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The ANTARES detector: time, energy and space calibrations

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Abstract content

The ANTARES neutrino telescope is being constructed in the Mediterranean Sea. The complete detector will consist of 12 strings, supplemented by an additional instrumentation line. Five strings are at present deployed and operating. Each string is equipped with 75 Optical Modules (OMs) housing the photomultipliers to detect the Cherenkov light induced by the charged particles produced in neutrino reactions.

An accurate measurement of the photon arrival times (hit times), the deposited charge as well as the positions and orientations of the OMs is required for a precise reconstruction of the direction and energy of the detected neutrinos. For this purpose the ANTARES detector is provided with several systems to facilitate the calibration of the detector. The time calibration is performed using light pulses emitted from LED and laser devices. The positioning is done via acoustic triangulation using hydrophones and the measurement of local tilt angles and orientations of the modules with a set of tiltmeters and compasses on each storey. Finally, dedicated algorithms allow for the extraction of the deposited charge, thus providing the means for the reconstruction of the neutrino energy.

This contribution details the different calibration devices of ANTARES, summarises the applied calibration methods and reports on the accuracy and precision which is thereby achieved with the present configuration of the detector.

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

ANTARES

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olive, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 3 (OG part 2), pages 1349-1352

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