

Development of an expofeso acquisition card for a Cherenkov detector.

Content

Cosmic rays is ionizing radiation that, as it passes through the Earth, collides with atmospheric atoms in an elastic form, forming cascades of subparticles that can be detected on the Earth's surface. Among the particles that can be registered are, protons, electrons, pions, muons, among others.

Water Cherenkov detectors (WCD) record the passage of secondary particles originated in an atmospheric showers, which generate Cherenkov light when traveling at a speed bigger than that of light in that medium. Generally, they are conformed in detector arrays and, each one usually has ultra pure water inside that serves as a radiator to generate Cherenkov light and as a light sensor they use photomultiplier tubes in the blue-ultraviolet range. The use of WCDs is a of the most used techniques for the detection of cosmic rays and gamma photons in the atmosphere.

It was developed an electronic card based on Red Pitaya for the study of cosmic rays in a Cherenkov water detector and a simulation of the range of energies of the showers we plan to detect.

Summary

Cosmic rays are radiation of cosmic origin consisting mainly of protons with energies of up to 1020eV. Its origin is associated with supernova remnants, active galaxy nuclei among others. Upon reaching the earth they interact against the atmospheric nuclei forming extensive atmospheric showers (EAS). Cosmic ray studies with the EAS-BUAP detector at 2200 masl record events between 1012 - 1014 eV of energy. In this paper we present the acquisition of data based on a new Red Pitaya electronics in a Water Cherenkov Detector for the study of cosmic rays.

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