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A New Parallel Processing Scheme Enabling Full Monte Carlo EAS Simulation in the GZK Energy Region

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Abstract content

We developed a new parallel processing method enabling full M.C EAS simulation (say, with minimum energy of 500 keV) without using thin sampling even at 10ˆ19 eV. Normally, distributed-parallel processing needs a specific software and programs must be organized to match with such system. During the computation such a scheme also requires complex communications among many computer hosts. Our scheme first creates a skeleton of a shower, and smashes it into n-peaces and distributes the peaces to n- cpu to flesh them. After each peace is completely fleshed, they are assembled to make a complete picture of the shower. Thus, during the computation need no communication. With n=50, a 10ˆ19 eV shower can be simulated in ˜10 days. For a 10ˆ20 eV shower, we may randomly sample a fraction of n-peases (say, 100 for n=1000), and safely econstruct whole picture of the shower. The scheme dose not use any weight on each particle and very much stable. The scheme has been implemented in Cosmos code. To produce a number of showers with full fluctuations, we have also developed a new method which utilizes the present result. The latter is used for the TA experiment and is described in an accompanying paper.

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 581-584

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