

Nonlinear Ion Acoustic Waves in a Magnetized Dusty Plasma in the Presence of Nonthermal Electrons

Taraknath Saha^a, Prasanta Chatterjee^a, and Mohamed Ruhul Amin^b

^a Department of Mathematics, Siksha Bhavana Visva Bharati, Santiniketan, India

^b APCE Department, East-West University, Mohakhali, Dhaka, Bangladesh

Reprint requests to P. C.; E-mail: prasantachatterjee1@rediffmail.com

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The Kadomtsev-Petviashvili (KP) equation is derived for weakly nonlinear ion acoustic waves in a magnetized dusty plasma in the presence of nonthermal electrons. Soliton solutions are obtained in both the one-dimensional and two-dimensional framework. For the one-dimensional soliton solution the ‘tanh’ method is considered while the two-dimensional solution is obtained by a method introduced by S. V. Manacov et al., Phys. Lett. A **63**, 205 (1977). It is found that in case of the one-dimensional solution, both compressive and rarefactive solitary waves exist which could be obtained depending on the ratio of the electron and ion density. It is also seen that the nonthermal distribution of electrons has some significant effect in the shape of both the one-dimensional and two-dimensional solitary wave.

Key words: Ion Acoustic Wave; Dusty Plasma; Nonthermal Electron; Kadomtsev-Petviashvili Equation.