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GFLASH - parameterized electromagnetic shower in CMS

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An object-oriented package for parameterizing electromagnetic showers in the framework of the Geant4 toolkit has been developed. This parameterization is based on the algorithms in the GFLASH package (implemented in Geant3 / FORTRAN), but has been adapted to the new simulation context of Geant4. This package can substitute the full tracking of high energy electrons/positrons(normally form above 800 MeV) inside Geant4 with the probability density function of the shower profile. A mixture of full simulation and fast parameterization is also possible. This new implementation of the GFLASH package leads to a significant gain in simulation time for pp events at 14 TeV at the LHC, without sacrificing too much the simulation accuracy and can be used for any homogenous calorimeter. GFLASH has been also included into the GEANT 4.7 release and the CMS detector imulation OSCAR, which is based on Geant4. Some GFLASH parameters has been also tuned to achieve better agreement with the CMS electromagnetic calorimeter. Comparisons between GFLASH and full simulation in timing and physics performance will be presented as well.

Primary author: WENG, Joanna (Karlsruhe/CERN)

Presenter: WENG, Joanna (Karlsruhe/CERN)

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