

Abstract

An advanced thin ionization calorimeter (ATIC) will be used to investigate the charge composition and energy spectra of ultrahigh energy primary cosmic rays in a series of long- duration balloon flights. While obtaining new high priority scientific results, this balloon payload can also serve as a proof of concept for a BGO calorimeter-based instrument on the International Space Station. The ATIC technical details are presented in a companion paper at this conference. Here we discuss the expected performance of the instrument based on a GEANT code developed for simulating nuclear-electromagnetic cascades initiated by protons. For simulations of helium and heavy nuclei, a nucleus-nucleus interaction event generator LUCIAE was linked to the GEANT based program. Using these models, the design of the ATIC detector system has been optimized by simulating the instrument response to particles of different charges over the energy range to be covered. Results of these simulations are presented and discussed.