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Fluka and Geant4 simulations using common geometry source and digitization algorithms

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Based on the ATLAS TileCal 2002 test-beam setup example, we present here the technical, software aspects of a possible solution to the problem of using two different simulation engines, like Geant4 and Fluka, with the common geometry and digitization code. The specific use case we discuss here, which is probably the most common one, is when the Geant4 application is already implemented. Our goal then is to run the same simulation using the Fluka package by re-using the maximum number of the existing components.

For simple setups, a tool (FLUGG) already exists that allows to use the Fluka engine while the navigation is performed with Geant4, starting from a description of the geometry in terms of Geant4 classes. In complex applications, however, the geometry is often built up at run time from the information stored in a database, and in these cases such a tool cannot be used directly; furthermore, it does not deal with sensitive detectors and digitization. We show how it is possible to overcome these two problems by building around FLUGG a set of tools for reading common Geometry Description Markup Language (GDML) files as well as for generating the output in the format allowing common processing algorithms.

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