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Anomalous and galactic cosmic rays at a blunt termination shock

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Abstract content

The subsonic heliosheath beyond the termination shock (TS) of the solar wind plays a profound role in the transport of anomalous (ACR) and galactic cosmic rays (GCR). The energetic particle observations of Voyager-1, after crossing the TS in December 2004, indicate that the distribution of ACR is not uniform in the heliosheath. We point out that our concepts based on a simple 1-D shock cannot be directly applied for the TS, which is not a 1-D shock, since the spiral magnetic field lines intersect the TS multiple times. In a scenario like this, we cannot expect a uniform power law spectrum at the shock. Instead, a two-population spectrum can be anticipated. We present numerical simulations of the diffusive transport of ACR with parallel and perpendicular diffusion in a 2-D model including a blunt termination shock. The heliosheath is of major importance for the transport of GCR as well: a significant, perhaps dominant, fraction of the modulation of GCR occurs beyond the TS. We discuss the transport of GCR and ACR in the heliosheath and present numerical simulation results.

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 853-856

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