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Monte Carlo Generators in Atlas software

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The Atlas software framework, Athena, is written in C++ using python for job configuration scripts. Physics generators which provide the four-vectors describing the results of LHC collisions are written in general by third parties and are not part of Athena. These libraries are linked from the LCG Generator Services (GENSER) distribution. Generators are run from within Athena and put the generated event output into a transient store, in HepMC format, using StoreGate.

A common interface, implemented via inheritence of a GeneratorModule class, guarantees common functionality for the basic generation steps and for event formating such as stripping partons from the HepMC record while keeping the mother-daughter relationships within the events. The ATLAS detector simulation packages access the truth informtion in StoreGate. A TruthHelpers package provides some standard functions for querying and manipulating generator information. Steering is done through the specific interfaces to allow for flexible configuration using Atlas python scripts.

Interfaces to most general purpose generators, including: pythia6, pythia8, fortran herwig, Herwig++ and Sherpa are provided, as well as to more specialised packages, for example Phojet and Cascade.

A second type of interface exist for the so called Matrix Element generators that only generate the particles produced in the hard scattering process and write events in the Les Houches event format. A generic interface to pass these events to Pythia6 and Herwig for parton showering and hadronisation has been written.

In addition, Athena provides interfaces to validation tools, i.e. for MCTester, Rivet and HepMCAnalysisTool.

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