Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Geant4-based Simulation Study of Cosmic Ray Showers and the Associated Applications OLESYA SARAJLIC, XIAOCHUN HE, Georgia State University — Cosmic ray radiation has galactic origin and consists primarily of protons and a small percentage of heavier nuclei. The primary cosmic ray particles interact with the molecules in the atmosphere and produce showers of secondary particles at about 15 km altitude. A Geant4-based cosmic ray shower simulation is developed to study secondary cosmic ray particle showers in the full range of the Earth's atmosphere. A proper atmospheric air density profile and a full-scale geomagnetic field are implemented in order to precisely simulate the particle interactions in the atmosphere. Preliminary results from this simulation will be presented along with the association applications in the study of the correlation between the cosmic ray flux variation at the sea level and the dynamic weather patterns.

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Date submitted: 08 Jan 2015 Electronic form version 1.4