

Underground muon flux measured by EEE students

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The Extreme Energy Events experiment (EEE) is an extended array of about 60 cosmic ray detectors installed in several Italian High Schools and in a few research laboratories. The EEE experiment has two main targets: a scientific and a dissemination. An array of telescopes made of three MRPC detectors is used to detect cosmic rays and perform physics measurements, such as studies on galactic cosmic rays variation, anisotropies or long distance correlations. The dissemination goal is achieved by allowing students to actively participate in collaboration's activities, building telescopes, monitoring data acquisition, performing physics analysis under supervision of EEE researchers and presenting their results in monthly EEE collaboration meetings.

For field operations, the EEE collaboration developed a portable scintillator-based detector named Cosmic Box (CB). The CB allows students to perform cosmic ray counting measurements in various environments. CBs are made with two 15 x 15 x 1 cm scintillators read by two 3 x 3 cm² SIPMs operated in coincidence. Three CBs were deployed in Nuraxi Figus and Seruci coal mine to perform an underground measurement of the cosmic muon flux attenuation. 83 days were required to collect a total of 4260 events at the maximum depth of 512 m. High schools students from Sardinia and Lombardia were directly involved in all phases of the measurements. After a safety training, students helped in underground positioning of the detectors, DAQ configuring and data collection. Data were recorded in a SD memory card and eventually transferred for the off-line analysis.

After presenting the EEE project, the contribution will be focused on the experimental set up and the measurement, reporting some preliminary results.

Reference to paper (DOI or arXiv)

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