

Electron-acoustic solitons in an electron-beam plasma system consisting of two-ion temperature isothermal plasma

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ABSTRACT

Electron-acoustic solitons are studied in an unmagnetized electron-beam plasma system whose constituents are cold plasma electrons, cold beam electrons and isothermal ions with two different temperatures. Using the reductive perturbation method, the nonlinear evolution of such a system is shown to be governed by Korteweg-de Varies (KdV) equation. The conditions for the occurrence of electron acoustic solitons are obtained. Theory is extended to arbitrary amplitude electron-acoustic solitons using the Sagdeev pseudopotential method. The results are compared with the nonlinear structures observed in the auroral zone by Polar and FAST spacecraft.