

MONTE CARLO SIMULATION ON THE EFFECT OF AIR MASS ABOVE THE PRINCESS SIRINDHORN NEUTRONS MONITOR TO ATMOSPHERIC NEUTRONS FROM COSMIC RAYS

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Neutron monitors are recognized as a key tool for studying the time variations of galactic cosmic rays, especially with regard to solar effects. Cosmic-ray detectors inside the atmosphere do not record cosmic ray particles directly. The so-called primary cosmic rays interact with nuclei in the atmosphere to produce secondary daughter products. Neutron monitors record predominantly the secondary neutrons from these atmospheric showers. The Princess Sirindhorn Neutron Monitor (PSNM) is the first neutron monitor station in Chiang Mai, Northern Thailand, which installed at a high vertical cutoff rigidity of 16.8 GV. It provides unique data on the energy dependence of solar synodic variations, cosmic ray anisotropy, Forbush decreases, and solar modulation. In this work we performed Monte Carlo simulations of the atmospheric structure effects on secondary neutron counts above The Princess Sirindhorn Neutron Monitor by using the FLUKA program. These atmospheric processes are well understood, and the response of neutron monitors to these secondary particles is simulated. This work also provides the techniques for further analysis and a better understanding of those effects.

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