Common Geometry (LCGO)

Introduction talks

gear_overview.pdf

Workpackages

to get a list of work items that need to be addressed klick on the link above

Requirements

- Should be at least as functional as existing systems (org.lcsim, GEAR, Mokka, SLIC)
- Shoule enable smooth transition path from existing systems
- Should encourage interoperability between systems
- have no known principle short comings: "everything should be possible"

Implementation Ideas

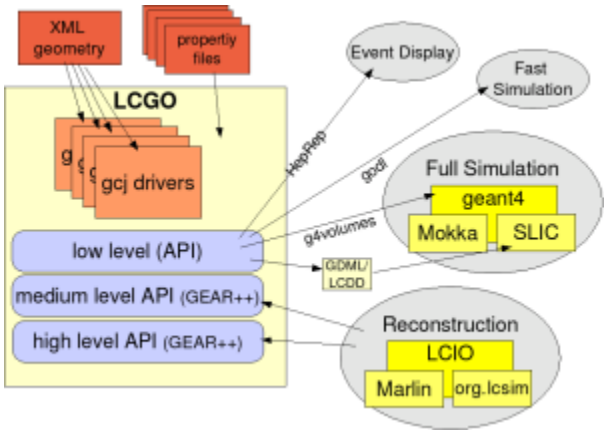
- Three levels of API?
  - Low level (equivalent to Geant4 geometry objects)
    - Initially dumb objects, sufficient to create Geant4 geometry
  - Medium level (similar to GEAR::Vertex::API)
  - High level (allows finding which detectors exist)
- have collection of driver classes
  - one subdetector level
  - gcj comliant Java (to be called from C++/Marlin)
  - read in 'free format' from parameters from xml elements
    - should probably be similar to compact/gear
- low level implemetation:
  - create "queue" of geometry instructions
    - logical volumes
    - physical volumes
    - placements
    - material
    - etc
  - have converters that go through queue of instructions and create
    - G4Detector
    - HepRep
    - GDML / LCDD
- medium and high level: GEAR interface(API)

points to cover

- GEAR++ interface deifinition (medium and high level)
  - tracking (and clustering PFA)
    - average material volumes
    - intersection with 'next' volume
    - dE/dx
    - field maps
  - volumes ?
  - local to global position
  - extensions of detectors (a la gear)
    - e.g. #layers, thickness, width,...

- material database
- field maps
- properties (sampling fractions)
- readout properties
  - cellId <-> position
  - cellid range (noise simulation)
  - cell sizes
  - neighbors
- Vector and Matrix classes (also LCIO)
  - ThreeVector, Point3D
  - Planes, cylinders, ... ?
  - FourVector
  - SymMatrix (covariances)

lcgo schema


XML geometry
property files
LCGO
gcj drivers
low level (API)
medium level API (GEAR++)
high level API (GEAR++)
HepRep
gdml
g4volumes
GDML/ LCDD
Event Display
Fast Simulation
Full Simulation
geant4
Mokka
SLIC
Reconstruction
LCIO
Marlin
org.lcsim