

EXTENSIVE AIR SHOWER STUDIES WITH SMALL ARRAYS

D. Purmohammad, M. Bahmanabadi, M. Khakian Ghomi and J Samimi
Physics Department, Sharif University of Technology, P.O. Box 11365-9161,
Tehran, Iran.

dpu@mehr.sharif.ac.ir

In order to study Extensive Air Showers (EAS), two arrays of 1 m^2 plastic scintillator detectors, one with 3, and the other with 4 detectors, have been constructed. The site of the experiment is 1200 m above the sea level at $35^\circ 43' \text{N}$ and $51^\circ 20' \text{E}$. The experiment was aimed to determine the uncertainties in arrival direction of cosmic rays due to shower front thickness, detector performance, and electronic circuits. We estimated the uncertainties akin to each of these factors. On the other hand, taking the uncertainties into account, we studied the distribution of the EAS in zenith and azimuth angles. A $\cos^n \theta$ dependence with $n = 7.2 \pm 0.2$ for zenith angle and a North-South asymmetry azimuth angle distribution was observed. The asymmetry is caused by geomagnetic field and depends on the angle of the field lines with zenith which is $\theta_H = 38^\circ$ at our site. Amplitudes of the first and the second harmonics of the observed azimuthal distribution depends on the zenith angle of shower axis as $A_I \approx 0.02 + 0.34 \sin^2 \theta$ and $A_{II} \approx 0.027 + 0.5 \sin^4 \theta$. By comparing the results with asymmetries reported by Yakutsk array at 62°N , we see that the second harmonic become more important when the colatitude of the site increases.