

COMPARISONS OF CORSIKA-GENERATED SHOWERS WITH HIRES DATA

HiRes Collaboration

We have generated UHE cosmic ray showers using the CORSIKA program and the QGSJet hadronic interaction code, and have simulated the response of the HiRes detector to the showers. We included in the simulation the triggering and DAQ characteristics of the detector and the background sky noise. We processed these Monte Carlo events with the same analysis program run on HiRes data.

To efficiently use the CORSIKA events, we developed a library of showers generated at various discrete energies and zenith angles. Since the showers fit very well to the Gaisser-Hillas formula, we characterized each shower in the library by its Gaisser-Hillas parameters. Then in the detector simulation program we placed the showers at different distances and azimuthal orientations, and scaled the Gaisser-Hillas parameters in energy and zenith angle to reproduce continuous energy and zenith angle distributions.

We present a detailed set of comparisons between the Monte Carlo simulations and actual HiRes data.