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Use of GEANE for tracking in Virtual Monte Carlo

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The concept of Virtual Monte Carlo allows to use different Monte Carlo programs to simulate particle physics detectors without changing the geometry definition and the detector response simulation.
In this context, to study the reconstruction capabilities of a detector, the availability of a tool to extrapolate the track parameters and their associated errors due to magnetic field, straggling in energy loss and Coulomb multiple scattering plays a central role: GEANE is an old program written in Fortran 15 years ago that performs this task through dense materials and that is still succesfully used by many modern experiments in its native form. Among its features there are the capability to read directly the geometry and the magnetic field map from the simulation and to use different track representations.
In this work we have "rediscovered" GEANE in the context of the Virtual Monte Carlo: the talk will show how GEANE has been integrated in the FairROOT framework, firmly based on the VMC, by keeping the old features in the new ROOT geometry modeler. Moreover new features have been added to GEANE to allow its use also for low density materials, i.e. for gaseous detectors, and preliminary results will be shown and discussed.
The tool is now used by the PANDA and CBM collaborations at GSI as the first step for the global reconstruction algorithms, based on a Kalman filter which is currently under development.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

Panda

Summary

The use of GEANE as track follower for the Virtual Monte Carlo with the ROOT geometry modeler is shown. New features that extend the capabilities of GEANE to low density materials are also discussed. The tool is now used by the PANDA and CBM collaborations at GSI.

Primary author: Dr FONTANA, Andrea (INFN-Pavia)

Co-authors: Dr PANZARASA, Alberto (Dept. of Nuclear and Theoretical Physics, University of Pavia); Prof. ROTONDI, Alberto (Dept. of Nuclear and Theoretical Physics, University of Pavia); Dr BERTINI, Denis (GSI); Dr LAVEZZI, Lia (Dept. of Nuclear and Theoretical Physics, University of Pavia); Dr AL-TURANY, Mohammad (GSI); Dr GENOVA, Pablo (INFN-Pavia)

Presenter: Dr FONTANA, Andrea (INFN-Pavia)

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