Comments on revisiting the classical electron model in general relativity

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Abstract We point out here that all the solutions presented in Rahaman et al. (Astrophys. Space Sci. 331:191–197, 2011) are incorrect and do not satisfy the system of governing Einstein–Maxwell field equations.

Keywords Einstein–Maxwell equations

To model electron as a spherically symmetric charged perfect fluid matter, Rahaman et al, in Section 2 of their paper, consider the Einstein–Maxwell field equations (equations (5)–(7) and equation (9) or (10) in Rahaman et al. 2011). Note that equations (9) and (10) are equivalent. They assume a quadratic equation of state (equation (8) in Rahaman et al. 2011) and include the hydrodynamical equilibrium condition (equation (11) in Rahaman et al. 2011) in the system.

In Section 3 of their paper, they assume the volume charge density to be a polynomial function of the radial parameter (equation (12) in Rahaman et al. 2011). Then in Section 3.1, they assume that the effective radial pressure is constant (equation (13) in Rahaman et al. 2011). They are also relating the second metric coefficient with effective gravitational mass (equation (19) in Rahaman et al. 2011).

Therefore, the authors finally have a system of *nine* differential and algebraic equations, namely, equations (5)–(9), (11)–(13) and (19) in Rahaman et al. (2011), involving *seven* unknowns, namely λ , v , ρ , p , E , s and σ or q . In order to

obtain different solutions they choose particular values of one of the unknowns “ s ”, which is essentially reducing the number of unknowns to *six* with *nine* equations to satisfy.

It can be trivially checked that the solutions given in the Section 3.1, equations (20)–(29) in Rahaman et al. (2011), do not satisfy equation (5) in Rahaman et al. (2011). Also, the solutions given in the Section 3.2, equations (36)–(37) in Rahaman et al. (2011), do not satisfy equation (7) in Rahaman et al. (2011).

Reference

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