



Comparative study of Dust-Ion-Acoustic modified Korteweg-de Vries solitons in a dusty plasma with cubic and quartic nonlinearity

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Modified Korteweg-de Vries (mKdV) solitons with cubic nonlinearity has already been derived and the effects of different plasma parameters on amplitude and widths of Dust-Ion-Acoustic (DIA) solitary waves has been studied [1] for a dusty plasma comprising ions, Cairns distributed electrons and immobile dusts using usual reductive perturbation technique. In this pursuit, we intend to study Dust-Ion-Acoustic (DIA) solitary waves by considering quartic nonlinearity in the system. A new Modified Korteweg-de Vries equation is derived using reductive perturbation technique. Many interesting results are found in this theoretical investigation and the effects of different plasma parameters on the amplitudes and widths of the DIA solitary waves is studied. Finally a comparison of DIA mKdV solitons for cubic and quartic nonlinearity is done for this dusty plasma.

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