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Detection of the Cherenkov light diffused by Sea Water with the ULTRA experiment.

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Abstract content

The study of Ultra High Energy Cosmic Rays represents one of the most challenging topic in this field. The interaction of primary particles with atmospheric nuclei produces a huge Extensive Air Shower together with isotropic emission of UV fluorescence light and highly directional Cherenkov photons, that are reflected/diffused isotropically by the impact on the Earth's surface or on high optical depth clouds. For space-based observations, detecting the reflected Cherenkov signal in a delayed coincidence with the fluorescence light allows to measure the shower maximum, giving a strong signature for discriminating hadrons and neutrinos, and allowing to estimate the primary chemical composition. Since the Earth's surface is mostly covered by water, the ULTRA (UV Light Transmission and Reflection in the Atmosphere) experiment has been designed to provide the diffusing properties of sea water, overcoming the lack of information in this specific field. A small EAS array, made of 5 particle detectors, and an UV optical device, have been coupled to detect in coincidence both electromagnetic and UV components. The detector was in operation from May to December, 2005, in a small private harbour in Capo Granitola (Italy); the results of these measurements in terms of diffusion coefficient and threshold energy are presented.

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

ULTRA Collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Oliveo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 4 (HE part 1), pages 287-290

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