

Review Form 1.7

Journal Name:	International Astronomy and Astrophysics Research Journal
Manuscript Number:	Ms_IAARJ_98115
Title of the Manuscript:	Some new models of anisotropic relativistic stars in linear and quadratic regime
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Compulsory REVISION comments</p> <p>1. Is the manuscript important for scientific community? (Please write few sentences on this manuscript)</p> <p>2. Is the title of the article suitable? (If not please suggest an alternative title)</p> <p>3. Is the abstract of the article comprehensive?</p> <p>4. Are subsections and structure of the manuscript appropriate?</p> <p>5. Do you think the manuscript is scientifically correct?</p> <p>6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.</p> <p>7. Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)</p>	<p>1. The Einstein–Maxwell system of field equations plays a substantial role in the modeling of compact stars. In particular, it is important to consider the pressure experienced to be anisotropic whenever relativistic fluids are involved. However, due to its non-linearity getting an exact solution for the system of field equations is a difficult task. So, relativistic models for anisotropic compact stars are essential as they can provide important physical insights about stellar configurations.</p> <p>2. At the first glance the term “regime” is not clear (see question 7.6) at point 7. below). Besides, it does not convey the idea that the author analyzes the case of charged stars. I would propose the following title: “Some new models for charged anisotropic relativistic stars with a linear and quadratic equation of state”.</p> <p>3. The Abstract is clearly written even if I would specify that the terms “linear and quadratic regimes” refer to “linear and quadratic equation of state”.</p> <p>4. Yes.</p> <p>5. Although I have not redone all the calculations in detail (the time for the evaluation of the work was very tight), my impression is that the calculations are correct.</p> <p>6. The list of references cited in this work is quite exhaustive. For completeness, I would also quote the following works: [1] Takisa P.M., Maharaj S.D. and Ray S., <i>Stellar objects in the quadratic regime</i>, ArXiv (2014). https://arxiv.org/abs/1412.8124. [2] L. Herrera, <i>Cracking of self-gravitating compact objects</i>, Physics Letters A, 165(3), 206 (1992). [3] S. Chandrasekhar, <i>The Dynamical Instability of Gaseous Masses Approaching the Schwarzschild Limit in General Relativity</i>, Astrophysical Journal, 140, 417 (1964). [4] B.K. Harrison, K.S. Thorne, M. Wakano, and J.A. Wheeler, 1965, <i>Gravitation Theory and Gravitational Collapse</i> (Chicago, IL: Univ. Chicago Press). [5] Zeldovich, Ya.B. and Novikov, I.D. (1971) <i>Relativistic Astrophysics</i>. University of Chicago Press, Chicago.</p> <p>7. The following suggestions are intended to facilitate the reading of this work. Below can be found only a few of them without being exhaustive.</p> <p>7.1) In the literature, $\square(r)$ and $\square(r)$ are referred to as <i>metric potentials</i>.</p> <p>7.2) Please specify that in this work, the speed of light c and the constant G are set to unity, i.e. $c=G=1$.</p> <p>7.3) Eqs (2) and (3) pop-up without explanation. To facilitate the reading of the work, after Eq.(1) on page 3, please report the stress-energy tensor for the anisotropic matter distribution within the stellar structure and show that from this expression and the line element Eq.(1) we get the Einstein field equations for the charged anisotropic matter.</p> <p>7.4) Please, specify that this work considered the four-velocity U^ν comoving stellar fluid velocity i.e., $e^{v(r)} U^\alpha = \delta^\alpha_0$.</p> <p>7.5) Please, specify that $\square = p_t - p_r$ is referred to as the <i>anisotropy parameter</i>.</p> <p>7.6) The author has chosen the metric potential proposed by Thirukanesh and Ragel and Malaver $Z(x)=(1-ax)^n$ and analyzed the case $n=1$ (<i>linear regime</i>) and $n=2$ (<i>quadratic regime</i>). Please explain why, from the physical point of view, these two cases are called “regimes”. Actually, these terms refer rather to equations of state than to real regimes.</p> <p>7.7) Concerning the conditions of physical acceptability for new models, typically, the main conditions to be satisfied are: i) The internal metric and the external metric must be continuous about the surface $r=R$. ii) The solution must not have singularities, i.e., for $0 \leq r \leq R$ the metric functions, the charge, density, and pressures are non-negative. iii) The charge should be a monotonically increasing function of radius, towards the surface of the sphere. iv) The pressures and density must be positive and monotonically decreasing, with their maximum value in the center. v) Radial pressure should vanish at the boundary. vi) The solution must satisfy the balancing force equation. vii) The stability conditions (the Herrera cracking condition, the Chandrasekhar stability criterion, and the Harrison–Zeldovich–</p>	

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	Novikov criterion) must be satisfied. In addition, some conditions must be imposed on the linear relationship of energy density and pressure of anisotropic compact stars, which are collectively known as energy conditions. The solutions are required to fulfill all the energy conditions simultaneously. The author is asked to discuss this point by citing the appropriate references in this respect.	
Minor REVISION comments		
1. Is language/English quality of the article suitable for scholarly communications?	1. Please check English; several typos were found.	
Optional/General comments	The work is interesting and deserves attention. However, there are some points that, in my opinion, need to be clarified. The suggestions expressed above are intended to fill some (but not all) of these gaps.	

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

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