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New approach to UHE cosmic ray investigations in the energy range 10^{15} - 10^{19} eV

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Abstract content

A new approach to investigations of ultra-high energy cosmic rays based on the new EAS observable - spectra of local density of muons measured at ground level in a wide range of zenith angles - is considered. It is shown that muon density spectra are sensitive to the primary cosmic ray spectrum and composition, and to features of the forward kinematic region of hadronic interaction, and thus provide new information that can be used for verification of some hypotheses about UHE cosmic ray spectra and of EAS simulation tools. For illustration of possibilities of the new approach, the experimental data on muon bundles at zenith angles from 30 degrees to horizon obtained with the Russian-Italian coordinate-tracking detector DECOR are used. The analysis based on CORSIKA simulation shows that measurements of muon density spectra in inclined EAS give the possibility to study characteristics of primary cosmic ray flux in a wide energy range from 10^{15} to 10^{19} eV by means of a single relatively not large detector with a single experimental technique.

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

DECOR Collaboration

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. 4 (HE part 1), pages 91-94

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