

Geant4 models for simulation of multiple scattering

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The process of multiple scattering of charge particles is an important component of Monte Carlo transport. At high energy it defines deviation of particles from ideal tracks and limitation of spatial resolution. Multiple scattering of low-energy electrons defines energy response and resolution of electromagnetic calorimeters. Recent progress in development of multiple scattering models within Geant4 toolkit is presented. The default Geant4 model based on Lewis approach and tuned to the available data. In order to understand precision of this model and to provide more precise alternatives new developments were carried out. The single Coulomb scattering model samples each elastic collision of a charged particle. This model is adequate for low-density media. It is combined with the new multiple scattering model based on Wentzel scattering function. This model assumed for muons and hadrons. Another new alternative model based on Goudsmit-Saunderson formalism have been developed for sampling of electron transport. The comparisons with the data are shown. The trade of precision and CPU performance is discussed with the focus on LHC detectors simulation.

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