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Radial diffusion coefficients of 1-30 MeV protons in the outer heliosphere

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Abstract content

Radial variations of quiet-time fluxes of ˜1-30 MeV protons are examined at distances of 2-85 AU using Voyager 1-2 (LECP, CRS) and Ulysses (LET) data. Attention is focused on the solar cycle minima of 1985-87 and 1995-97. Gradient values calculated from particle fluxes show an increase between 30 and 70 AU during the recovery phases of galactic cosmic ray intensity. The energy spectra change with heliocentric distance: for 1-8 MeV protons the characteristic negative slope with exponent –2 to –3 gradually decreases outwards and the spectra become nearly flat at 50 AU. These effects indicate the increase of galactic and anomalous particle contribution to the proton population in the distant heliosphere. Based on a simple one-dimensional modulation model of transport we determined the radial diffusion coefficients kappa(rr). The comparison of kappa(rr) with the diffusion mean free paths of higher energy anomalous protons suggests the dominant contribution of anomalous low energy protons in the outer heliosphere during the SC minima. The latitude variation of fluxes based on Ulysses data suggest a decrease towards higher latitudes on both hemispheres, however, streamer belt low-flux data are very scarce due to contamination from solar events during the fast latitude scans.

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. 1 (SH), pages 803-804

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