

Abstract

Quantum effects have been investigated in highly dense non relativistic, relativistic and ultra-relativistic plasmas. Various issues have been brought under consideration right from the Alfvén solitary structure in non-relativistic, relativistic and ultra-relativistic electron-ion degenerate quantum plasmas. The full set of nonlinear QHD equations for a relativistic degenerate electron-ion plasma is used to investigate circularly polarized Alfvén waves via the Zakharov equations. The solitary structures in non-relativistic and ultra-relativistic degenerate quantum plasmas are discussed by applying the Sagdeev potential technique. Also, we have studied obliquely propagating electromagnetic excitations in dissipative in the presence of relativistic and quantum effects. In this regard, relativistic quantum magnetohydrodynamic model and reductive perturbation technique is incorporated to study the linear and nonlinear magnetoacoustic modes in non-relativistic and ultra-relativistic electron-ion plasma. Also the effects of electron concentration, obliqueness and the magnetic field strength on the shock structures are investigated to both fast and slow modes.