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**Nonlinear dispersive evolution of coherent trapped particle structures in collisionless plasmas** DEBRAJ MANDAL, DEVENDRA SHARMA, Inst for Plasm Res — The nonlinear limit of the collective perturbations in plasma is characterized by the onset of amplitude dependence in the wave dispersion. In a special class of nonlinear effects having origin in plasma kinetic theory, this amplitude dependence is removed only by collisions such that perturbations have no linear counterpart in collisionless limit and must follow a nonlinear dispersion relation (NDR). Exploring whether these fundamentally nonlinear perturbations can be driven unstable without entropy production might transform the character of the linear threshold based operating mechanism of the plasma turbulence that relies on well defined discrete spectrum prescribed by the linear plasma dispersion. In our multiscale, exact mass ratio, kinetic simulations the evolution of fundamentally nonlinear trapped particle structures is explored on both fast and slow ion and electron acoustic branches of the associated Nonlinear dispersion relation, respectively. The propagating structures that mutually interact exhibit a near continuum of the phase velocities and show microscopic evolution of the separatrix between streaming and trapped particle regions in the phase space, describing the subtle continuity between discrete and continuum bases of the plasma turbulence.

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