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New statistical parameters for mass composition studies with energy above 10^{17} eV

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Abstract content

In this work we investigate new statistical parameters to infer the mass composition of high energy cosmic rays above 10^{17} eV. Trying to overcome the difficulties imposed by large fluctuations and limited experimental observables, we present a statistical method for composition studies based on several measurable features of the longitudinal and lateral development of the air shower. Principal component analysis (PCA) and linear discriminant analysis (LDA) were used to combine the different parameters and to maximize the discrimination between different primary particle showers. In this contribution we compare the discrimation power of the new proposed methods with the traditional ones used in cosmic ray studies. The work is based on Monte Carlo simulations and the difference between programs is also presented.

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. 4 (HE part 1), pages 531-534

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