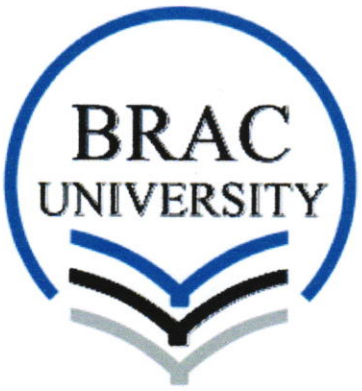

Inspiring Excellence

On Some General Relativistic Compact Anisotropic Charged Stellar Models

By
Tazkera Haque

A thesis submitted in partial fulfillment for the degree of Bachelor of Science in Physics

Department of Mathematics and Natural Sciences

BRAC University

July 2015

Declaration of Authorship

I, Tazkera Haque, declare that this thesis titled, 'On Some General Relativistic Compact Anisotropic Charged Stellar Models ' and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in requirement for a partial fullfilment of a Bachelor's degree in Physics at BRAC University.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help. This thesis has been done based on the work previously done by M. H. Murad and S. Fatema.

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"The increase of disorder or entropy is what distinguishes the past from the future, giving a direction to time."

Stephen Hawking, A Brief History of Time

BRAC University

Abstract

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With the presence of electric charge and pressure anisotropy some anisotropic stellar models have been developed. An algorithm presented by Herrera et al. (Phys. Rev. D 77, 027502 (2008)) to generate static spherically symmetric anisotropic solutions of Einsteins equations has been used to derive relativistic anisotropic charged fluid spheres. In the absence of pressure anisotropy the fluid spheres reduce to some well-known Generalized Tolman IV exact metrics. The astrophysical significance of the resulting equations of state (EOS) for a particular case (Wyman-Leibovitz-Adler) for the anisotropic charged matter distribution has been discussed. The interior matter pressure, energy-density, and the adiabatic sound speed are expressed in terms of simple algebraic functions. The constant parameters involved in the solution have been set so that certain physical criteria are satisfied. Physical analysis shows that the relativistic stellar structure obtained in this work may reasonably model an electrically charged compact star, whose energy-density associated with the electric fields is of the same order of magnitude as the energy density of fluid matter itself like electrically charged bare strange quark stars.