DD4Hep for Tracker Geometry Description

Usability for Fast Simulation & Reconstruction

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Required Tools

Surface Description

- For the Tracking, Reconstruction and Fast Simulation

- Material Description

Ordering & Navigation

- Find the next Tracking Surface

Particle Description

- Track Parameterisation

Transport through field

- including inhomogeneous

DD4Hep

- Provides representation of all TGeo (ROOT) shapes and places them in a hierarchy of detector elements

- Has Handles for accessing detector description data

- supports simulation (GEANT4), reconstruction and analysis

Surface Description

In DDSurface::ISurface, ICylinder, SurfaceType

In DDRec::

- Surface, CylinderSurface, SurfaceList

- SurfaceMaterial, SurfaceData,VolSurface, VolSurfaceList,VolPlane, VolCylinder

- Code seems not completed yet. How can a make a trapezoid or other plane surfaces, with different bounds? Why do I have two different Surface Descriptions (Surface and VolSurface)?

Ordering: DDSegmentation

- independent package: aims to providing LocalToGlobal conversion and vice versa -> Conversion from local coordinates (from a sensitive Volume) to CellID's

- Segmentations and sensitive Detectors are separated

- Cartesian GridXY, XZ, XYZ, Projective Cylinder

- In DD4Hep::Segmentations.h (SegmentationObject for Segmentation Handle)

- Documentation is needed

Implement existing code (ATLAS)

- Maybe extend ISurface to make it compatible with our existing Surface Description

- Existing Track Parameterisation (charged and neutral Parameters)

- For Field Description use DD4hep::Fields.h

General Questions

- Documentation and more information are needed (DDSegmentation and DDSurfaces) - Timeline for completion?

- How is the TGeo-Geometry translated into the DDRec-Surfaces?

- Why is there a own Vector3D class, when we already use ROOT for the Geometry Description? DDSegmentation has it's own Vector3D Struct as well

Useful Pages

DD4Hep

- http://aidasoft.web.cern.ch/DD4hep

DD4HepCode

- https://svnsrv.desy.de/public/aidasoft/DD4hep/trunk/

- https://frankm.web.cern.ch/frankm/DD4hep/html/index.html

DD4Hep & aidaTT

- https://agenda.linearcollider.org/getFile.py/access?
contribId=1&resId=0&materialId=slides&confId=6421

aidaTT Code

- https://svnsrv.desy.de/public/aidasoft/aidaTT/trunk/

Backup Slides

aidaTT - DESY

- is a tracking toolkit and aims to providing methods for extrapolation, propagation and intersection

- Particle Description: TrackParameters Class (charged, neutral?)

- Navigation: TrajectoryElement Class (connection to DD4hep::DDSegmentation)

- IBField (only constant available), IFittingAlgorithm, IGeometry (ISurfaces, IMaterial, Vector3D(DDSurfaces)), IPropagation

- is still being developed and not completed