

ABSTRACT

We carry out a systematic study of the dispersion relation for linear electrostatic waves in arbitrary degenerate electron plasma. In the model, we assume that electrons are arbitrary degenerate while ions are supposed to be non-degenerate. We solve for the complex frequency spectrum for arbitrary values of wave number k and level of degeneracy μ . Our finding is that for large k and high μ the real part of the frequency ω_r grows linearly with k and scales with μ only because of the scaling of the Fermi energy. In this regime the relative Landau damping rate ω_i/ω_r becomes independent of k and varies inversely with masses of electrons and ions. Thus, damping is weak but finite at moderate levels of degeneracy for short wavelengths. Further work is in progress.