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16-point DCT as the spectral 1st level surface detector trigger in the Pierre Auger Observatory

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Abstract content

Hadron induced, very inclined EAS, starting their development early in the atmosphere produce narrow, relatively flat muonic fronts on the Pierre Auger detection level. The signatures of FADC traces (very short rise time with fast exponential attenuation) from water Cherenkov tanks can be used for their detection. Currently used triggers in the Pierre Auger surface detector (Threshold and Time over Threshold triggers) have been selected to detect showers with possibly wide range of distances from the core, angles and energies. However they are not optimized for horizontal and very inclined showers, interesting as potentially generated by neutrinos. The paper describes the algorithm of 16-point discrete cosine transform as the spectral 1st level trigger implemented into a progressive FPGA, used in the 4th generation of the surface detector.

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 857-860

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