

Abstract

In this thesis, with the consideration of the dust charge variation we study the head on collision between two dust-acoustic solitary waves in an unmagnetized dusty. By using the extended Poincare-Lighthill-Kuo perturbation method. This method is used to study differential equations for finding periodic solution of a system which is perturbed in the parameter ϵ . This method treats all the problems on the uniform basis. The analytical phase shifts following the head-on collision are derived. The effects of the ratio of the ion temperature to electron temperature, $\beta = T_i/T_e$ the ratio of the number density of ions to the number density of the electrons $\delta = n_{i0}/n_{e0}$ and the dust charge variation on the phase shift are studied. It is found that the dust charge variation significantly changes the phase shift.