Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Monte Carlo studies on the response of the TRACER cosmic ray detector CHRISTIAN HOEPPNER, MAXIMO AVE, PATRICK BOYLE, JOERG HOERANDEL, MASAKATSU ICHIMURA, FLORIAN GAHBAUER, DIETRICH MULLER, ANDREW ROMERO-WOLF, SCOTT WAKELY, University of Chicago
— TRACER (Transition Radiation Array for Cosmic Energetic Radiation) is a large area balloon-borne detector for the determination of the energy spectra of heavy cosmic ray nuclei ($8 \leq Z \leq 26$) in the energy range from $\sim$ 500 MeV/nucleon up to $\sim$ 10 TeV/nucleon. The key component of TRACER is an array of 1600 single wire proportional tubes. The tube array provides the trajectory of the particle and also the Lorentz factor from the measurement of specific ionization loss (dE/dx) and transition radiation. The trajectory reconstruction procedure is complex and Monte Carlo studies are essential for the development of the algorithm. A full Monte Carlo simulation has been developed for TRACER using GEANT4. In addition to track reconstruction the simulation investigates important instrument characteristics such as geometric aperture, intrinsic resolution, δ-ray contribution to the signals, calibration of energy measurements, deconvolution of energy spectra and determination of particle fluxes. We shall describe in detail the Monte Carlo studies and compare them to data obtained during a long duration balloon flight in 2003.

Christian Hoeppner
University of Chicago

Date submitted: 14 Jan 2005 Electronic form version 1.4