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CMS Full Simulation for Run-II

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This presentation will discuss new features of the CMS simulation for Run 2, where we have made considerable improvements during LHC shutdown to deal with the increased event complexity and rate for Run 2. For physics improvements migration from Geant4 9.4p03 to Geant4 10.0p02 has been performed. CPU performance was improved by introduction of the Russian roulette method inside CMS calorimeters, optimization of CMS simulation sub-libraries, and usage of statics build of the simulation executable. As a result of these efforts, CMS simulation was speeded up by about factor two. In this work we provide description of these updates and discuss different software components of CMS simulation.

Geant4 version 10.0 is multi-threaded capable. This allows development of multi-threaded version of CMS simulation in parallel with mainstream sequential production version. For CMS multi-threaded Geant4 additional modules and manager classes were added. Geometry, magnetic field, physics, user actions, and sensitive detectors classes are the same for both sequential and multi-threaded versions of CMS simulation. In this work we report on details of implementation of CMS multi-threaded simulation including CPU and memory performance.

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