GEANT4 simulation for the FLC detector models with MOKKA

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GEANT 4 SIMULATION FOR THE FLC DETECTOR MODELS WITH MOKKA

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Mokka [1] began by being developped as a simulation tool for calorimetry studies for TESLA [2] and became a Geant4 [3] detailed simulation tool for the Future Linear Collider (FLC) detector. Almost all detector pieces are implemented and the calorimeter prototypes. Mokka is now being developped in an informal collaboration. The Common Geometry Access interface makes Mokka be a framework providing information to the reconstruction and analysis too.

1 Introduction

Mokka has been developped at the LLR since the end of 1999 as a simulation tool for calorimetry studies for the TESLA project. It became a Geant4 detailed simulation tool for all detector modules for the FLC, but also for the calorimeter prototypes. Mokka is being developped now in an informal collaboration.

2 The Geometry Model Of Mokka

The geometrical parameters of all detector pieces are kept in a MySQL [4] geometry database and are read by geometry drivers that build the Geant4 volumina corresponding to the detectors (see figure 1). A detector driver can read, at run-time, different databases and build different detector models.

The last detector model for TESLA is D09M1. It consists of Hcal and Ecal modules, TPC and inner tracker devices. Mokka can also simulate the calorimeter prototypes.

3 Other Features Of Mokka

A part of Mokka is the Common Geometry Access (CGA) API available for Fortran, C/C++ and Java programs. The CGA interface makes available for the reconstruction and analysis the same geometry model that is built for the simulation (see figure 2), and implements some reconstruction utilities such as the calculation of the number of X0's between two points in space.

The persistency model of Mokka consists of both ASCII and LCIO [5] output.

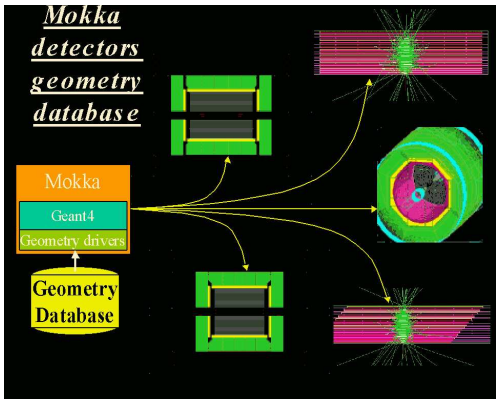

Figure 1: The geometry database and the geometry drivers.

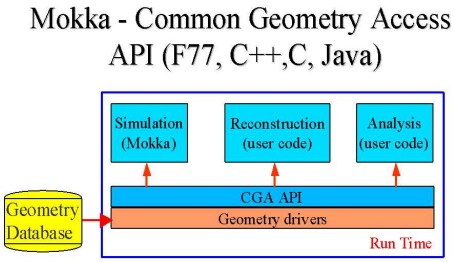

Figure 2: The CGA API.

Mokka has also a simple event display based on the Geant4 standard visualisation.

4 Mokka Development In Collaboration

The aims of the collaboration are the improving of the models of different detector pieces, the detailed prototype simulation and the improving of the framework.

In order to ease the development of Mokka in an informal collaboration, the Mokka cvs repository is accessible from abroad, the development procedure of the detector-drivers was simplified, and a documentation was included in the standard distribution of Mokka.

The last Mokka release already brings the contribution of Frank Gaede (DESY) who added new features to Mokka such as the steering files and the plugins, and from people from NIU (Nicadd) who implemented a new module of the test beam.

5 Conclusion

Mokka became a Geant4 detailed simulation tool for the FLC detector and calorimeter prototypes, now being developped in collaboration. The Common Geometry Access interface makes Mokka be a framework providing information to the reconstruction and analysis too.

References

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