

Cosmic ray measurements using such detectors in huge physical experiments as LHC or NICA

Project supervisor:

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Goal:

Large detectors, such as ALICE at CERN, are often equipped with additional cosmic ray detectors. These detectors are used to obtain information about which tracks inside the detector came from the passage of a particle coming from an atmospheric cascade (eg: muons), and are not a product of an internal collision. They are also very useful for calibrating detectors, such as TOF or TPC. The nature of radiation changes in relation to the direction in the sky that we observe, as well as the influence of very thick walls or ground. The goal of this project is to self-build a small cosmic ray detector and make real measurements using it.

Description of the project:

1. Discussion of the issue of wide atmospheric showers.
2. Construction of a small detector based on a scintillator and optical element of SMMP type.
3. Carrying out of measurements of cosmic radiation and determining of the azimuth angle and the environment dependence.
4. Understanding of the "arduino" control system and its programming.
5. Presentation on the Cosmic Watch program and the new cosmic radiation detector for the NICA collider (MCORD).
6. Preparation of student's own speech at the end of the student practice and for the conference after that, and preparation of a publication together with the practice supervisor based on the obtained results.

Requirements for the students:

- The subject is addressed to students interested in: practical measurement systems, astrophysics, nuclear physics, and electronics.
- Basic knowledge of electronic layout.
- Basic skills in using Excel program.

Number of participants: up to 4 students