

البحث السادس

Title: [Ion-acoustic waves in a degenerate multicomponent magnetoplasma](#)

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Abstract. The hydrodynamic equations of positive and negative ions, degenerate electrons, and the Poisson equation are used along with the reductive perturbation method to derive the three-dimensional Zakharov–Kuznetsov (ZK) equation. The G'/G -expansion method is used to obtain a new class of solutions for the ZK equation. At certain condition, these solutions can describe the solitary waves that propagate in our plasma. The effects of negative ion concentrations, the positive/negative ion cyclotron frequency, as well as positive-to-negative ion mass ratio on solitary pulses are examined. Finally, the present study might be helpful to understand the propagation of nonlinear ion-acoustic solitary waves in a dense plasma, such as in astrophysical objects.