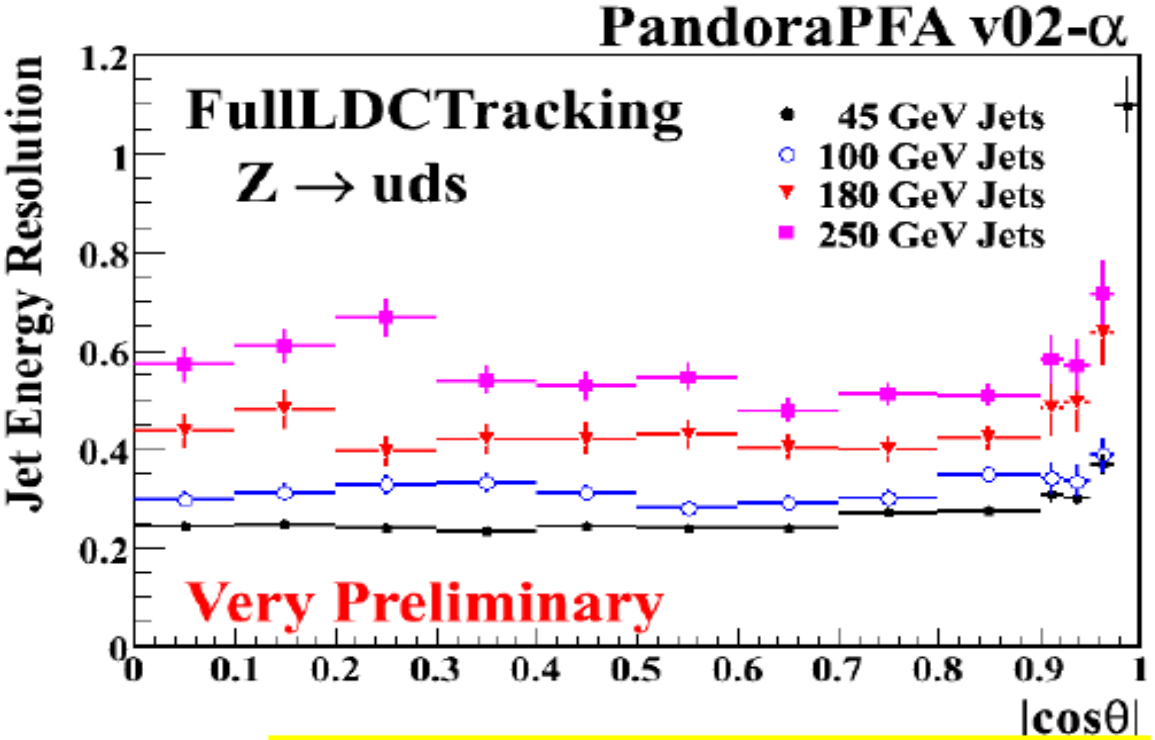
- new MarlinReco to be released soon

MarlinReco - FullLDCTracking

A.Raspereza (MPI)







25%/sqrt(E) at 45 GeV at the moment including full LDC tracking!

- can now **use real tracking code** and PFA for detector optimization !
- included in next release of PandoraPFA

MarlinReco – kinematic fits

- new subpackage MarlinKinfit (J.List, B.List)
  - C++ package for kinematic fits
    - based on Opal algorithms/code
- provides constraints such as
  - sum of p_x = 0
  - sum E = sqrt(s)
  - inv_mass of two jet pairs equal
- includes example processor WW5Cfit
  - px,py,pz,E, equal pair mass
- details from API documentation
- status: in MarlinReco cvs HEAD
  - available with next MarlinReco release

grid Monte Carlo production

- DESY detector optimization group now looking into 'mass production' of LDC Monte Carlo
  - make 500 fb-1 of SM generator 4-vector data files available on the grid (1.4 TB, produced at SLAC)
    - (delayed through technical problems with EU-grid middleware at SLAC)
  - debuged and tested job submission and data catalogue
  - discussion of physics benchmarks for detector optimization started
    - see (http://www-flc.desy.de/ldcoptimization/physics.php)
- input from ILD community is welcome
- working on grid software installation (J.Engels)
  - will provide LDC software (binaries, libraries/plugins) on all grid nodes supporting the VO 'ilc'

Summary/Outlook

- Mokka LDCv05 geometry description available
- fixes and improvements in core tools
  - gear files, build and installation scripts, event overlay
- MarlinReco
  - improved full tracking and kinematic fitting
- Monte Carlo grid production started/planned
- Outlook:
  - need new software release soon v01-02
  - include all packages ?
    - Pandora v02-00, LCFIVertex,...
  - need testing and debugging before we start with LOI 'mass production' -> all groups/experts !