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A study on the maximum mass and stability of strange stars affected by the mass of strange quarks (m_s≠0).

In this article, we analyze a class of compact object in spheroidal geometry described by Vaidya–Tikekar model and MIT bag equation of state considering the finite value of strange quark mass (m_s). The maximum mass and radius is evaluated by maximizing the radial sound velocity (v_r^2) at the centre of the star. For monotonically decreasing nature of the sound velocity, it is noted that an upper limit of the spheroidal parameter (λ) exists. Therefore, to calculate maximum mass, arbitrary choice of (λ) is not allowed. The effect of strange quark mass on the maximum mass is found to satisfy previously obtained result (Li et al 2021 Eur. Phys. J. C 81 921). We consider the compact stars 4U 1608-52 and 4U 1820-30 to study the relevant properties in this approach. The stability of strange quark matter inside these compact objects is explored by taking different values of the bag constant B. It is found that 4U 1608-52 may be categorized as strange star with wider stability window for three-flavor (u, d, s) quark matter whereas 4U 1820-30 only shows metastability. The model is found to be stable against small radial perturbation.

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