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Validation of Electromagnetic Showers in CORSIKA 8 (talk)

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The air shower simulation code CORSIKA has served as a key part of the simulation chain for numerous astroparticle physics experiments over the past decades. Due to retirement of the original developers and the increasingly difficult maintenance of the monolithic Fortran code of CORSIKA, a new air shower simulation framework has been developed over the course of the last years in C++, called CORSIKA 8.Besides the hadronic and muonic component, the electromagnetic component is one of the key constituents of an air shower. The cascade producing the electromagnetic component of an air shower is driven by bremsstrahlung and photoproduction of electron-positron pairs. At ultrahigh energies or in media with large densities, the bremsstrahlung and pair production processes are suppressed by the Landau-Pomeranchuk-Migdal (LPM) effect, which leads to more elongated showers compared to showers without the LPM suppression. Furthermore, photons at higher energies can produce muon pairs or interact hadronically with nucleons in the target medium, producing a muon component in electromagnetic air showers.In this contribution, we compare electromagnetic showers simulated with the latest Fortran version of CORSIKA and CORSIKA 8, which uses the library PROPOSAL for the electromagnetic component. While earlier validations of CORSIKA 8 electromagnetic showers focused on showers of lower energy, the recent implementation of the LPM effect, photo pair production of muons, and of photohadronic interactions allows now to make a physics-complete comparison also at high energies.

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