

# Electromagnetic Shower Simulation for CORSIKA 8

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Extensive air showers in astroparticle physics experiments are commonly simulated using CORSIKA. The electromagnetic shower component has been treated using EGS4 in the Fortran 77-based versions, which have been developed in the last thirty years. Currently, CORSIKA is being restructured and rewritten in C++, leading to the new version CORSIKA 8. In this process, the electromagnetic component is now being treated by the high-energy lepton and photon propagator PROPOSAL. Originally designed for the efficient simulation of high-energy muons and tau-leptons in large volume neutrino telescopes, the Monte Carlo library PROPOSAL has been extended to also treat electrons, positrons, and high-energy photons.

Validating this new implementation of the electromagnetic shower model is very important.

In this talk, the electromagnetic shower component simulated with PROPOSAL is compared to previous versions of CORSIKA, the air shower simulator AIRES as well as the electromagnetic shower tool ZHS, which is optimized for the radio signal.

This includes comparisons of the underlying theoretical models, the runtime performance as well as lateral and longitudinal shower characteristics, especially of parameters relevant for the radio component such as the charge excess.

## Keywords

EAS;extensive air shower;CORSIKA;CORSIKA 8;PROPOSAL;lepton propagator;photon propagator;simulation;monte carlo;electromagnetic shower;AIRES;ZHS;radio component;muon puzzle;charge excess

## Collaboration

CORSIKA-8

## other Collaboration

## Subcategory

Theoretical Methods

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