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Arbitrary amplitude ion-acoustic solitary waves in a two-temperature nonextensive electron plasma

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Abstract

Effects of presence of ions on the existence and structure of arbitrary amplitude ion-acoustic solitary waves in a plasma consisting of thermal ions and two-temperature nonextensive electrons are investigated. It is shown that solitons of both polarity (compressive and rarefactive) can exist in such a plasma, depending on the range of the plasma parameters. Also, it is seen that the maximum amplitude and the width of both soliton types depend sensitively on the temperature and concentration of ions. To better understand the role of positive ions, the presented model is reduced to a Maxwellian plasma and the results are compared to their Maxwellian counterparts.

Keywords. Ion-electron plasma, Sagdeev's potential, Nonextensivity, Two-temperature electrons, Solitons

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