



Response of a dusty plasma system to external charge perturbations

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The excitation of nonlinear wave structures in a dusty plasma caused by a moving external charge perturbation is examined in this work, which uses a 1-D flux corrected transport simulation. The plasma responds uniquely to different nature of the moving charge, depending on which, for small amplitude perturbations, pinned envelope solitons are generated and electrostatic

dispersive ion-acoustic shock waves are formed for a large amplitude perturbation. The presence of dust particles is found to suppress the formation of dispersive shocks at low velocity of the external charge debris. The results are also investigated theoretically as a solution to the generalized Gross-Piteavskii equation, which broadly supports the simulation results.