

Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Geant4-based Simulation of Cosmic Ray Shower Development in the Earth's Atmosphere XIAOCHUN HE, HAKMANA SANJEEWA, CHRISTOPHER CLEVEN, Georgia State University — Geant simulation package has been widely used for decades in high energy nuclear and particle physics experiment for studying detector performance. The newest version of this simulation toolkit, Geant4, is constructed with objected oriented technology and implemented in C++. Its application areas now extend to medical, accelerator and space physics studies. We report here our implementation of Geant4 simulation for studying cosmic ray shower development in the atmosphere with a realistic geomagnetic field and air density distribution. This study will provide significant detailed information about secondary cosmic ray shower particles and their distributions as a function of the altitude, the geomagnetic locations and the air density variations. The simulated results are important for understanding the measurement of primary cosmic ray spectra.

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Date submitted: 26 May 2005

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