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Interaction of Energetic Particles with Discontinuities Upstream of Strong Shocks MIKHAIL MALKOV, PATRICK DIAMOND, UCSD — Acceleration of particles in strong astrophysical shocks is known to be accompanied and promoted by a number of instabilities which are driven by the particles themselves. One of them is an acoustic (also known as Drury's) instability driven by the pressure gradient of accelerated particles upstream. The generated sound waves naturally steepen into shocks thus forming a shocktrain. Similar magnetoacoustic or Alfven type structures may be driven by pick-up ions, for example. We consider the solutions of kinetic equation for accelerated particles within the shocktrain. The accelerated particles are assumed to be coupled to the flow by an intensive pitch-angle scattering on the self-generated Alfven waves. The implications for acceleration and confinement of cosmic rays in this shock environment will be discussed.

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