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Electronics and Data Acquisition System of the Extensive Air Shower Detector Array at the University of Puebla

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Abstract content

Field programmable gate arrays (FPGAs) are playing an increasing role in DAQ systems in cosmic ray experiments due to their high speed and integration and their low cost and low power consumption. In this paper we describe in detail the new electronics and data acquisition system based on FPGA boards of the extensive air shower detector array built in the Campus of the University of Puebla. The purpose of this detector array is to measure the energy and arrival direction of primary cosmic rays with energies around 10^{15} eV. The array consists of 10 liquid scintillator detectors and 6 water Cherenkov detectors (of 1.86 m² cross section), distributed in a square grid with a detector spacing of 20 m over an area of 4000 m². The electronics described also makes use of analog to digital converters with a resolution of 10 bits and sampling speeds of 100 MS/s to digitize the PMT signals. We also discuss the advantages of discriminating the PMT signals inside the FPGAs with respect to the conventional use of dedicated discrimination circuits.

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

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 1187-1190

Primary author(s) : Dr. VILLASENOR, Luis (Institute of Physica and Mathematics, University of Michoacan)

Co-author(s) : Mr. PEREZ, Gonzalo (Fac. Cs. FIS-MAT, BUAP); Dr. SALAZAR, Humberto (Fac. Cs. FIS-MAT, BUAP); Dr. MARTINEZ, Oscar (Fac. Cs. FIS-MAT, BUAP); Mr. MURRIETA, Tirso (Fac. Cs. FIS-MAT, BUAP); Mr. CONDE, Ruben (Fac. Cs. FIS-MAT, BUAP)

Presenter(s) : Dr. VILLASENOR, Luis (Institute of Physica and Mathematics, University of Michoacan)

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