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Accelerating HEP detector simulations using G4HepEm

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Geant4 based detector simulations make a significant contribution to the overall computing budget of the LHC experiments. The individual experiments have been investing considerable effort in making their simulations more and more efficient. These performance optimisations are now even more important in order to cope with the special computing challenges of the HL-LHC era.

G4HepEm is one of the R&D projects that have been launched with the goal of contributing to this effort. It provides an efficient simulation of the electromagnetic shower, tailored for HEP detector simulations, in the form of a Geant4 extension. A significant performance improvement (~20 %) of the ATLAS and CMS full detector simulations has been achieved recently after integrating G4HepEm into the ATLAS Athena and CMS-SW frameworks while preserving the accuracy of the results. The motivations, ideas and results obtained for ATLAS and CMS will be presented.

Requested talk length

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