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Transport and acceleration of a few-MeV anomalous cosmic rays in the heliosheath

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Abstract content

The transport and acceleration of a few-MeV anomalous cosmic rays in the heliosheath is studied. We show that the compression of the solar wind (due to charge exchange) result in adiabatic acceleration of these particles. Furthermore, anomalous cosmic rays also experience acceleration of a stochastic nature in the inner heliosheath. Comparing numerical model results with Voyager 1 cosmic ray observations indicate that these acceleration mechanisms can be effective enough to reproduce the global trends in the observations beyond the termination shock and in the inner heliosheath. However, this process is strongly depending on the magnitude of the diffusion parameters in this region. It is also shown that a few-MeV anomalous particles may be effectively transported beyond the heliopause (traditionally defined as the modulation boundary) and into the outer heliosheath where they can dominate low energy intensities. In the hope to observe the true local interstellar spectrum at a few MeV, Voyager 1 has to travel significant distance beyond the heliopause.

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 857-860

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