PICK-UP ION ENERGIZATION AT THE SOLAR WIND TERMINATION SHOCK

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We describe the passage of preaccelerated, originally pitch-angle-isotropized pick-up ions over the solar wind termination shock taking into account the ACR/GCR-modulated shock structure. In a kinetic approach we study the fate of these ions in terms of transmission, reflection and spatial diffusion with the help of an adequate transport equation applied to the region of back-ground plasma conditions jumping from the upwind to the downwind side of the shock. At the changeover from the upstream to the downstream side of the shock the dynamic properties of the individual particles change according to the requirements of conserved adiabatic invariants. After transmission or reflection the pick-up ions reappearing on both sides of the shock constitute pitchangle-anisotropic distribution functions and on both sides are subject to further Fermi-2 acceleration processes described by anisotropic phase-space transports. We can show that the resulting down stream spectral distribution reveals two separate spectral features, one due to directly transmitted ions centered around KeV energies, the other due to multiply reflected ions around MeV energies. The relative spectral intensities in these features hereby vary fairly sensitively with the latitude of the shock position.