

Optimization of CoREAS simulations for the GRAND project

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Abstract: A planned array of 200,000 antennas covering an area of 200,000 km² - the GRAND project - is proposed to detect cosmic-ray, gamma-ray, and neutrino primaries in the energy range beyond 10¹⁷ eV. The GRAND array will be able to detect upward-going air showers initiated by neutrino interactions in the rocks on its mountainous site, furthermore, it may also detect very inclined and atmosphere-skimming air showers initiated by cosmic rays. So the corresponding shower geometry differs from the other experiments and asks for a detailed investigation. To meet the requirements of GRAND, we develop an update of CORSIKA7 for the simulation of upward-going air showers. Furthermore, we apply today's best knowledge of parameters of the GRAND project, in particular realistic on-site atmospheres, in an extensive library of inclined air showers. Finally, we evaluate expected signal-to-noise ratios and detection thresholds for the GrandProto300 phase of GRAND.

Keywords

GRAND; CoREAS; CORSIKA7, Upward-going air shower, S/N ratio

Collaboration

other (fill field below)

other Collaboration

GRAND

Subcategory

Experimental Methods & Instrumentation

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