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Capability of Extended Air Shower Arrays for Gamma-Ray Astronomy

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Abstract content

Current efforts in ground-based VHE gamma-ray astronomy use two methods: Atmospheric Cherenkov Telescopes (ACTs) and Extended Air Shower (EAS) Arrays. While ACTs typically have greater sensitivity to gamma-ray point sources and lower energy thresholds, EAS arrays have an enormous advantage in exposure to the sky due to their large fields of view (1-2 sr) and high duty cycle ($> \sim 90\%$). The lower sensitivity of EAS detectors is largely due to the fact that they sample only the particles in the longitudinal tail of the shower that reach the ground level, whereas ACTs are able to observe the shower development high in the atmosphere. An examination of the intrinsic capabilities and limitations of EAS arrays as instruments for gamma-ray astronomy is presented. The angular and energy resolution and effective area of an optimized detector is shown as well as an analysis of gamma/hadron separation. The capabilities of the optimized detector are compared and contrasted to those of the recently proposed HAWC detector.

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

HAWC 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. 2 (OG part 1), pages 397-400

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