

# Abstract

In this thesis, we studied the Alfvénic double layer in three component space plasmas that consists of cold and hot electrons, ions. In our study, we considered electrons as nonthermal which follow kappa distributions. We derived linear dispersion relation from a set of fluid equations by using linear analysis. From linear dispersion relation, we found that by increasing population of hot electrons frequency increases both for cold and hot electrons. Also from normalized set of system fluid equation, by using nonlinear analysis we derived Sagdeev potential equation and got the solution for Alfvénic double layers. Existence regime of these double layers has been plotted showing the range of Alfvénic Mach number for different obliqueness. Moreover, we found that only compressive double layers exist for different values of kappa. Additionally, the study investigated how different values of kappa, which characterizes the nonthermal behavior of electrons, influence the formation and properties of these double layers.