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Radioactivity in rainwater: Background for air shower detectors

Abstract content

We report here our observations on particle counting rates with 10-20 mm thick plastic scintillation detectors used for studies on air showers at CERN and Ooty. Due to efficient and uniform collection of scintillation photons with 20-30 wave-length shifting fibers placed in parallel above the scintillator surface, the number of photoelectrons collected by the photomultiplier is relatively large. Therefore the detectors are quite sensitive to > 100 keV gamma-ray photons emitted from the ground below and from the material around the detectors.

It is observed that the rainwater falling on and around the detectors increases the counting rates significantly due to the presence of radon and its daughter products in the rainwater. Therefore the variation in the counting rate of shower detectors is much larger than the variation due to the changes in the atmospheric pressure during the rainy weather. These large changes have significant consequences for counting rate based monitoring of the performance of the shower detectors and need to be taken into account properly.

If this papers is presented for a collaboration, please specify the collaboration

L3+C and GRAPES Collaborations

Summary

Reference

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