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Design Considerations for the Next Generation of Atmospheric Imaging Cherenkov Telescopes

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Abstract content

The HESS, MAGIC and VERITAS experiments are now fully operational and are detecting and discovering a large number of high-energy gamma-ray sources. This is a good time to work on the design of the next generation of IACT experiments.

We estimate the limiting angular resolution and detection area for an array of 3 large-aperture IACTs. We consider an idealized IACT system in order to understand the limitations imposed by the intrinsic nature of the atmospheric showers for such a configuration. The idealization includes the assumptions of a perfect optical system, the absence of the night sky background and a wide field of view.

The showers are simulated using the ALTAI code. A number of values of altitude and magnetic field intensity are tested corresponding to possible future sites for a new northern-hemisphere array. The optimal design depends on the target energy range; for each energy we tune both the cell length and the image processing in order to maximize the signal-to-noise-ratio and present the resulting values of the detection area and the angular resolution. We discuss the dependence of these quantities on the mirror size and the field of view of the telescopes.

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 893-896

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