

DD4hep based event reconstruction

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The DD4hep detector description tool-kit offers a flexible and easy to use solution for the consistent and complete description of particle physics detectors in one single system. The sub-component DDRec provides a dedicated interface to the detector geometry as needed for event reconstruction. With DDRec there is no need to define an additional, separate reconstruction geometry as is often done in HEP, but one can transparently extend the existing detailed simulation model to be also used for the reconstruction.

Based on the extension mechanism of DD4hep, DDRec allows one to attach user defined data structures to detector elements at all levels of the geometry hierarchy. These data structures define a high level view onto the detectors describing their physical properties, such as measurement layers, point resolutions and cell sizes.

For the purpose of charged particles track reconstruction dedicated surface objects can be attached to every volume in the detector geometry. These surfaces provide the measurement directions, local-to-global coordinate transforms and material properties. The material properties, essential for the correct treatment of multiple scattering and energy loss effects, are automatically averaged from the detailed geometry model along the normal of the surface.

Additionally a generic interface allows the user to query material properties at any given point or between any two points in the detector's world volume.

In this talk we will present DDRec and how it is used together with the generic tracking toolkit aidaTT and the particle flow

package PandoraPFA for full event reconstruction of the ILC detector concepts ILD and SiD and of CLICdp.

This flexible tool chain is also well suited for other future accelerator projects such as FCC and CEPC.

Tertiary Keyword (Optional)

Secondary Keyword (Optional)

Data processing workflows and frameworks/pipelines

Primary Keyword (Mandatory)

Reconstruction

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