

Voyager observations of energetic particles near the termination shock

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We present new observations of spectral characteristics of low-energy particles from Voyager 1 and 2 (V1 and V2) based on an improved analysis technique. We find that the proton power-law index for $0.5 \leq E \leq 1.5$ MeV as measured by V1 in the heliosheath from days 23 to 359 of 2005 has a median value of -1.7, with a daily rms variation of ± 0.1 . There are transient features in the spectra both in the heliosheath and in the upstream region. Strong field-aligned streaming is observed in the region just upstream of the shock where it has been suggested that the spectrum corresponds to the suprathermal tail of pickup ions in the solar wind.

Voyager 2 began observing termination shock particles (TSPs) streaming inward along the spiral magnetic field from the termination shock at ~ 76 AU, opposite to the streaming direction at V1. The V2 proton TSP spectra are similar to those observed by V1, with a spectral break near 3 MeV. Similar spectral breaks are also observed during transient interplanetary events associated with merged interaction regions.

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