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Recent progress of Geant4 electromagnetic physics for simulation of calorimeters

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We report on recent progress in the Geant4 electromagnetic (EM) physics sub-packages. New interfaces and models introduced in Geant4 10.3 (December, 2016) are already tried in LHC applications and may be useful for any type of Monte Carlo simulation. Additional developments for EM physics are already available with the recent public version Geant4 10.4beta (June, 2017) and will be included in the next Geant4 10.4 (December, 2017).
Important developments for calorimetry applications were carried out for the modeling of single and multiple scattering of charged particles. Corrections to scattering of positrons and to sampling of displacement have been added to the Geant4 default Urban model used for simulation of electrons and positrons. The alternative Goudsmit-Saunderson (GS) model is based fully on theory, it was recently reviewed and re-written. For testing of novel calorimeters we provide a configuration of electron scattering based on the GS model or on the single scattering model (SS) instead of the Urban model. In addition, an option may be used for GS and SS models when Mott corrections are enabled.
In this report, we will also present developments of EM models in view of the simulation for the new FCC facility. The simulation of EM processes is important for optimization of FCC interaction region and for study of various conceptions of FCC detectors. This requires an extension of validity of EM models for energies higher than the ones used for LHC experiments.
Important developments were recently carried out in low-energy EM models, which may be of interest to various application domains including fine grain calorimeters. In particular, an option to simulate full fluorescence and Auger cascades is added, triplet production in gamma conversion is introduced and the model of photoelectric effect is reviewed and updated.

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