

NONLINEAR WAVE STRUCTURES IN COMPLEX PLASMAS: THEORY AND EXPERIMENTS

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S u m m a r y

Theoretical and experimental results on nonlinear wave structures in complex (dusty) plasmas are reviewed. It is shown that the hydrodynamic ionization source model is applicable to the nonlinear dust ion-acoustic structures in a double plasma device and a Q-machine device. The most important dissipative processes which are responsible for the generation of dust ion-acoustic nonlinear structures are investigated. Among them are the anomalous dissipation due to dust charging process, absorption and scattering of ions by dust grains, as well as the kinetic (including Landau) damping. Possibilities of observation of the dust ion-acoustic shocks in active rocket experiments in Earth's ionosphere as well as applications of such shocks to natural phenomena and technologies are discussed. Dust acoustic nonlinear structures are described both in strongly and weakly coupled complex plasmas.