

Relaxed States / Equilibrium Structures in the Atmospheres of Compact Stars

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Abstract

In present thesis the existence of equilibrium structures in the compact stars' atmospheres is studied. First we overviewed the characteristic parameters of the atmospheres of regular stars and compact stars comparing them. Special attention was made to the observed fine structure character of atmospheres. We concentrate on two specific examples: solar atmosphere with non degenerate electron-ion plasma and white dwarf atmosphere with degenerate (Fermi) electron plasma. We derived the major equations for non-degenerate electron-ion plasmas describing the relaxed states / equilibrium structures. Then we derived the describing equations for degenerate electron gas of electron-ion plasmas of compact star atmosphere and studied the equilibrium structures using Beltrami-Bernoulli (BB) states. Finally we could find the possibility of the existence of the equilibrium structures in degenerate electron-positron plasmas studying the triple Beltrami States; we investigated the possible applications of such states in Astrophysical context.