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Cherenkov radio emission from showers in dense media at EeV energies

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Abstract content

The properties of extremely energetic neutrino- and cosmic ray-induced showers depend on the shower energy, on the type of particle initiating the shower, and on the medium. Studying these dependences is important both for understanding cascade phenomenology, and for estimating the efficiency of experiments using the radio technique. In this contribution we study the feasibility of applying 'thinning techniques' to the simulation of extremely energetic electromagnetic showers. We show that thinning is a powerful tool that allows a considerable reduction in computing time while keeping a good level of accuracy in the relevant shower and radio observables produced in the simulations. We apply thinning techniques to the simulation of EeV electromagnetic showers in a variety of materials, including the Landau-Pomeranchuk-Migdal effect that is relevant for shower development at very high energies. This study is essential in determining the sensitivity to extremely energetic neutrinos and cosmic rays of experiments looking for radiopulses in ice such as RICE and ANITA, and in the moon regolith such as LUNASKA, the Westerbork radiotelescope array and LOFAR.

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. 5 (HE part 2), pages 1507-1510

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