

# LC-Software Meeting

## - Follow Up -

FG, NG, AM, JS, et al  
ECFA 2013  
DESY, May 30, 2013

# DD4Hep open issues

- drivers

- =>MF: should have example with simple strings for parsing xml **DONE**

- placements - rotations/translations

- -> need to follow geant4 convention
- =>MF: include CLHEP matrices, rotations and translations and only allow these **DONE**
  - NB: only TGeoMatrices are returned

- extensions **OPEN**

- -> need to document requirements (copy c'table, ...)

- agreement that the candidate for the interface for the detector description is LCDD **DONE**

- =>MF: implement missing bits to write complete LCDD

# SLIC - status and plans

- LCDD (gdml extension) interface to geant4
- no user code for geometry description
- B-field map  $B_{x,y,z}(x,y,z)$
- GNU autotools -> move to cmake possible
- current detector types (sensitive detectors) are somewhat simplified
- plan to add more sophisticated sensitive detectors
- -> can users do this in a simple way ?
- -> can there be a plugin-mechanism ?

Open

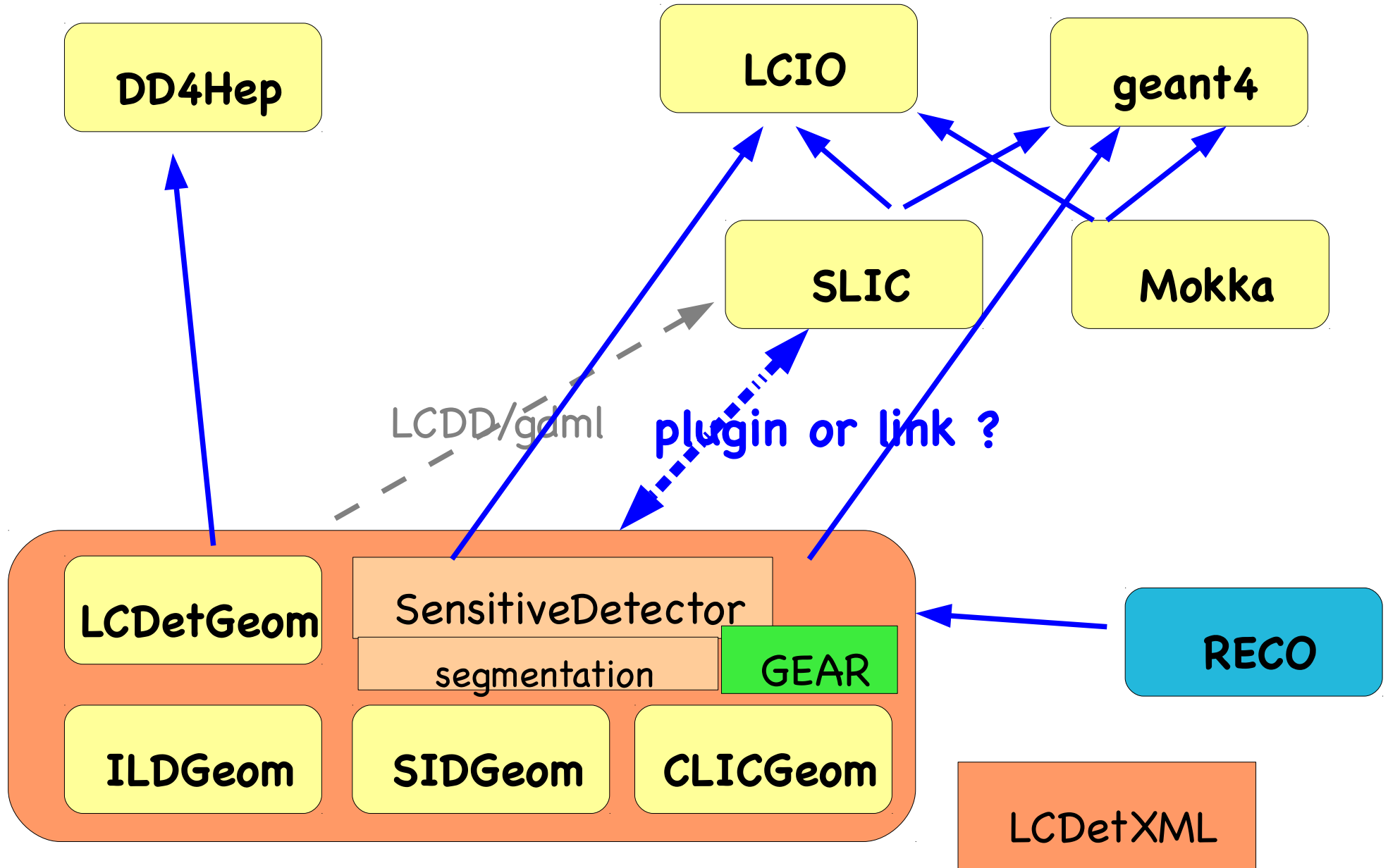
# Mokka status and plans

- converting Mokka DB & drivers to DD4Hep
  - could use “same” hierarchical structure in xml files in a svn repository
  - would need to convert all currently used Mokka drivers
  - -> who does it ?  
the sub-detector experts ?
- could start in first step with replacing DB by xml files
  - =>LLR will do this for existing ILD\_o1(2,3)\_v05 models plus what is used by calice (et al)

Ongoing

# Package structure

To be discussed today...



# moving towards DD4Hep

- general agreement to move towards DD4Hep for defining the detector geometry
- useful to have Design Review as soon as we have most demonstrator prototypes available
- agreement to have single package "LCDetGeom" (need name) and a separate package with xml files "LCDetXML" (name?)
- =>ILD/CLIC: have to re-implement the ILD-like detector models in DD4Hep with the full engineering level of detail
  - need to find several experts ...

Open

- =>SID: move/copy current models to DD4Hep (straight forward)

Open

# Interfacing DD4Hep to Geant4/SLIC

- Question: where should the sensitive detector classes live and how are they included in SLIC/Geant4
- could live in LCDetGeom and then:
  - be linked in by SLIC - direct dependency
  - included via a plugin mechanism - ship library
- could live in SLIC
  - would have to provide complete set of sensitive detectors
- =>FG,NG need to check feasibility of both options by looking at existing drivers

Ongoing

# Tracking requirements for DD4Hep

- need navigation:
  - which volume am I going to hit next
  - give me material between two point
- idea: have two(three) different geometries:
  - simulation - full detail
  - reconstruction - averaged/simplified + "parallel" navigation cylinders....
- =>CR,FG need to set up prototype to understand, how this can be done

Ongoing



# PandoraPFA

- library restructured in SVN - algorithms split up into
  - FineGranularityContent
  - LArContent
- for iLCSoft standard with cmake:
  - PandoraPFANew
  - FineGranularityContent
  - PandoraMonitoring (optional)
- no open issues identified

# LCFI

- LCFI+ used successfully in DBD (SiD&ILD)
- Currently being addressed:
  - effect of beam-related backgrounds
  - vertex charge construction
  - vertex finder kernel (speed vs. performance)
- Plans, ideas, nice-to-have's:
  - ensuring tracks have proper covariant vertices
  - use of track hit information: refit vertex
  - =>TT check if this can be also done w/o the hits by using the TrackState @FirstHit
  - use of cluster information: particle ID ?
  - =>TT provide example how external jet finder can be used with LCFI+ flavor tag

Open

# Common generator tools

- for DBD used
  - Whizard for  $2 \rightarrow n$ ,  $n=2-6$
  - Physim for  $t\bar{t}H$
  - Guineapig for pair bg
- full 8-fermion final state generator would be desirable
  - (ME calculation in Whizard 2.0 but no generation )
  - => Generator Comm Task group should resume regular meetings
- would like to move to Whizard 2
- IO: stdhep -> LCIO
  - =>NG,FG check status of LCIO output in Whizard

Done: ongoing

# Concurrency Forum

- parallel simulation
  - geant4-MT (next release)
  - Geant Vector Prototype (project)
- heterogenous computing
  - GPUs for trigger and track seeding
- memory and parallelism
  - memory compression, identifying duplicate pages, transactions
- concurrent frameworks:
  - SuperB FW (static) , CMSSW (toy), GaudiHive (toy)
- GaudiHive
  - parallelism on:
    - event level
    - algorithms level
    - allow sub-algorithm (TBB)
- prototype reconstruction planned for LHCb

# Parallelism for LC software

- no immediate need (just did CDR, DBD Monte Carlo production)
- however should observe the development and participate
  - =>FG want to try to parallelize Marlin
- GPUs ?
  - probably no need (best for trigger - ILC is untriggered )
  - maybe track seeding in ILD VTX (pair bg)
- NG has given talk at CHEP about parallelization in Java

# ILCDirac

- proposal to provide production service for event generation with whizard based on process definition
  - =>SP will integrate Whizard 2 with ILCDirac
- can ILD switch to use ILCDirac ?
  - need to move/copy ILD data catalogue to Dirac ?
  - =>SP: check gridprod DB model how to export/import catal.
  - =>FG: check the meta data that is needed for ILD
- need to be able to control resource usage
  - =>SP: provide proposal for configuration of resource usage by ILC group (CLIC, ILD, SID)

# ILC VO

- handling of ILC-VO membership requests is often slow as people are unknown
- -> they should provide a statement with
  - Name, Institute, Working group, Supervisor,...
- to the ilc-vo-support mailing list
- =>FG text that requires users to send the corresponding email

Done

# Common Software Infrastructure

- documentation:
  - Doxygen, JavaDoc
- Wikis:
  - Confluence (SLAC), TWiki(CERN),...Calice,FLC,Pandora,...
- Tests:
  - Code tests: Coverity (CERN) static checker
  - Unit Tests: Junit, CTest
  - Integration Tests: (Jenkins), CDash (->AIDA CDash)
- Bug report:
  - forum.linearcollider.org
  - Jira @ SLAC
- =>All: need to update documentation and point (new) users to it

Ongoing



# Common Software Infrastructure

- Nightly builds and tests:
  - exist for iLCSoft and for org.lcsim
- common software releases
  - => aim for common releases/installations of iLCSoft for ILD and CLIC (requirement for ILCDirac)
- do we want to provide software tutorials ?
  - => check with LC community if there is demand

# Next steps

- have small expert meeting at ECFA Workshop (27.-31.05.2013) in Hamburg to follow up on to do items from this meeting
- also report on progress in software sessions of the ECFA Workshop
- additional software meeting in summer ?