21st International Conference on Computing in High Energy and Nuclear Physics (CHEP2015)



21st International Conference on Computing in High Energy and Nuclear Physics CHEP2015 Okinawa Japan: April 13 - 17, 2015

Contribution ID: 242

Type: oral presentation

Geant4 VMC 3.0

Tuesday 14 April 2015 16:45 (15 minutes)

Virtual Monte Carlo (VMC) provides an abstract interface into Monte Carlo transport codes. A user VMC based application, independent from the specific Monte Carlo codes, can be then run with any of the supported simulation programs. Developed by the ALICE Offline Project and further included in ROOT, the interface and implementations have reached stability during the last decade and have become a foundation for other detector simulation frameworks, the FAIR facility experiments framework being among the first and largest.

Geant4 VMC, which provides the implementation of the VMC interface for Geant4, is in continuous maintenance and development, driven by the evolution of Geant4 on one side and requirements from users on the other side. Besides the implementation of the VMC interface, Geant4 VMC also provides a set of examples that demonstrate the use of VMC to new users and also serve for testing purposes. Since major release 2.0, it includes the G4Root navigator package, which implements an interface that allows one to run a Geant4 simulation using a ROOT geometry.

The release of Geant4 version 10.00 with the integration of multi-threading processing has triggered the development of the next major version of Geant4 VMC (version 3.0), whose release is planned for this year. A beta version, available for user testing since March, has helped its consolidation and improvement. We will review the new capabilities introduced in this major version, in particular the integration of multi-threading into the VMC design, its impact on the Geant4 VMC and G4Root packages, and the introduction of a new package, MTRoot, providing utility functions for ROOT parallel output in independent files with necessary additions for thread-safety. Migration of user applications to multi-threading that preserves the ease of use of VMC will be also discussed. We will also report on the introduction of a new CMake based build system, the migration to ROOT major release 6 and the improvement of the testing suites.

Author: HRIVNACOVA, Ivana (IPNO, Université Paris-Sud, CNRS/IN2P3)
Co-author: GHEATA, Andrei (CERN)
Presenter: HRIVNACOVA, Ivana (IPNO, Université Paris-Sud, CNRS/IN2P3)
Session Classification: Track 2 Session

Track Classification: Track2: Offline software