CORSIKA 8 Air-Shower Simulation and Development Workshop



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Simulation of the propagation of cosmic ray air shower cores in ice

Tuesday, July 12, 2022 3:00 PM (30 minutes)

We summarize the results of simulation studies of the propagation of cosmic ray air shower cores through highaltitude polar ice sheets, using the COSIKA 7.7100 Monte Carlo code and the Geant4 10.5 simulation toolkit. We discuss the general characteristics of the in-ice particle cascade, including the energy density deposted in the ice, the longitudinal development of the shower, and the radial distribution of the charged particles in the ice as a function of Xmax of the shower. We present preliminary calculations of the Askaryan radio emission of the in-ice particle cascade using the end-point formalism, showing that they may resemble the Askaryan radiation of in-ice neutrino-induced particle cascade. Finally, we discuss the possibility of detecting the plasma created in the ice by comsic ray air shower cores using RADAR echo techniques.

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