

Analysis of capability of detection of extensive air showers by simple scintillator detectors

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One of the main objectives of the CREDO project is to search for so-called Cosmic-Ray Ensembles (CRE). To confirm the existence of such phenomena a massive scale observation of even relatively low energy Extensive Air Showers (EAS) and an analysis of their correlations in time must be performed. To make such observations possible, an infrastructure of widely spread detectors connected in a global network should be developed using low-cost devices capable of collecting data for a long period of time. For each of these detectors or small detector systems the probability of detection of an EAS has to be determined. Such information is crucial in the analysis and interpretation of collected data. The standard approach based on detailed and extensive simulations is not possible for many such systems, thus a faster method is developed. Knowing the characteristics of EAS from more general simulations any required probability is calculated using appropriate parametrization taking into account EAS spectrum, energy dependence of particle density and zenith angle dependence. This allows to estimate expected number of EAS events measured by a set of small detectors. Results of calculations are compared with first measurements using a test system. These results can also be useful for the design of more effective small systems in the future.

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Subcategory

Theoretical Methods

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