Contribution ID : **576** Type : **Oral**

The transition from tortuous to rectilinear cosmic ray trajectories in the Galaxy is at the origin of the knee and the ankle

Saturday, 7 July 2007 09:46 (0:12)

Abstract content

The shapes of cosmic ray trajectories in the Galaxy result from the effect of the chaotic and regular magnetic field, the rates of the nuclear collisions, the gas density and other minor parameters. For a given magnetic field configuration the forms of the trajectories, regardless their lengths, naturally subdivide in rectilinear and highly tortuous, depending on the ion energy. It is shown that the ankle and the knee energies of individual ions correspond to those particular energies of the ion traversing the Milky Way which mark, respectively, the rectilinear and tortuous propagation. A comparison of the computed helium spectrum, taken as an example, with the experimental data is presented and the good accord highlighted.

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 257-260

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Session Classification : HE 1.3.B

Track Classification : HE.1.3.B