

Anomalous and galactic cosmic rays in the heliosheath

J. Kota (1) and J.R. Jokipii (1)

(1) The University of Arizona, Lunar and Planetary Laboratory, Tucson, AZ 85721-0092, USA
(kota@lpl.arizona.edu)

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. 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.