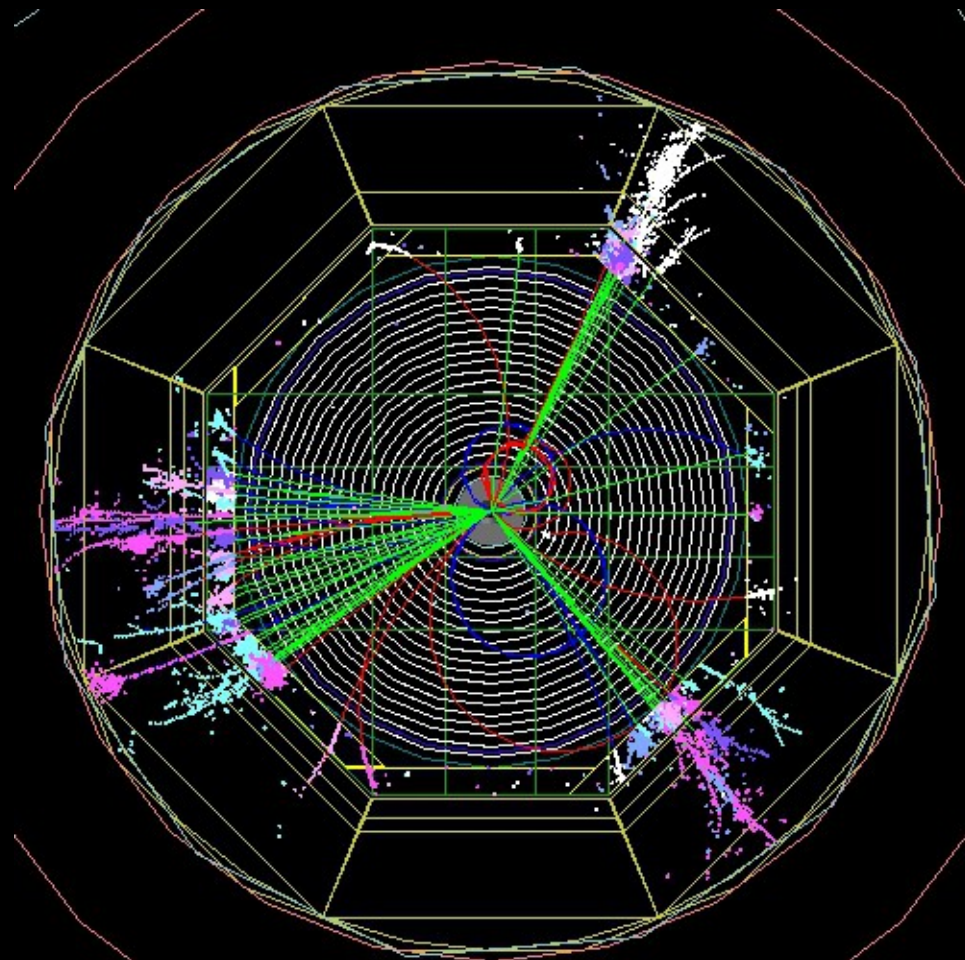


Mokka Status & plans



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L.L.R. – Ecole polytechnique

CLIC WS 2013

29/01/2013

Mokka

- Developed at LLR since 2009
 - P. Mora ($\leq 1/3/2011$, mokka-07-06-p01) & G. Musat
- based on large cooperation network (IRES, IPNL, LPNHE, **DESY**, RHUL, SLAC, CERN, NIU, Cambridge, ...)
- Became *the* parametric geometry tool on top of GEANT4 for all (LDC then) ILD models (ILC & CLIC)
 - Last updates: Add services to ILD, X-check of geometry (overlap) + corrections (boost, timing), improved Secondary trackings
<http://llrforge.in2p3.fr/svn/Mokka/tags/mokka-08-00-03/ReleaseNotes/>
 - and for most of the CALICE prototypes & TB setups
 - ~160 models in the DB now (\supset versions)
<http://polzope.in2p3.fr:8081/MOKKA/detector-models/models>
http://www-flc.desy.de/ldcoptimization/tools/mokkamodels.php?model=ILD_O2_v03

MySQL server ancillaries

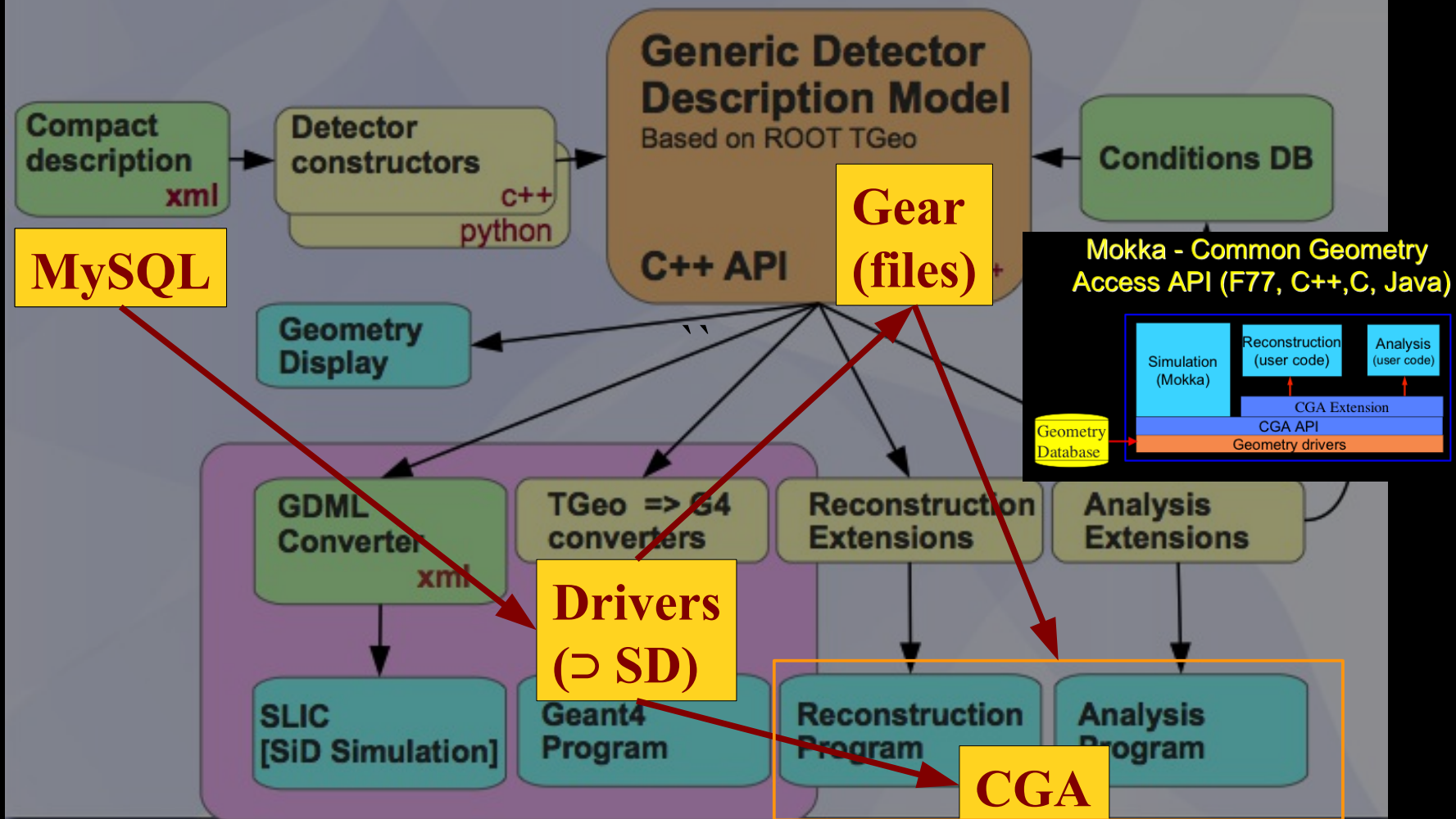
- pollin1.in2p3.fr – points to polui01.in2p3.fr
- Routine Tasks
 - New users (rarely)
 - Loading of new DBs or modification of new models03 (new models, modification of default parameters) – requires a backup dump (and a check of SQL scripts).
 - Regular backup (daily) of all DBs (mysqldump).

Status & Plans

- Decision of LLR to stop support of Mokka beyond the DBD studies (recentering on SiW ECAL studies support)
 - Expertise still there: G. Musat (→ CMS),
 - Emilia Becheva gain experience on ECAL mods
 - Still some developments to be included in trunk (track in calo, interaction types, ...)
- AIDA WP2 commitment: consulting + adaptation of Mokka to the new geometry package (*just started*)
- DB management for the ILD models to be taken care of by IPNL (*in discussion*) with event^{ly} *if needed*:
 - improvement of DB resilience (versioning, backups, ...)
 - Move of DB server to CC IN2P3 (central support)

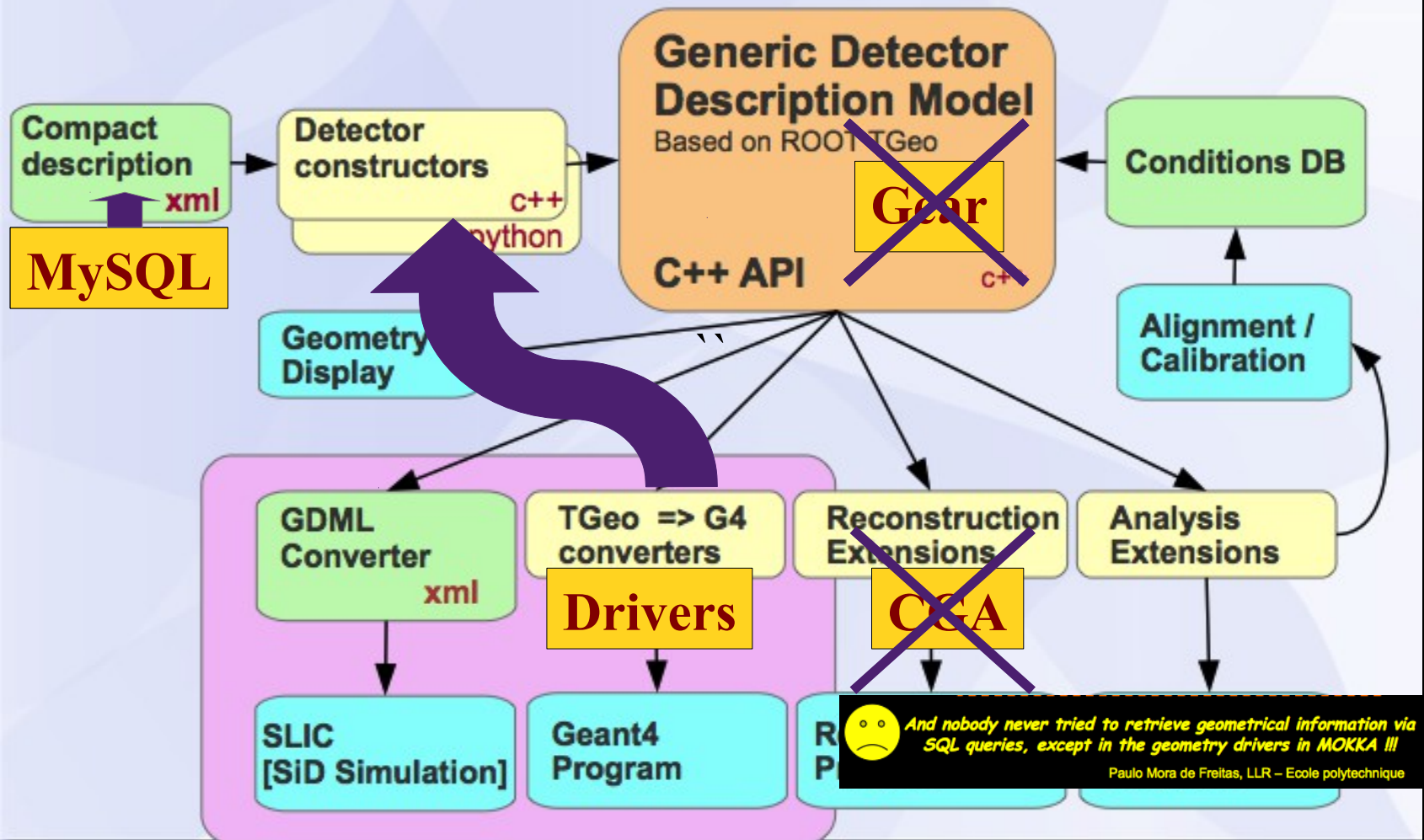
Mokka structure vs DD4Hep

DD4Hep - The Big Picture



Mokka to DD4Hep

DD4Hep - The Big Picture



«Adaptation to DD4Hep»

- DD4Hep has all the feature of Mokka
 - Model DB has to be adapted MySQL → xml + svn ?
 - *does XML files allows for hierarchical structure ?*
 - *who does it ?*
 - Drivers & SD → DD4Hep constructors :
 - Generic mods: .e.g. MySQLQ → Xml, Volumes def.
 - *Specific code (sub-det): generic mod possible ?*
 - *Who does the check (tests) ?*
- **but** for G4 specific
 - e.g. LCIO interface: storage of hits (cells or G4 hits, w or w/o MC information), MC particles.

Code organisation (in SVN)

trunk/	source/Geometry/CGA → 31 files	Source/Kernel/src/ → 34 files	
MarlinPackages	Calice → 15 files	include/	
MySQLMacros	EUTelescope → 1 file	G4LossTableManager.cc	
ReleaseNotes	LDC → 59 files	GNUmakefile	
Doc	MokkaGear → 4 files	Mokka.cc	
Examples	SiD → 2 files		
Java	SiLC/Model → 18 files		total 334 classes
Macros	SiLC/Mokka → 13 files		
source/Geometry	Tesla → 79 files		
Kernel	Tmag → 4 files		
Plugin	Tbeam → 73 files		
TrackingPhysicsList	Workshop → 2 files		
Test			
GNUmakefile			
Mokka.steer			
particle.tbl			

Adaptation to new geom:

- Model specific code → Geometry
 - will require generic change & test procedure (to be provided by users)
- Kernel code.

Summary – Historical channel...

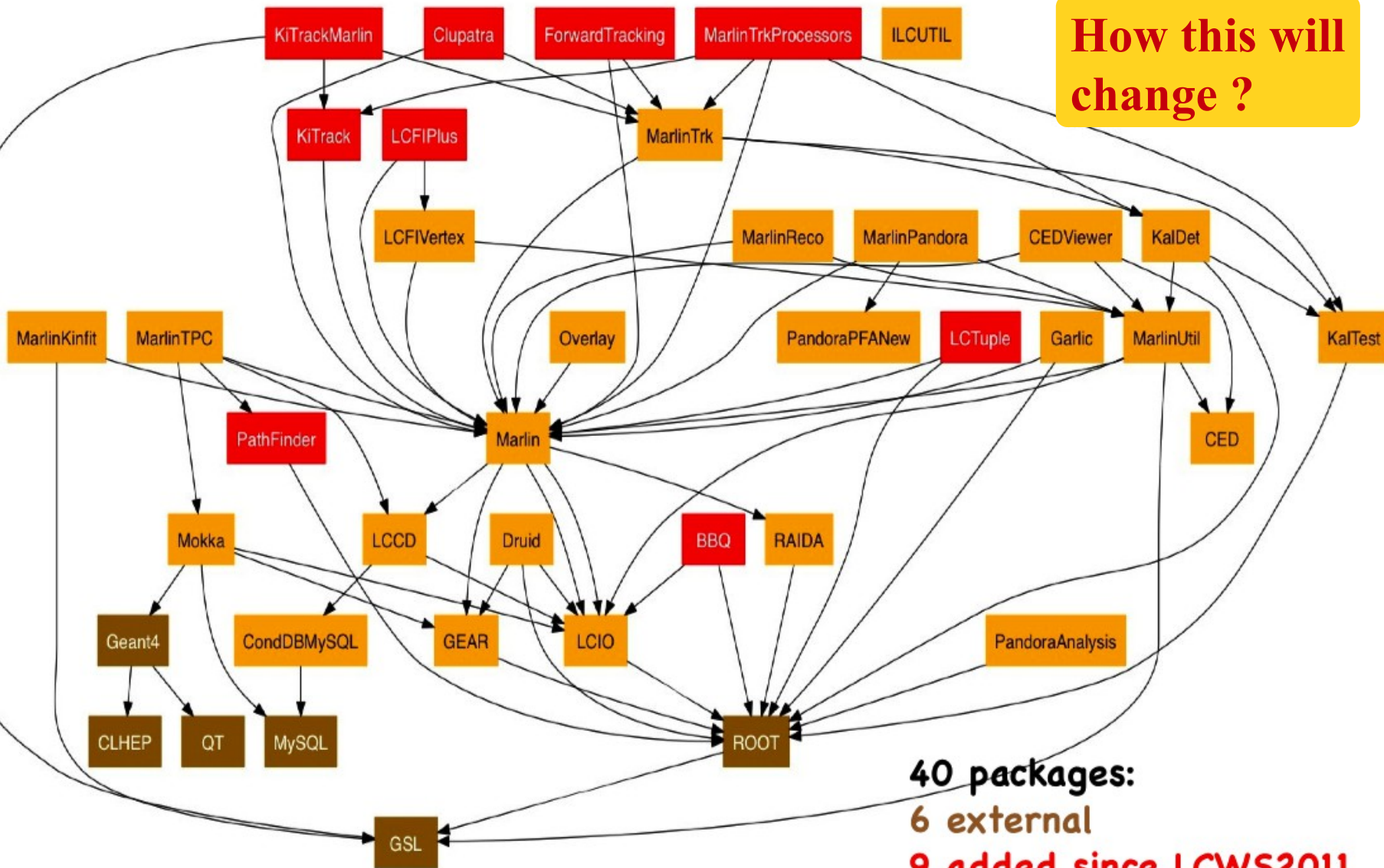
- Mokka has been very successful for ILD LoI, DBD, CLIC detectors and CALICE studies since 1999.
- Now at a turning point
 - Support from LLR is becoming scarce (~3-40% FTE)
 - Keep expertise and AIDA development
- DB upkeep and maintenance *might* be solved for ILD
 - Still needed for a couple of month (transition time to DD4HEP) *only* ?
- Overall responsibility chain and must be clarified, and probably better distributed to avoid interferences
 - Model Librarian & area of resp.
 - Documentation (web page & model DB) needs upkeep.

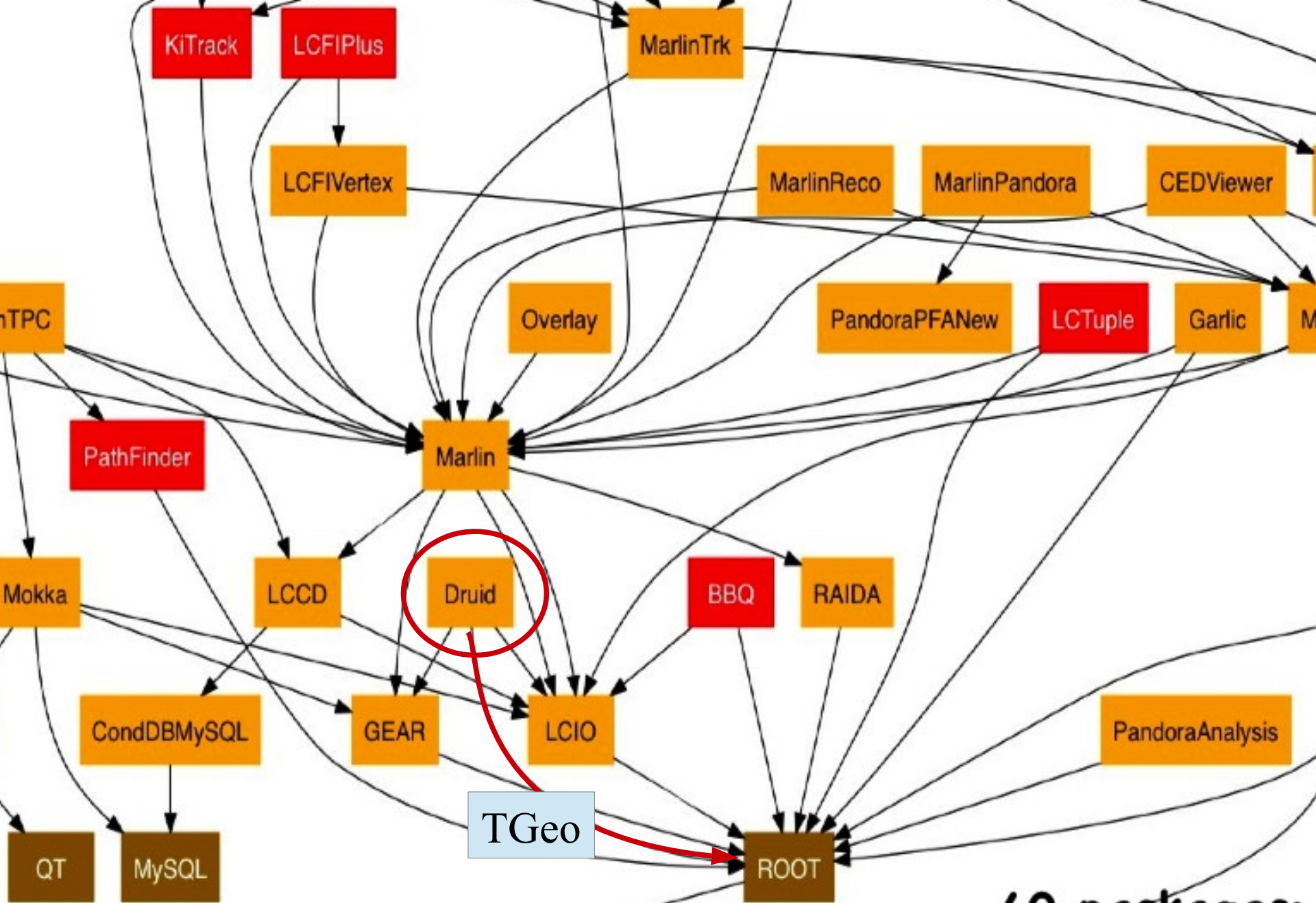
Summary – Mokka in/over DD4Hep

- Adaptation of Mokka → WP2 : LLR commitment.
- Work has started (*looking at code*)
 - Structure and example are there for «simple» objects (TPC, Tesla ≡ 1 driver) → composed ones. **Work has to be estimated → Agenda ?**
- Much work to convert all models: *Who does it ?*
 - How can we best help with limited manpower ?
 - Generic transforms (DB & construct ?): test bef. & after move
 - Require return from users of active models:
provide key distributions to be X-check (beyond geom).
- Overall responsibility chain and must be clarified, and probably better distributed to avoid interferences
 - Model Librarian & area of resp.

iLCSoft packages (release v01-16)

How this will change ?



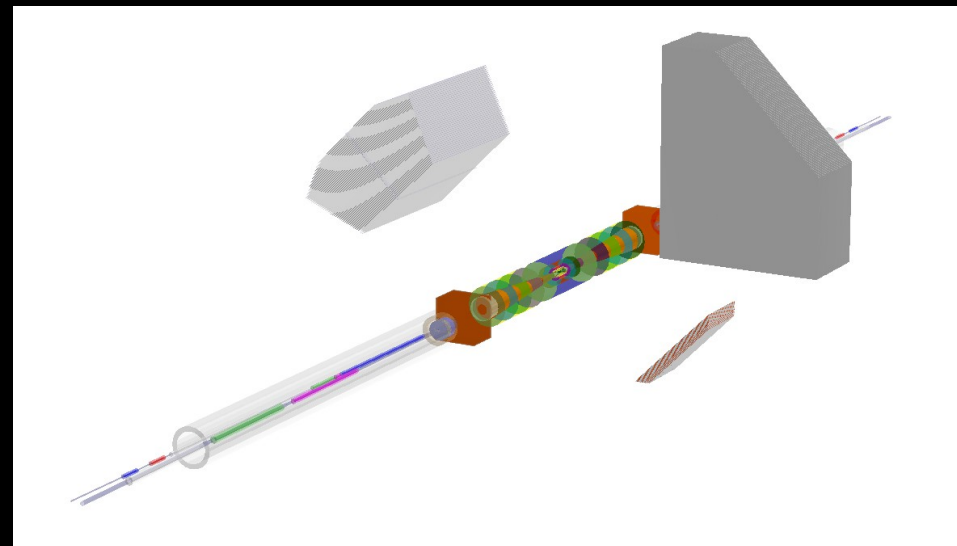
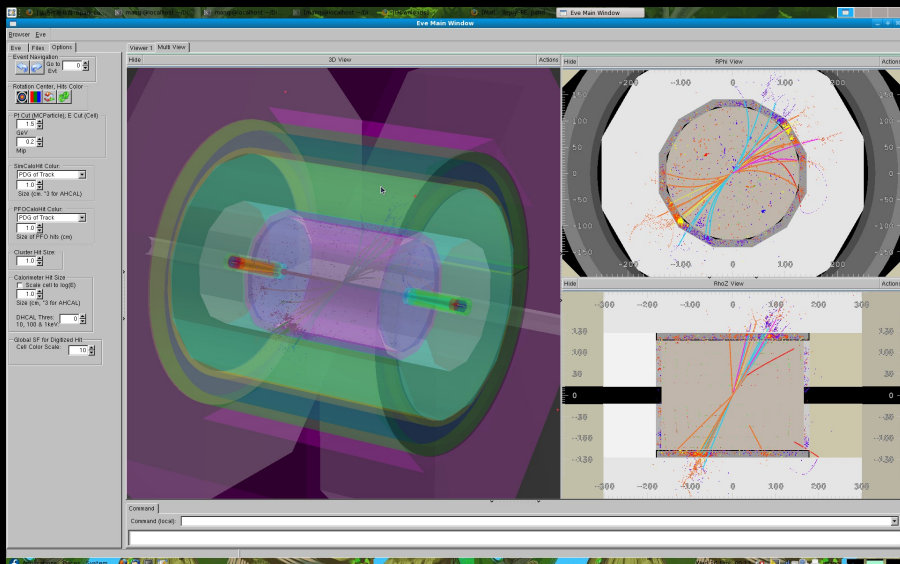


40 packages:
6 external

Druid Geometry & event display

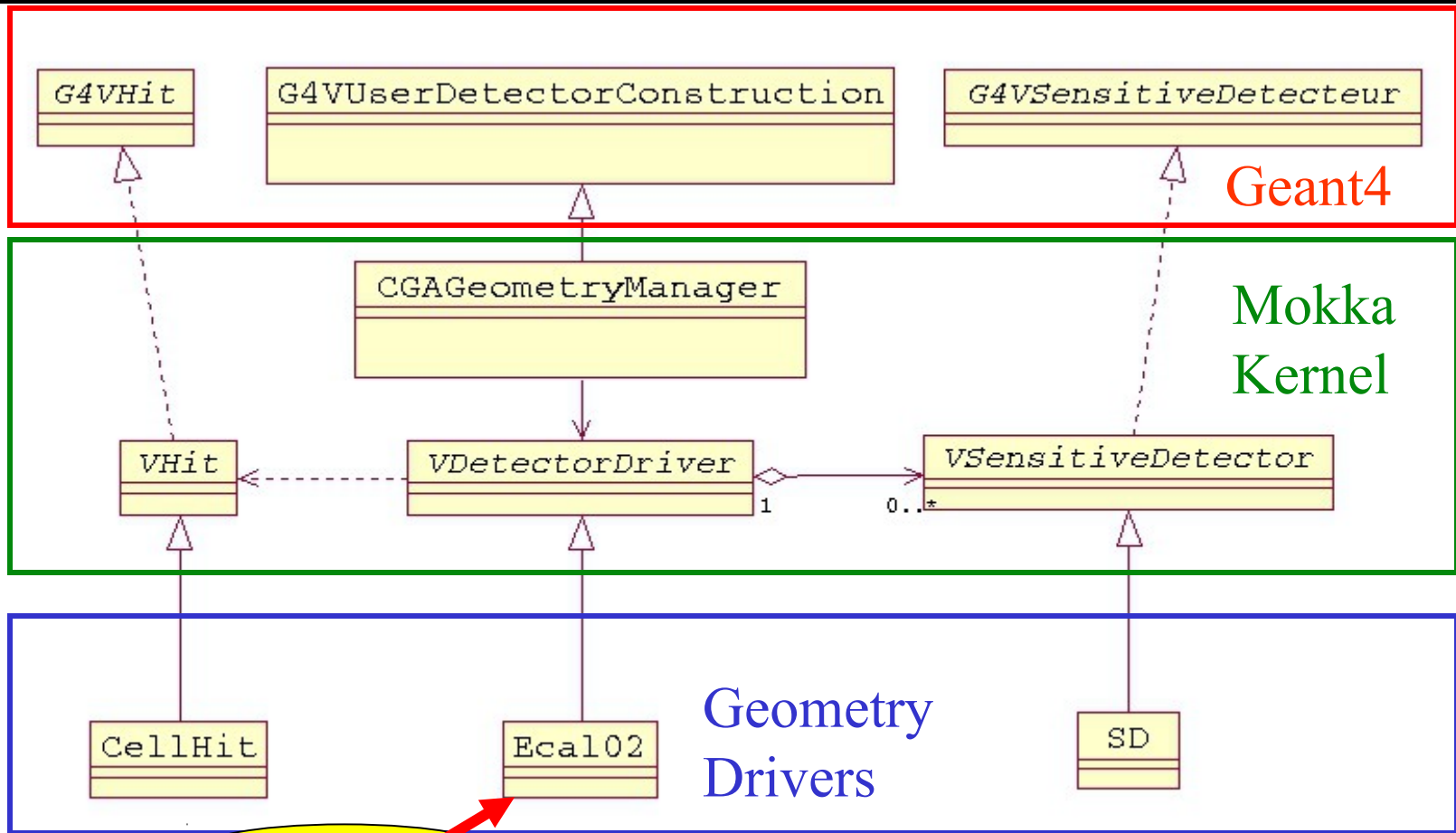
Also a contribution to WP2

- Reads Gear(w user code), Root (TGeo), GDML
 - LCIO for events
- Lot work in UI:
 - Hierarchical navigation in Geom, level of details, color, transparency, zooming etc.



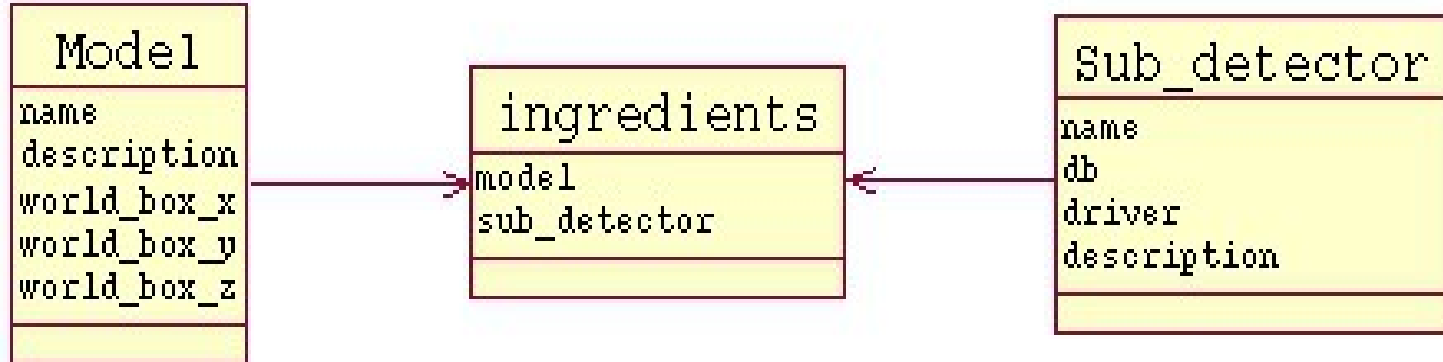
Back-up

Mokka's kernel framework



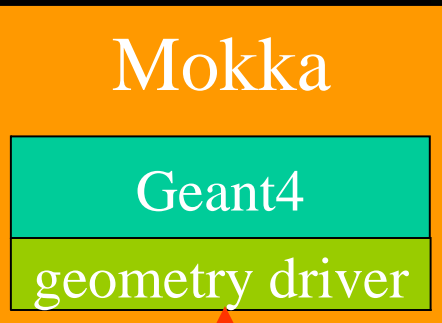
Geometry Database

The detector models in DB

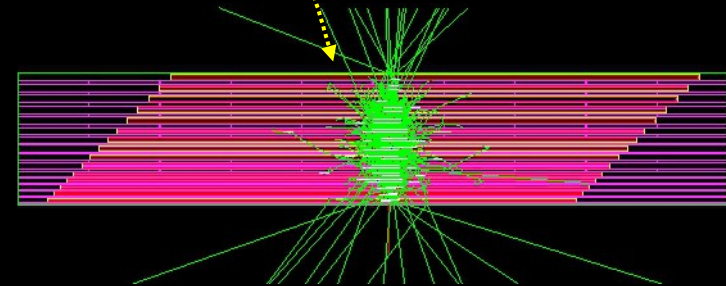
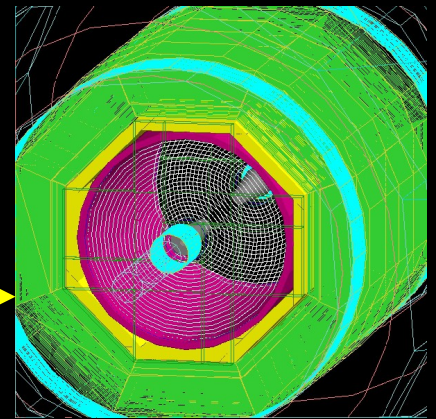
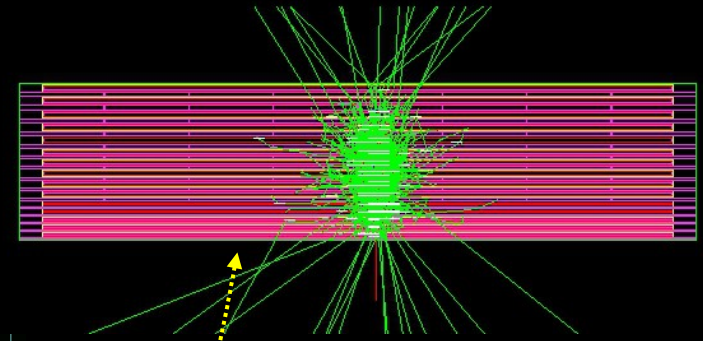
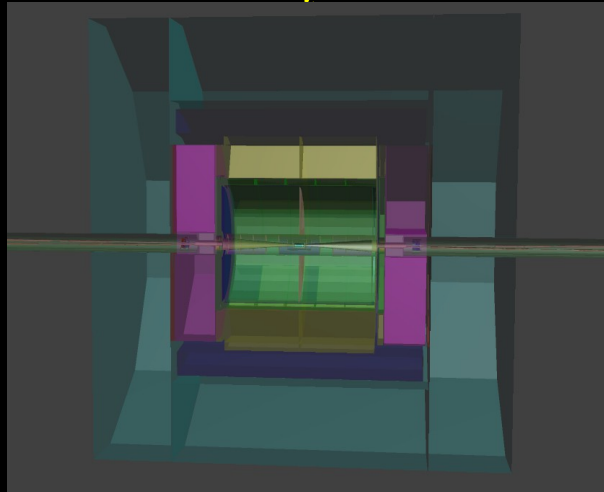
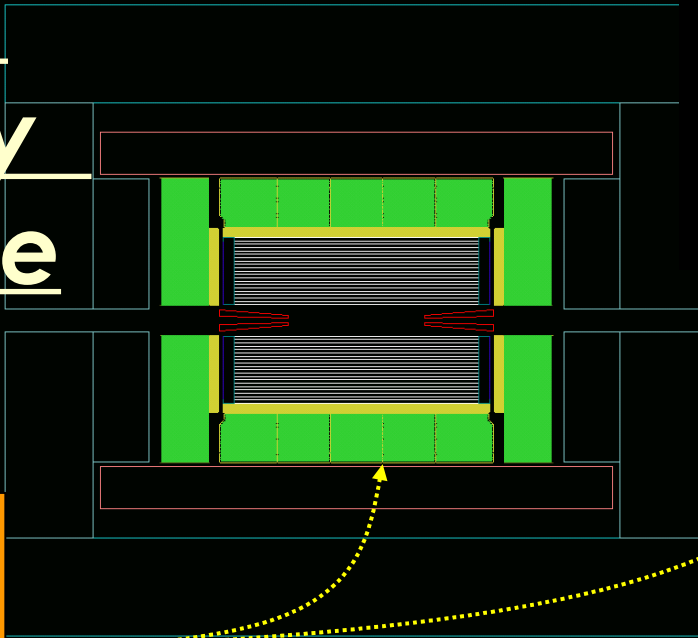


- ❑ A model = a set of sub detectors (TPC, Ecal, Hcal, etc.)
- ❑ A sub detector = a driver ↔ DB association

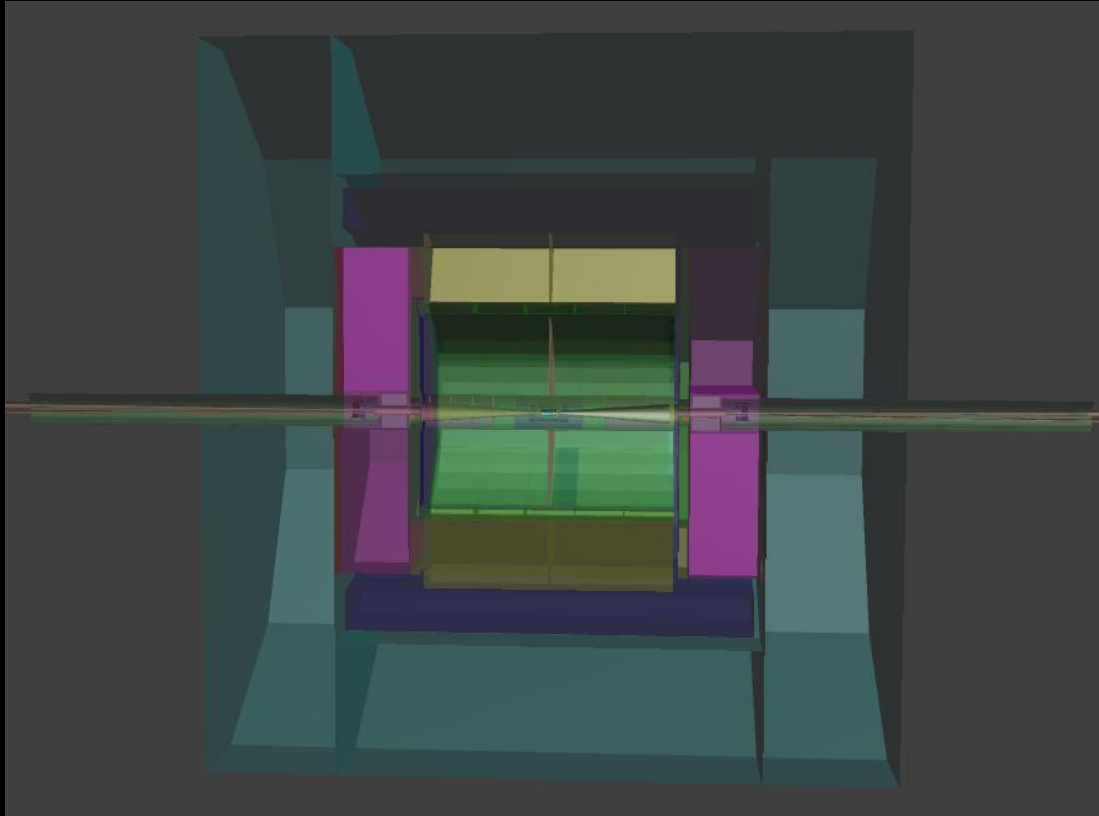
MOKKA, Geometry database



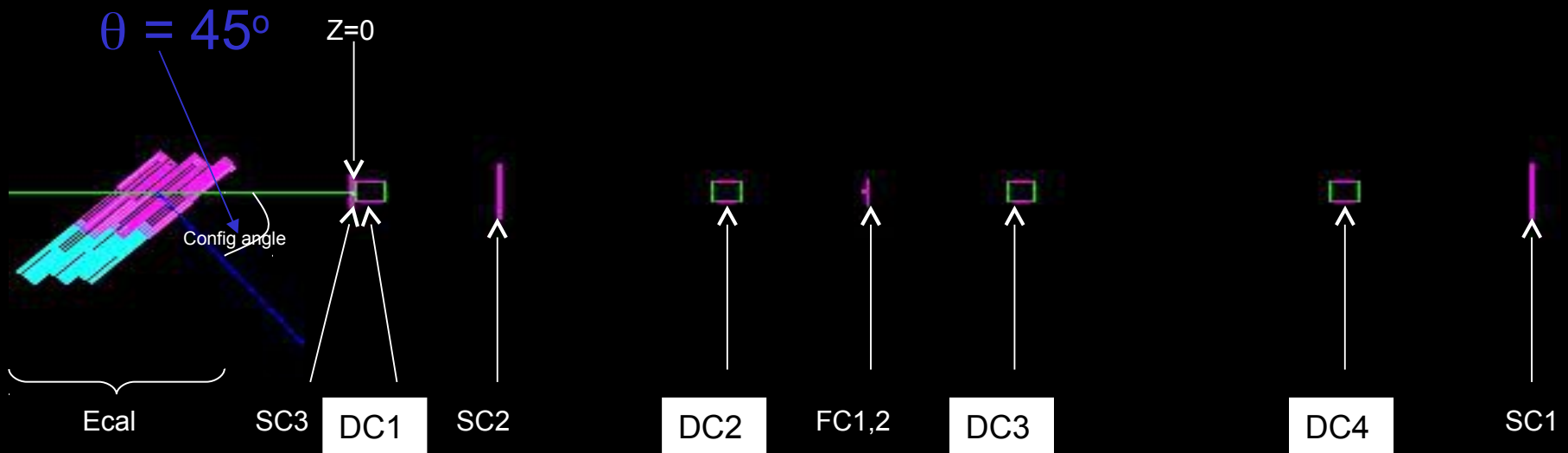
Geometry
Data base



ILD_00 Model



TB DESY 2006 Model



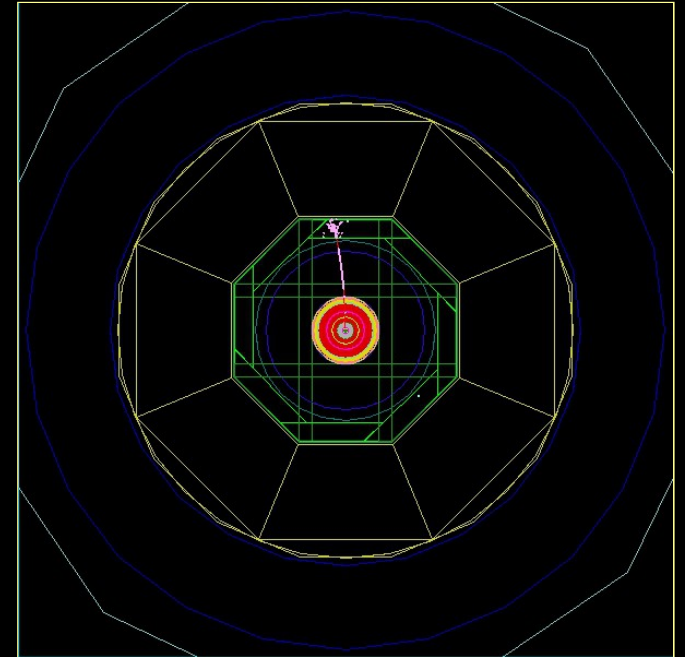
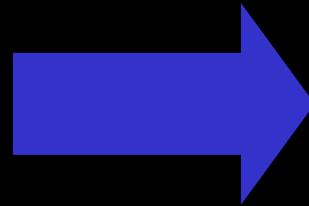
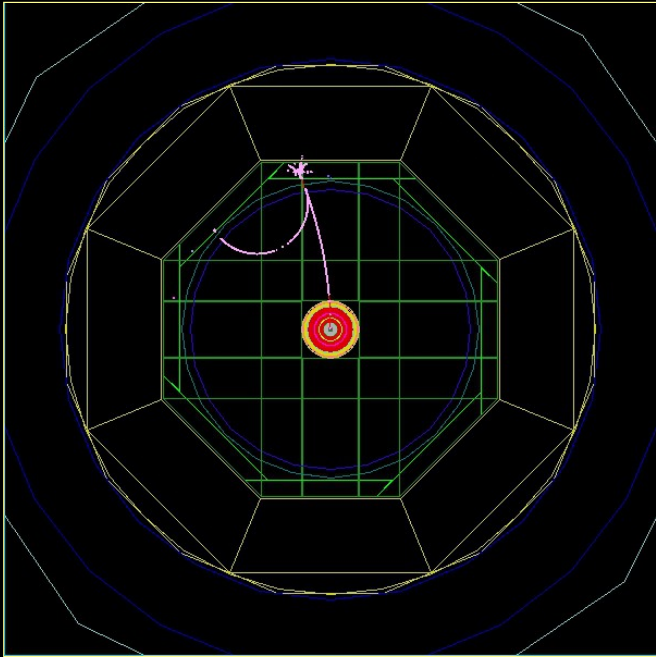
Mokka, other geometry features

- “Scaling”, the user is able to modify the model's main parameters at launch time
 - To easily be able to study different detector options, like TPC size, number of layers in calorimeters, etc.
- “Cooking”, the user is able to modify the model ingredients at launch time
 - To easily be able to study different detector technologies, like analogical versus Digital HCAL, etc.

Scaling

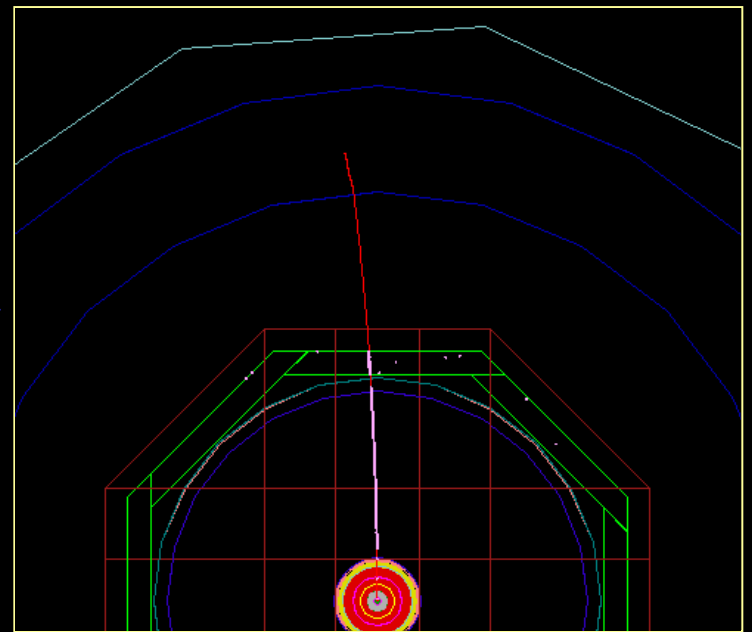
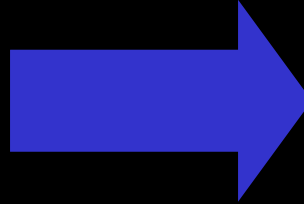
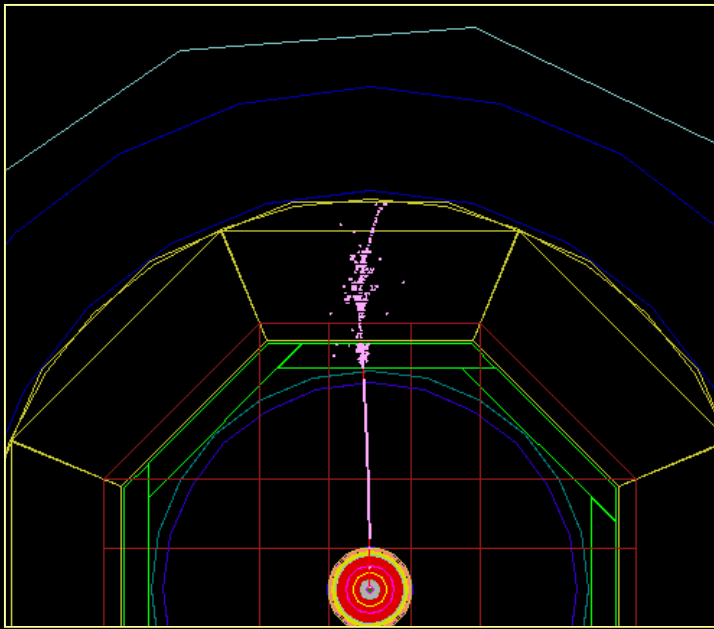
- Example :

`/Mokka/init/globalModelParameter TPC_outer_radius 800`

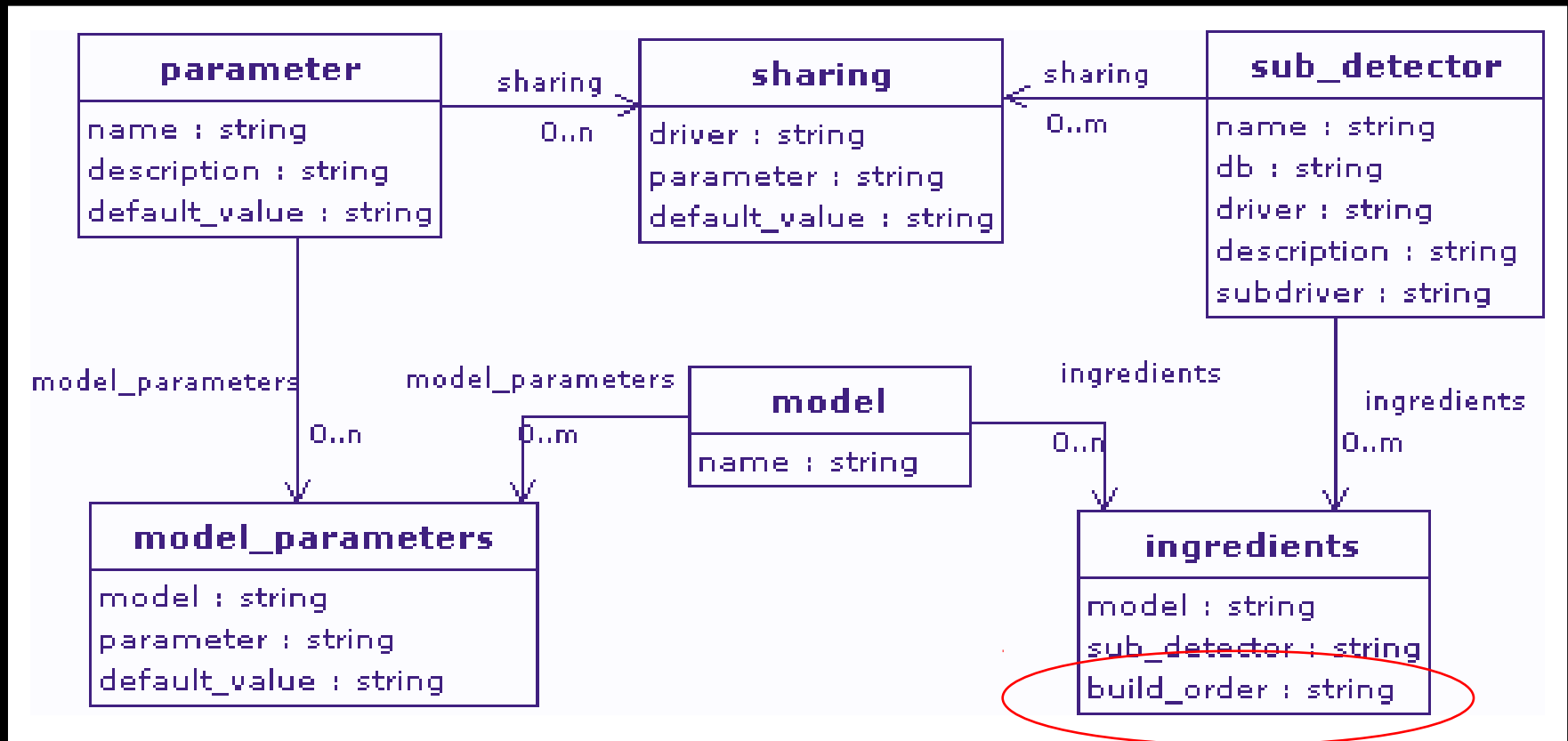


Cooking

- Example :
/Mokka/init/EditGeometry/rmSubDetector SHcal01



Parameters in Mokka DB



- ❑ Parameter values are overwritten by the sub_detector default, then the model_parameter default, then steering file value if any, and finally by the environment value if modified at run time by a previous driver.
- ❑ Scaling follow the model build_order in ingredients