Abstract

In this thesis, we have considered the effects of trapping in a relativistic and ultra-relativistic fully degenerate e-p-i plasma with quantizing magnetic field. The linear dispersion relation for such an ion acoustic wave is derived for both relativistic and ultra-relativistic case and the propagation characteristics of these waves are discussed. To determine the nonlinear properties we have used the method of Sagdeev pseudo potential. The Sagdeev potential for the formation of solitary structures is been derived, that gives only the compressive solitons for relativistic and ultra-relativistic e-p-i plasmas. The dependence of linear and nonlinear propagation of ion acoustic wave on different plasma parameters i.e., quantizing magnetic field, positron concentration and Mach number have also been explored. The present work can be helpful for the understanding of complex phenomena in dense astrophysical plasmas.