Contribution ID: **323** Type: **oral presentation**

From Geant 3 to Virtual Monte Carlo: Approach and Experience

Wednesday 29 September 2004 15:00 (20 minutes)

The STAR Collaboration is currently using simulation software based on Geant 3. The emergence of the new Monte Carlo simulation packages, coupled with evolution of both STAR detector and its software, requires a drastic change of the simulation framework.

We see the Virtual Monte Carlo (VMC) approach as providing a layer of abstraction that facilitates such transition. The VMC platform is a candidate to replace the present legacy software, and help avoid its certain shortcomings, such as the use of a particular algorithmic language to describe the detector geometry. It will also allow us to introduce a more flexible in-memory representation of the geometry.

The Virtual Monte Carlo concept includes a platform-neutral kernel of the application, to the highest degree possible. This kernel is then equipped with interfaces to the modules responsible for simulating the physics of particle propagation, and tracking.

We consider the geometry description classes in the ROOT system (in its latest form known as TGeo classes) as a good choice for the in-memory geometry representation.

We present an application design based on the Virtual Monte Carlo, along with the results of testing, benchmarking and comparison to Geant 3. Internal event representation and IO model will be also discussed.

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Session Classification: Event Processing

Track Classification: Track 2 - Event processing