



Contribution ID : 352

Type : Oral

Solar Particle Source Energy spectrum: Stochastic acceleration vs Neutral Current Sheet acceleration vs Shock Wave acceleration

Wednesday, 4 July 2007 13:05 (0:12)

Abstract content

It has been shown in a series of works that some solar particle events (SPE) are composed of two different relativistic populations, a Prompt Component (PC) and a Delayed Component (DC), each one with different energy spectrum behavior. The source spectra of the DC tend to be an inverse power law at the steady state situation, whereas the spectra of the PC are considerably deviated from such a power law. Here we attempt to reproduce the observational spectra of the PC and the DC on terms of different scenarios: (i) DC acceleration from magnetic merging in a Magnetic Neutral Current Sheet (MNCS). (ii) Stochastic acceleration of an injected population pre-accelerated in a MNCS. (iii) Stochastic acceleration with monoenergetic injection. (iv) Stochastic acceleration with monoenergetic injection, while undergoing adiabatic deceleration. We contrast our results with those assuming Shock Wave Acceleration. Results are illustrated for the case of the September 29, 1989, July 14, 2000, October 28, 2003 and January 20, 2005 Ground Level Events (GLE's).

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. 1 (SH), pages 117-120

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Session Classification : SH 1.4, SH 1.5

Track Classification : SH.1.5