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Effect of the dissipation range on the heliospheric modulation of cosmic-ray electrons

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Abstract content

At low energies, cosmic-ray nuclei experience the adiabatic limit where their intensity becomes proportional to their kinetic energy per nucleon, independent of the diffusion tensor and interstellar spectrum. Low-energy electrons, on the other hand, do react to changes in the diffusion tensor and are therefore ideal probes of its spatial- and rigidity dependence. To construct a diffusion tensor that is valid for low-energy electrons, we need to know at least the wavenumber k_D where the dissipation range occurs, and the latter's spectral index. In this study we explore how these quantities, when employed in a recent model for the diffusion tensor, could affect the modulation of cosmic-ray electrons. More specifically, we consider two relationships for k_D suggested by Leamon et al. 2000 (ApJ, 537), based on observational results. In each case, two fits to the data are used. We show that these different fits lead to profound difference in the diffusion tensor at low energies.

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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. 1 (SH), pages 439-440

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