



## **Solar wind bulk velocity fluctuations inducing ion power law distributions**

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At more or less all distances in the inner heliosphere ion velocity distributions in form of power laws have been observed in the range between 1 and several 100 KeV/nucleon. The spectral velocity power index in these cases is found close to (-5) with deviations to smaller and larger values, obviously depending on actual plasma conditions. In the recent past it has already been demonstrated that standard velocity diffusion processes driven by resonant scattering at counterflowing Alfvén waves (i.e. Fermi-2 acceleration!) in the inner heliosphere do not operate effectively enough to explain these extended suprathermal ion power tails. Therefore we are studying here an alternative acceleration process induced by the interaction of ions with consecutive solar wind bulk velocity jumps. We can demonstrate that an idealistic quasi-equilibrium state in the form of ion power laws exists under the assumption that complete pitchangle isotropy is maintained. The resulting power index of this quasi-equilibrium distribution function turns out to be (-3). We can, however, show that smaller spectral indices arise for uncomplete pitchangle isotropies. Dependent on the degree of this isotropy we can prove that power laws with spectral indices near (-5), as most often observed, naturally prevail at moderate pitchangle anisotropies.