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DUST ACOUSTIC SOLITARY WAVES IN A WEAKLY RELATIVISTIC UNMAGNETIZED PLASMA

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Abstract

In this paper, we study dust acoustic solitary waves (DASW) based on the dust charge $Z_d = \frac{n_{d_0}}{n_{i_0}} = \frac{equilibrium\ density\ of dust\ ions}{equilibrium\ density\ of ions}$, initial dust speed U_{d0} and initial streaming speeds v_{e0} and v_{i0} of electrons and ions respectively with the introduction of relativistic effects. Noticeably speaking, the negatively charged dust particles are observed to be instrumental to generate only rarefactive solutions of small amplitudes inspite of relativistic ions and electrons. The small amplitude and width of the soliton of quite interesting character are established based on Z_d, u_{d0}, v_{i0} and v_{e0}. The existence of rarefactive solitons in dusty plasma with weak relativistic effects on ions and electrons for suitably defined parametric domains is the new outcome of this investigation.
