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The Front-End Cards of the Pierre Auger Surface Detectors: Test Results and Performance in the Field

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Abstract content

The Pierre Auger Observatory, presently under construction in Argentina, is nearing completion. The instrument is designed to measure the highest energy cosmic rays with unprecedented resolution and statistics. Its surface array comprises 1600 water Cherenkov detectors distributed over an area of 3000 km2. The Cherenkov light of each tank is detected by three 9-inch photomultipliers from which the signals of the anode and last dynode are digitized each by 10 bit 40 MHz FADCs. An Altera Cyclone FPGA is employed to generate different local triggers and to handle the data transfer to a communication board. The low-power budget, large environmental temperature variations, and the long-term operation impose special constraints to the Front-End cards. After discussing the design of the cards we present an automized test-bench including a climate chamber which has been set up in order to test the large number of boards prior to installation in the field. The qualification procedure and the results obtained in the laboratory are presented. Data collected during operation in the field demonstrate a very good performance and reliability of the Front-End cards.

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 1085-1088

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