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Fisk-Gloeckler Suprathermal Proton Spectrum in the Heliosheath and the Local Interstellar Medium JOHN COOPER, NASA Goddard Space Flight Center — Convergence of suprathermal keV-MeV proton and ion spectra approximately to the Fisk-Gloeckler (F-G) form $j(E) = j_0\ E^{-1.5}$ in Voyager 1and 2 heliosheath measurements is suggestive of distributed acceleration in Kolmogorov turbulence, which may extend well beyond the heliopause into the local interstellar medium (LISM). Turbulence of this type is already indicated by interstellar radio scintillation measurements of electron density power spectra. Previously published extrapolations (Cooper et al., 2003, 2006) of the LISM proton spectrum from eV to GeV energies are highly consistent with the F-G power-law and further indicative of such turbulence and LISM effectiveness of the F-G cascade acceleration process. The LISM pressure computed from this spectrum well exceeds that from current estimates for the LISM magnetic field, so exchange of energy between the protons and the magnetic field would likely have a strong role in evolution of the turbulence as per the F-G theory and as long ago proposed for cosmic ray energies by Parker and others. Pressure-dependent estimates of the LISM field strength should not ignore this potentially strong and even dominant contribution from the plasma. Presence of high-beta suprathermal plasma on LISM field lines could significantly affect interactions with the heliospheric outer boundary region and might potentially account for distributed and more discrete features in ongoing measurements of energetic neutral emission from the Interstellar Boundary Explorer (IBEX) mission.

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