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Getting rid of artificial fluctuations in EAS simulated with thinning: estimate of artificial fluctuations and simple economical method to suppress them

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Abstract content

The most common way to simplify extensive Monte-Carlo simulations of air showers is the thinning approximation. We study its effect on the physical parameters reconstructed from simulated showers. To this end, we created a library of showers simulated without thinning with energies from 10^{17} eV to 10^{18} eV, different zenith angles and primaries. This library is publicly available. Various physically interesting applications of the showers simulated without thinning are discussed. Observables reconstructed from these showers are compared to those obtained with the thinning approximation. The amount of artificial fluctuations introduced by thinning is estimated. A simple method, multisampling, is suggested which results in controllable suppression of artificial fluctuation and simultaneously conserves computational resources as compared to the usual thinning.

If this paper 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 641-644

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