

## **Small amplitude ion acoustic solitary wave in negative ion plasma with superthermal electron**

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### **Abstract**

Ion-acoustic solitons in plasma consisting of warm positive and negative ions and hot superthermal electron (Kappa distribution) have been studied. Using the Reductive Perturbation Method (RPM), Korteweg de-Vries (KdV) and modified Korteweg de-Vries (m-KdV) equations are derived for the system. It is found that due to the presence of finite ion temperature there exist two-type of modes, namely slow and fast ion-acoustic modes. For slow mode, the amplitude and width of compressive/rarefactive soliton increases with increase in spectral index ( $k$ ). In fast mode, the amplitude of the compressive/rarefactive soliton decreases and width of the compressive/rarefactive soliton increases with increase in spectral index ( $k$ ). The present result may be helpful to understand the ion-acoustic solitary wave in space plasma, where superthermal electrons are present.