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Carpet-3 EAS array efficiency estimates

Carpet-3 of BNO INR RAS is an array of scintillation detectors situated in Neutrino Village, Kabardino-Balkarain Republic, Russian Federation. It is meant to observe extensive air showers (EAS) with energies above 100 TeV.

We generated more than 200,000 EAS using CORSIKA 7.8000 with QGSJETIII and FLUKA2024 models from different primary particles: γ-quanta, protons, helium and iron nuclei. Chosen energy range: 10-300 TeV with a discrete uniform distribution, θ distribution is uniform by $\cos^2\theta$ in $[0^\circ, 40^\circ]$ range. The height of observation is 1700 m above sea level.

We created a Geant4 model of the Carpet-3 facility to estimate the efficiency of the array. The simulation program includes 1251 scintillation detectors and passive geometry (buildings and granite embankment). The main result is the energy dependencies of the EAS detection and reconstruction efficiencies.

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