Status of software and simulation
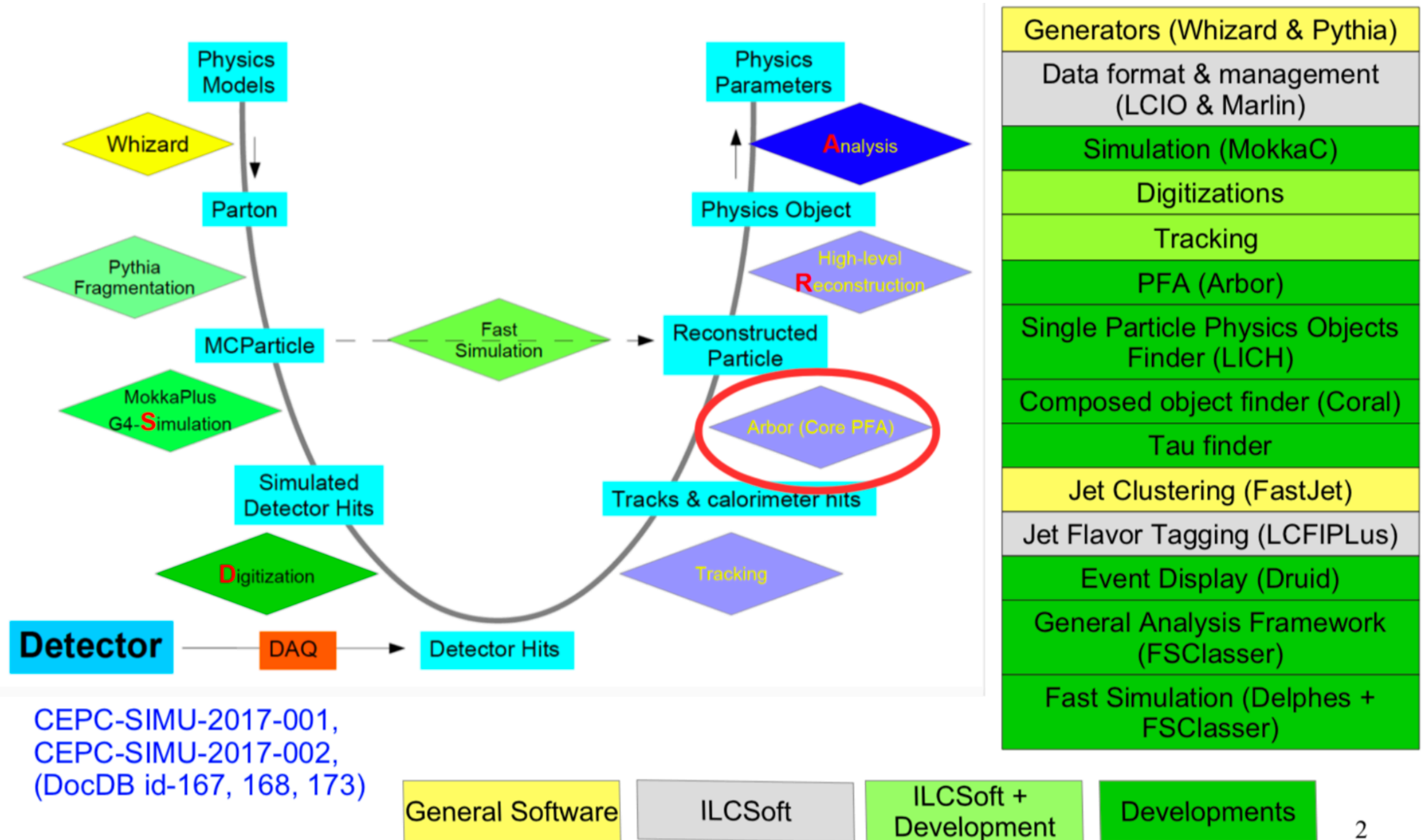
G. Li

Aug 14, 2019

outline

- New software framework

- DD4HEP— detector description

- Common tracking

- Fast simulation efforts

- Others

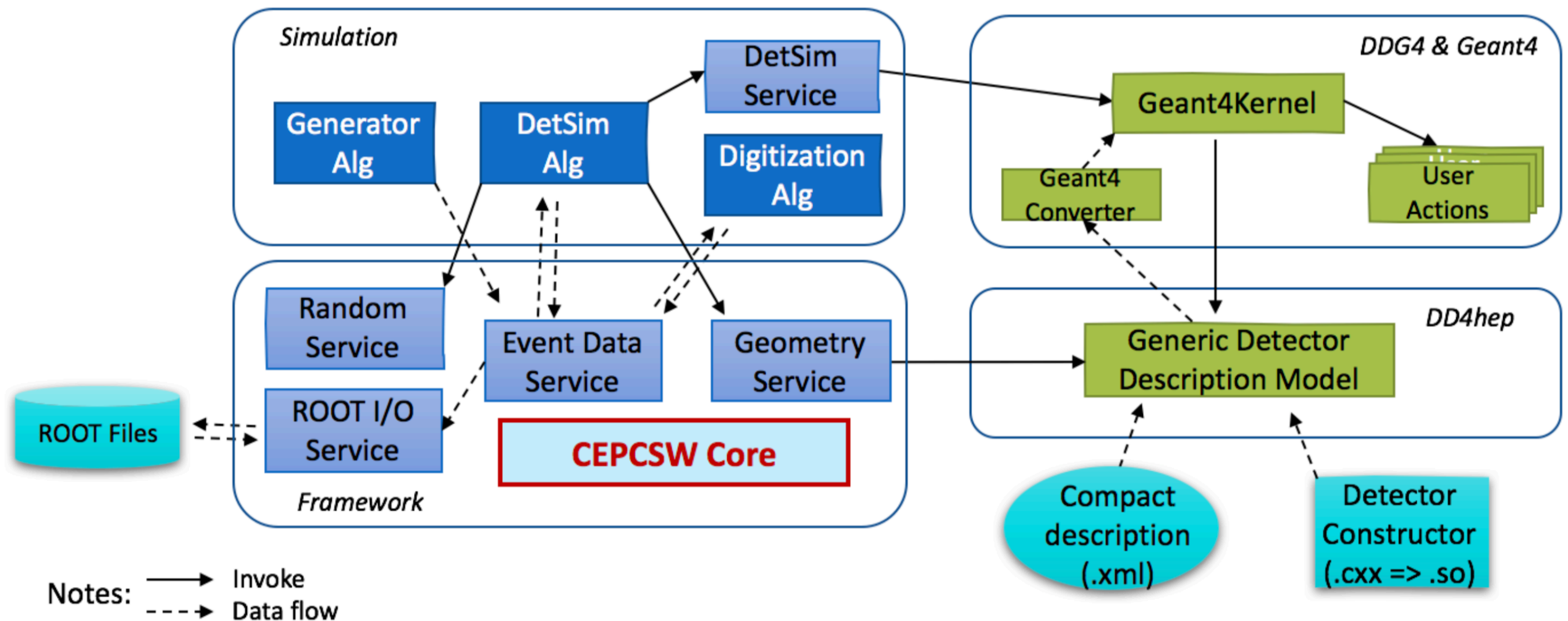   ☑ Implementation of new calorimetry

We did a lot with CEPCsoft

CEPC-SIMU-2017-001,
CEPC-SIMU-2017-002,
(DocDB id-167, 168, 173)

Pursue a more modern and powerful software for a real experiment !

A new framework
— lightweight and more flexible

Starts from SNiPPer or Gaudi?

New Framework Prototype Plan

◆ Investigate and design Kernel part of CEPC new Framework

⇨ Based one of current one or not?

◆ Develop ROOT-based Event Data Model & I/O

⇨ Similar interface as LCIO EDM.

◆ Develop Backward Compatible Input System

⇨ Read existing simulated samples during the migration.

◆ Develop Unified Geometry System for Sim/Rec/Ana

⇨ DD4hep

◆ Integrate and migrate the existing codes

⇨ Simulation/Reconstruction/Analysis algorithms

◆ Design integration interfaces with new technologies

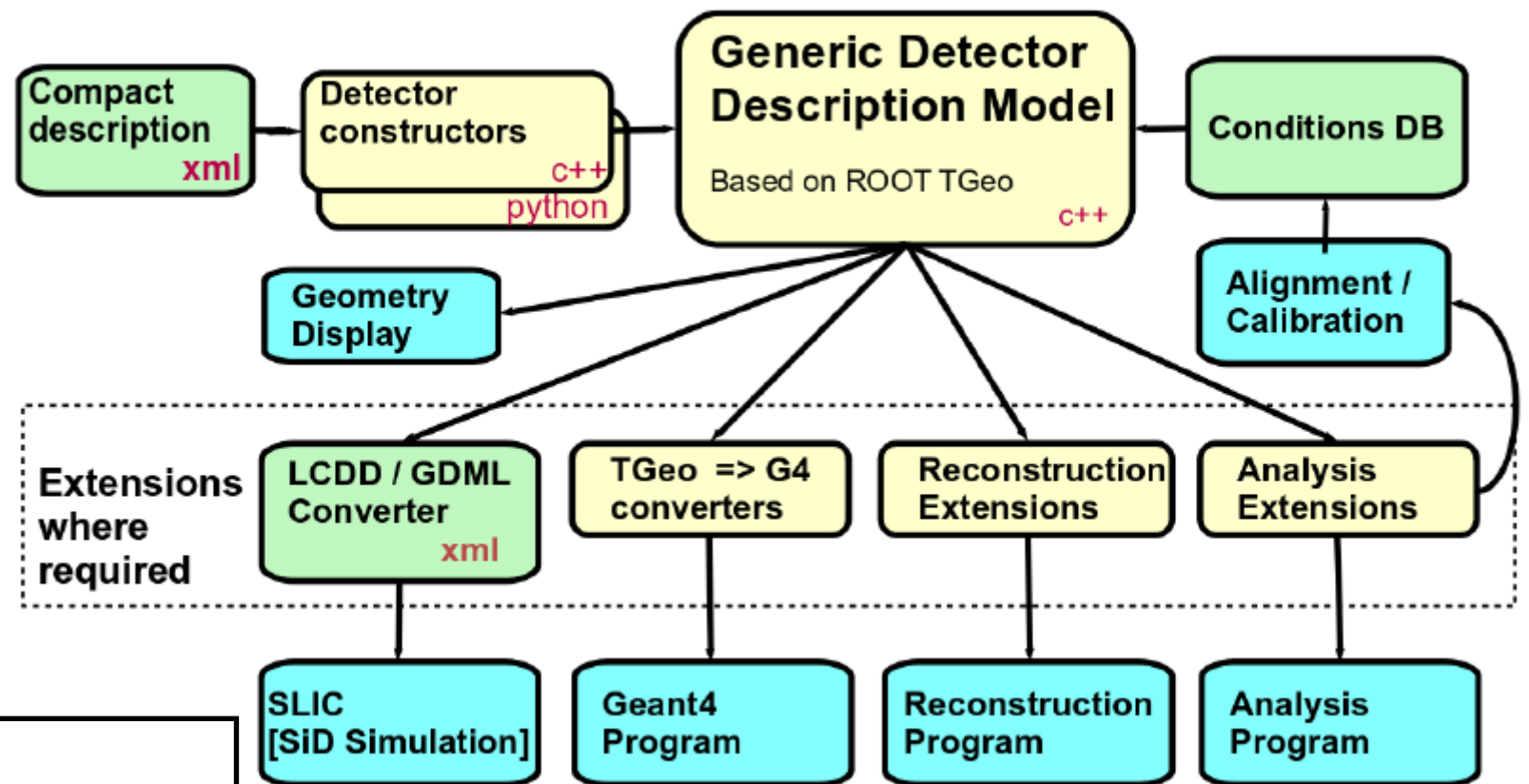◆ Conduct performance testing and give advices for the final CEPC framework

Workshop at Bologna

- A fruitful workshop

- Various frameworks

- Converge to a Turnkey Software Stack (Gaudi)

- Weidong is one of the facilitators

DD4HEP at CEPC
by Chengdong

- CEPC_v4 implemented

- A unique geometry description for sim/rec and analysis

Usage

- environment
  - source /cvmfs/cepc.ihep.ac.cn/software/cepcsoft/x86_64-sl6-gcc49/standby/DD4hep/01-09/env_all.sh
  - source /besfs/groups/higgs/users/fucd/lcgeo/bin/thislcgeo.sh

- run
  - ddsim steeringFile.py

A Common Tracking Software (Acts)

DD4HEP ready to use
full silicon design could be first option
TPC is next

1. Introduction
2. Repository structure
3. Releases
4. License and authors

Latest release: v0.1

17 Jul 2019

- Download
- Release Notes
- Documentation

ACTS CEPC

✓ CEPC Geometry

✓ Run Fatras

- Test the new material mapping method

- Run the Kalman Fitter Test

Working group: Jin Zhang, Yubo Han, Hongbo, Linghui, Liangliang, Ziyan, Shengseng, …

Hit level fast simulation tool

- Use fastras (fast tracker simulation:based on a simplified geometry description and particle-material interaction model)   +

- parameterized calorimeter or frozen showers (a shower library)

- Ziyan, Gang, … not really started yet

A few new calorimetry designs since March workshop

- Better EM resolution: cristal

- Timing, …

- Hang + Chunxiu, et al, woking on it …

Summary

- Many aspects : geometry, framework, EDM, fast simulation, common reconstruction package(s), etc

- Fast simulation is first priority: fast iteration, white paper …

- A usable new framework is the key now

- But lack of manpower： framework, fastsim, tracking, …