

Modulational Instability of Ion-Acoustic Wave in Electron-Positron-Ion Plasmas with Two-Electron Temperature Distributions

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Abstract : The nonlinear amplitude modulation of ion-acoustic wave is studied in the presence of two-electron temperature distribution in unmagnetized electron-positron-ion plasmas. The Krylov-Bogoliubov-Mitropoulosky (KBM) perturbation method is used to derive the nonlinear Schrödinger equation. The dispersive and nonlinear coefficients are obtained which depend on the temperature and concentration of the hot and cold electron species as well as the positron density and temperature. The modulationally unstable regions are studied numerically for a wide range of wave number. The effects of the temperature and concentration of the hot and cold electron on the modulational stability are investigated in detail.

Keywords : modulational instability, ion acoustic wave, KBM method

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