

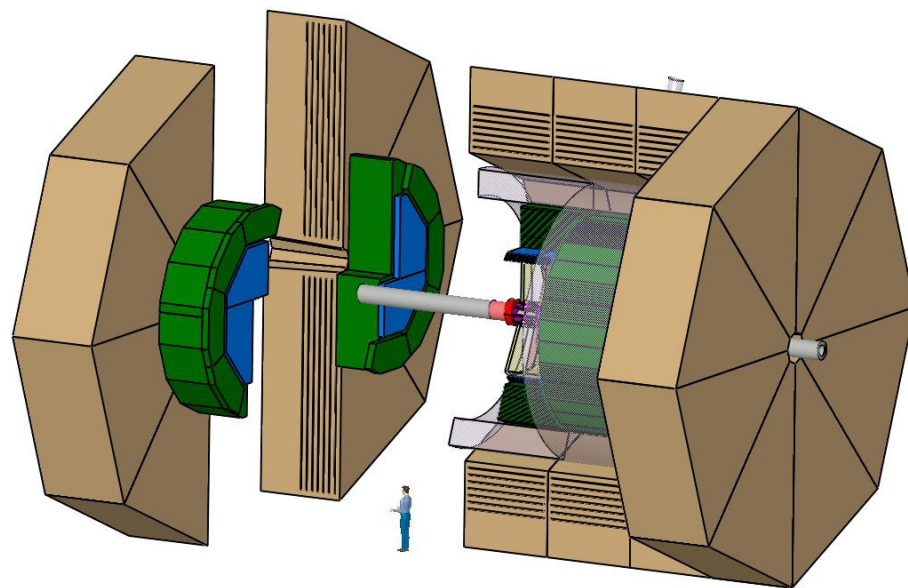
The GLD concept - status of simulation and software

Frank Gaede
DESY

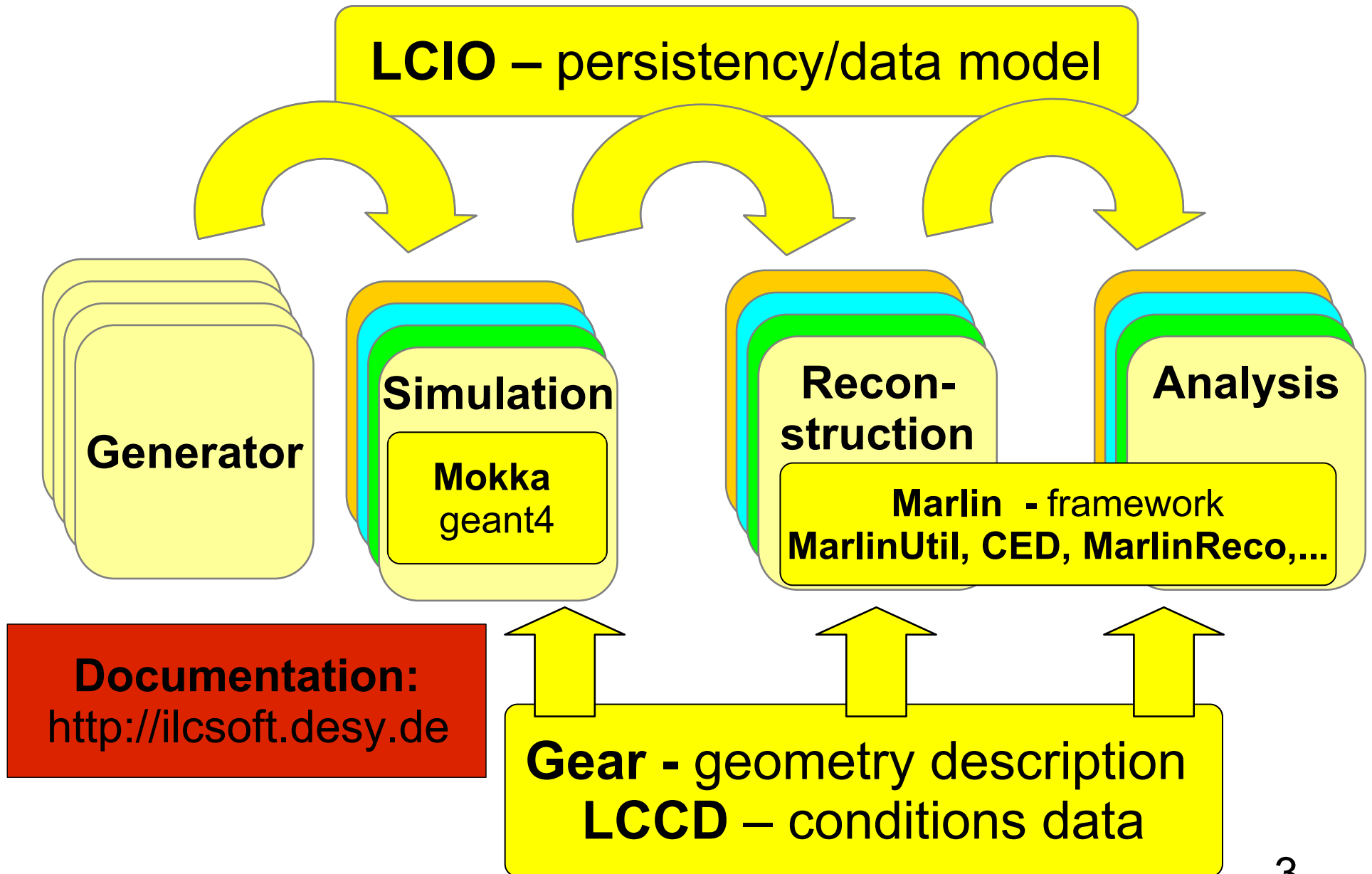
ILD Detector Optimization WG
Phone Meeting, October 31, 2007

Outline

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

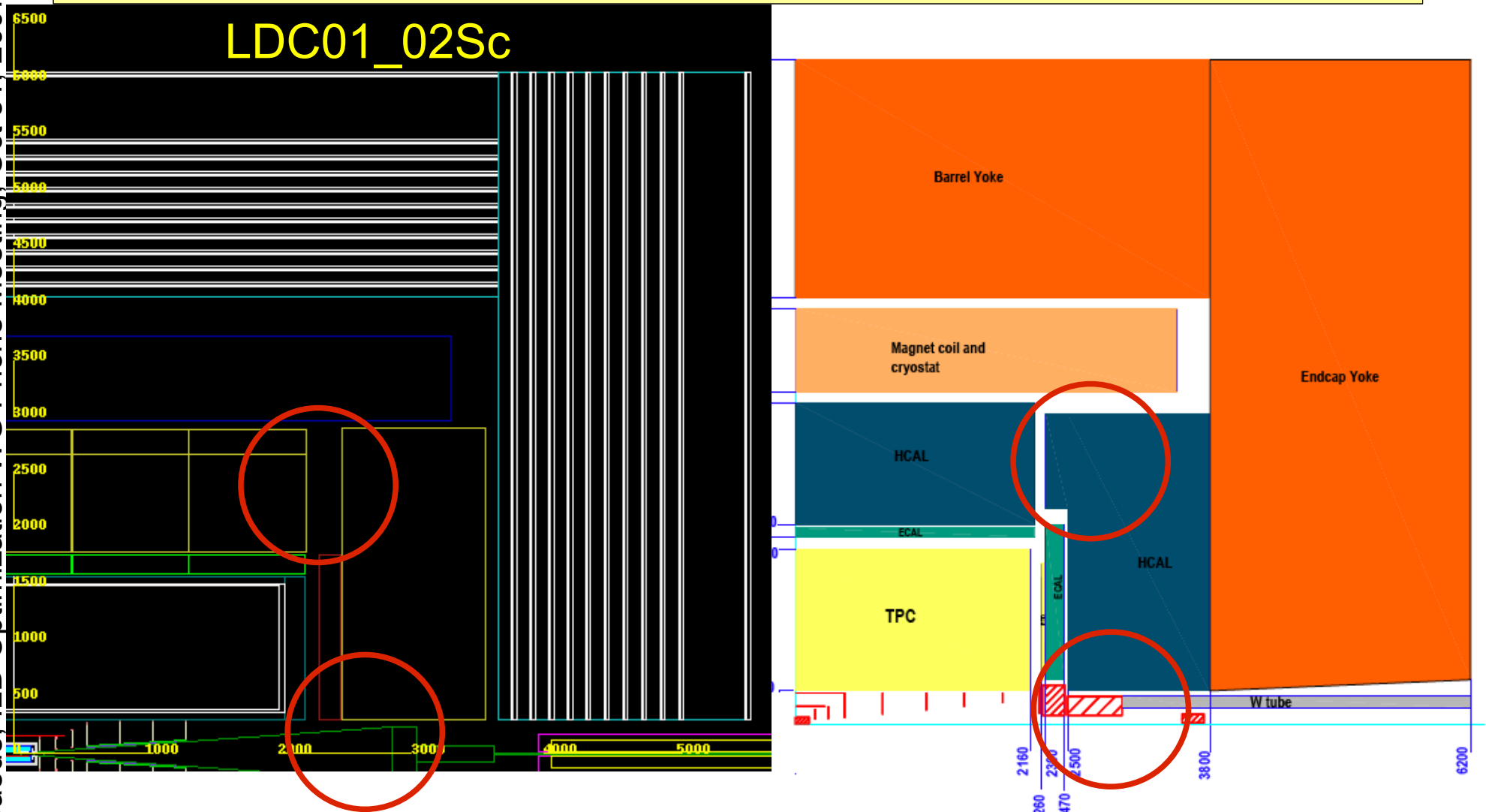


LDC SW-framework



(old) LDC description in Mokka

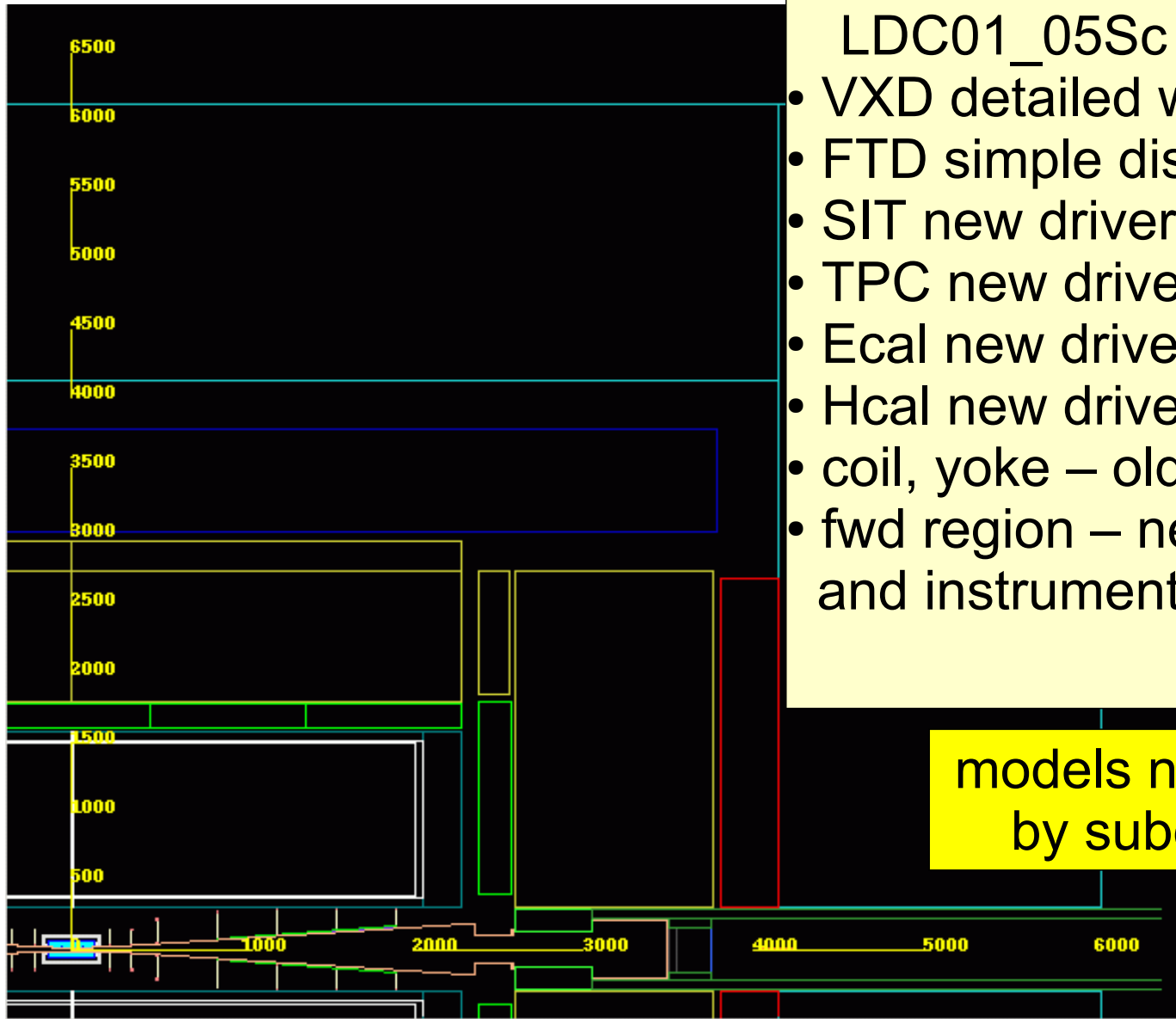
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- **detailed description of LDC (DOD) exists in Mokka**
- some caveats: missing Hcal ring and forward region
- appropriate code exits – need to combine into new model
- **fixed right now for planned MonteCarlo production**

new LDC description in Mokka

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- 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

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

Mokka Detector Model Database Browser

LDC01_05Sc Select

Detector Model "LDC01_05Sc"

Description	LDC baseline version 5
Status	unstable

Detector Concept "LDC Extended"

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

Subdetector "vxd01"

Description	The realistic vertex detector geometry based on TESLA TDR
C++ Driver	SVxd01 (superdriver for vxd01)
MySQL Database	vxd01
Parameters	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
Build Order	20

Subdetector "sit01"

Description	New sit implementation by Hengne Li from LAL
C++ Driver	si t01
MySQL Database	si t01
Build Order	30

Subdetector "SFtd02"

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

Subdetector "SEca02"

Description	A scalable LDC Ecal driver without database, just parameters.
C++ Driver	SEca02
Parameters	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
Build Order	90

Done

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

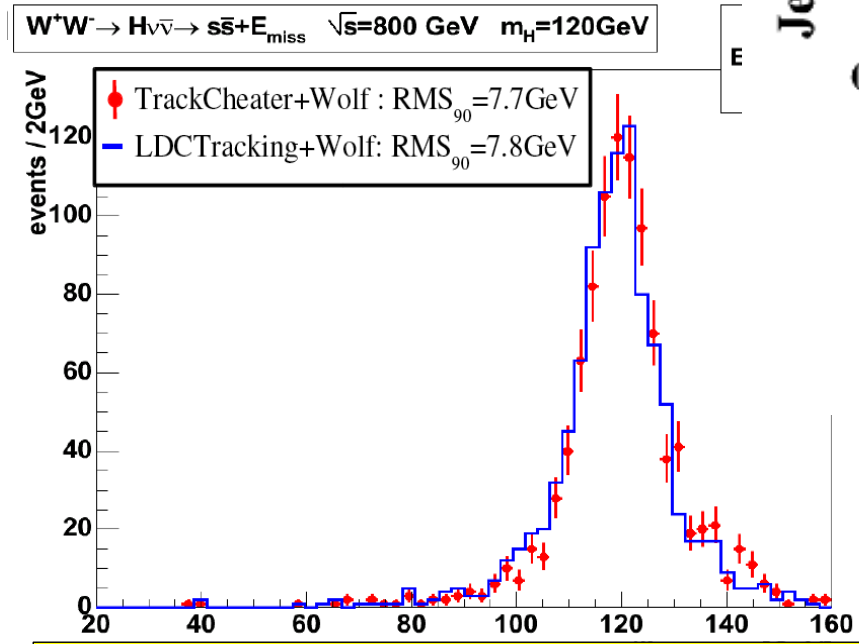
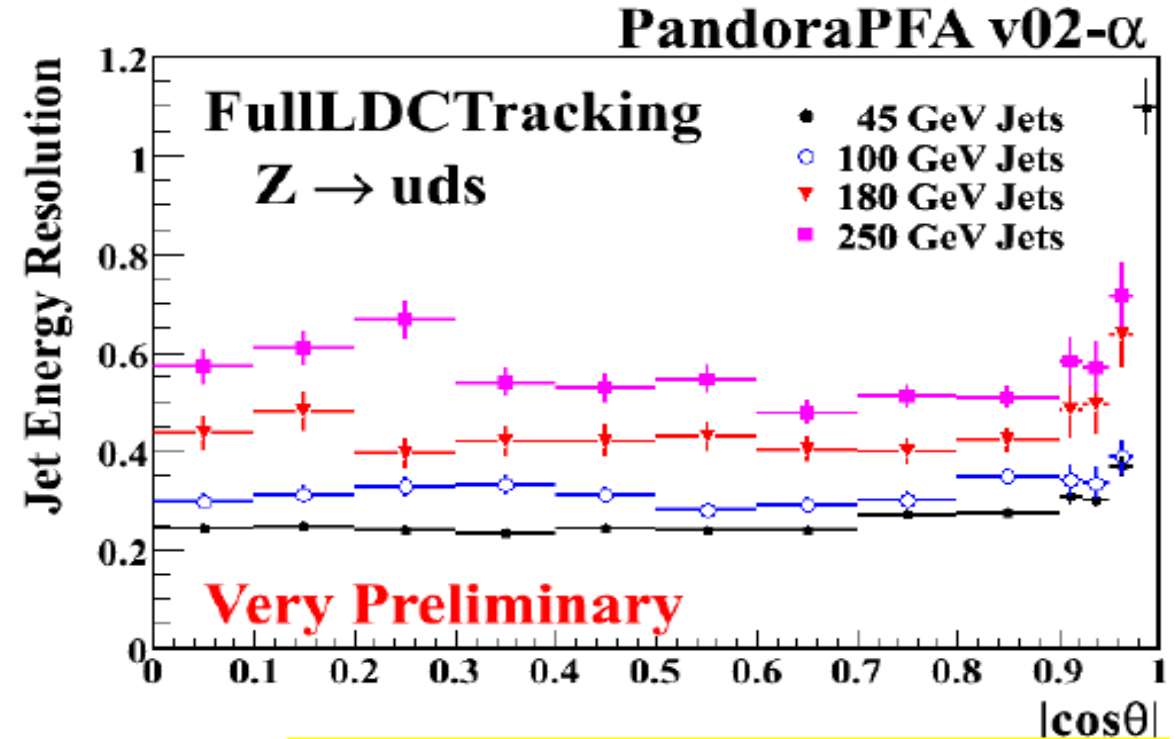
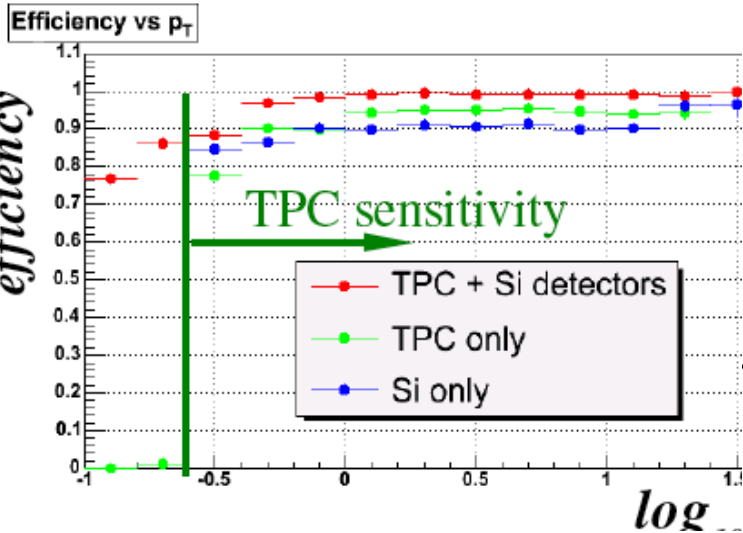
MarlinReco - Tracking

- 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)

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ALCPD

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 **MarlinKinf** (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**
 - p_x, p_y, p_z, 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)
- debugged 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 !