Geophysical Research Abstracts, Vol. 9, 02086, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02086

Ions accelerated in the Turbulence of Shocks

G. Gloeckler (1,2) and L. A. Fisk (1)

(1) Department of Oceanic, Atmospheric and Space Sciences, University of Michigan, Ann Arbor, Michigan 48109, USA, (2) Department of Physics and IPST, University of Maryland, College Park, Maryland 20742, USA (gglo@umich.edu)

We extend our previous work on stochastic acceleration in compressional turbulence, which naturally leads to power law velocity distributions with the unique spectral index of -5 (Fisk. L. A. and G. Gloeckler, ApJL 640, L79-L82, 2006), to the acceleration of energetic particles at shocks. Redistribution of energy by stochastic acceleration, from the core population (particles with speeds less than about twice the solar wind speed, Vsw) to the tail particles with speed above 2Vsw, should occur both upstream and downstream from the shock. However, the core particles are heated non-adiabatically when crossing a shock, which raises more of them above the threshold for injection into the tail than is the case in the turbulence upstream of the shock, and this will yield an enhanced suprathermal tail downstream. We derive a simple expression for the pressure jump, as a function of the shock Mach number, of the tail particles in crossing the shock, and compared this with observations of the many shocks available in the solar wind.