

The particle-shower simulation code CORSIKA 8 (talk)

Monday, June 12, 2023 12:15 PM (15 minutes)

CORSIKA up to version 7 has been the most-used Monte Carlo code for simulating extensive air showers for more than 20 years. Due to its monolithic, Fortran-based software design and hand-optimized code, however, it has become difficult to maintain, adapt to new computing paradigms and extend for more complex simulation needs. These limitations led to the CORSIKA 8 project, which constitutes a complete rewrite of the CORSIKA 7 core functionality in a modern, modular C++ framework. CORSIKA 8 has now reached a state that we consider “physics-complete” and a stability that already allows experts to engage in development for specific applications. It already supports the treatment of hadronic interactions with Sibyll 2.3d, QGSJetII-04, EPOS-LHC and Pythia 8.3 and the treatment of the electromagnetic cascade with PROPOSAL 7.6. Particular highlights are the support for multiple interaction media, including cross-media particle showers, and an advanced calculation of the radio emission from particle showers. In this contribution, we discuss the design principles of CORSIKA 8, give an overview of the functionality implemented to date, the validation of its simulation results, and the plans for its further development.

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Session Classification: ICRC