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Magnetic Pattern Resulting from Particle Acceleration in the Cosmic Ray Shock Precursor V. IVANOV, M.A. MALKOV, P.H. DIAMOND, UCSD — An acoustic instability of shocks which nonlinearly accelerate particles by the diffusive mechanism is studied in a nonlinear regime. The instability is driven by the pressure gradient of accelerated particles. The nonlinear term, included in the description of the instability, leads to the steepening of the unstable acoustic waves and to the formation of an ensemble of shocks (shocktrain). By compressing an ambient and turbulent magnetic field the shocktrain creates a distinct magnetic pattern. This changes the transport regime of accelerated particles from diffusive at lower momenta to fractionally kinetic (Levy flights and traps) over about two decades below the momentum cut-off. As a result, the spectral index of these particles steepens.

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