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Simulation of the fluorescence signal detected by a space telescope for extreme energy cosmic ray observation

The observation of UHECR are performed nowadays by the Pierre Auger Observatory (PAO) in Argentina and Telescope Array (TA) in the USA. Future experiment like JEM-EUSO, which stands for Joint Experiment Missions for Extreme Universe Space Observatory, will explore for the first time the UHECR from space. For this purpose, extensive air showers (EAS) initiated by extreme energy cosmic rays (EECRs), up to 100 EeV and entering the Earth's atmosphere, are simulated with the CORSIKA package and using different hadronic interaction models. Influence of different simulation parameters on the EAS characteristics is studied, especially on longitudinal distribution of charged particles, depth of shower maximum and energy released to the air. In addition to thinning algorithm, we have highly reduced computation time by using an hybrid procedure with CONEX program. This method combines fully MC simulation at high energy with a fast numerical cascade equation below certain threshold energies. By taking into account the atmospheric scattering of light, the number of fluorescence photons, with wavelengths between 300-430 nm, and their arrival time distribution to an ideal space telescope are calculated.

Choix de session parallèle

1.3 Physique nucléaire: physique hadronique et QCD

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