

Abstract Submitted
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Ubiquitous Suprathermal Power Law Tails with Spectral Index -5

GEORGE GLOECKLER, University of Michigan — There is a great commonality in the spectra of low-energy (less than about a few MeV/nucleon) particles and suprathermal tails of the solar wind and pickup ions. When expressed as distribution functions in velocity space, all these spectra are power laws with a specific and common spectral index of 5. This is the case for all particle species examined so far and in all regions of the heliosphere explored up to now. Voyager 1 has been observing such spectra throughout the heliosheath it traversed and found -5 spectra in the low-energy particles accelerated at termination shock. These 5 spectra prevail during the most quiet times in the solar wind, far away from shocks, as well as in the regions downstream of shocks. The 5 spectra share some remarkable features. For example, it can be shown that such a spectral index is to be expected if the tails are formed by stochastic acceleration due to compressional turbulence in the solar wind (in which the particles are accelerated by and do an equal amount of work on the turbulence) and a cascade in energy, analogous to turbulent (Kolmogorov) cascades. Here we concentrate on observation evidence for the common spectral shapes.

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