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Experience on Grid Production for GEANT4

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Geant4 is a general purpose toolkit for simulating the tracking and interaction of particles through matter. It is currently used in production in several particle physics experiments (BaBar, HARP, ATLAS, CMS, LHCb), and it has also applications in other areas, as space science, medical applications, and radiation studies.

The complexity of the Geant4 code requires careful testing of all of its components, especially before major releases (which happens twice a year, in June and December) including detailed regression testing on complex configurations.

We describe the recent development of an automatic suite for testing physical processes in high-energy calorimetry. The idea is to use a simplified set of hadronic calorimeters, with different beam particles at, several beam energies, and comparing relevant observables with the reference version of Geant4. Only those distributions that are statistically incompatible are then printed out and finally inspected by a person to look for possible bugs. The suite is made of Python scripts, and utilizes the "Statistical Toolkit" for the statistical tests between pair of distributions, and runs on the Grid to cope with the large amount of CPU needed in a short period of time. The total CPU time required for each of these Geant4 release validation productions amounts to about 4 CPU-years, which have to be concentrated in a couple of weeks. The Geant4 team has already run four of them, starting in December 2004. From December 2005 they run as Geant4 VO demonstrating the full involvement of Geant4 inside the EGEE communities. Several EGEE sites have provided them with the needed CPU, and this has guaranteed the success of the production, arriving to an overall efficiency rate of about 99%.

We report the Geant4 experience in using the Grid, and in particular the results obtained during the last production (June 2006). During that production we used the Ganga/Diane framework developed by the ARDA group at CERN was used for. the 10% of the production with very promising results. The next production (December 2006) will be fully executed using this framework and we present the present status of the

preparation.

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