

ASYMPTOTIC MODELING OF FORMATION AND SATURATION OF MIRROR STRUCTURES

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A model for the nonlinear dynamics of mirror modes near the instability threshold is presented, aimed to understand the observations in planetary magnetosheaths and in the solar wind. By matching the quasi-linear theory for the space-averaged distribution function with a reductive perturbative description of the mirror modes, the model reproduces the development of magnetic humps from an initial noise, and also displays subcritical solutions in the form of magnetic holes, in agreement with Vlasov-Maxwell numerical simulations. While linear Landau damping is known to be driving the mirror instability, nonlinear Landau damping turns out to arrest the phenomenon of wave collapse.