

HIGHER ORDER DISPERSIVE EFFECT ON THE MODULATION OF ION ACOUSTIC WAVES IN WARM PLASMA AND THEIR STABILITY

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Abstract

The modulation of nonlinear ion . acoustic waves and their stability are studied through some typical balance of higher order dispersion and nonlinearity of warm plasma medium by deriving a Nonlinear Schrodinger Equation (NLSE) through a Modified Reductive Perturbation Technique (MRPT). Further the strongly dispersive ion-acoustic solitary waves (IASW) in warm plasma and their modulation have been studied through a Higher order equation of NLSE (HNLSE). A Duffing-like equation is obtained from the NLSE and corresponding solutions show some destabilizing effect for the wave number $k < 1$ and breather-like soliton formation (both compressive and rarefactive) for $k > 1$. Exact solution of the Duffing equation shows some mixed behavior of the stability of the nonlinear waves. The critical value of k with respect to ion temperature parameter α is considered for comparative study.

Key Words : *Wave modulation, MRPT, Non linearity, IAW, NLSE, HNLSE.*

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