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## DARK MATTER VS BLACK HOLE MODEL

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We extend our results published in Comm. Math. Phys. 2021 and J. Diff. Eqs 2023 to cover relativistic case in Math. Meth. Appl. Sci. 2023 modelling dark matter model for Tolman-Oppenheimer-Volkoff Equation

$$-rp'(r)(r - 2m(r)) = (m(r) + 4\pi r^3 p(r))(\rho(r) + p(r))$$

as an alternative to black hole model studied recently by Klainerman, Szeftel and Giorgi or Dafermos, Holzegel, Rodnianski and Taylor both in static Schwarzschild and rotating Kerr geometries. For the introduction see the review papers of Giorgi and Bieri. The results obtained by Genzel and Ghez for Sagittarius A\* were analyzed among others by Ruffini and Chavanis in the framework of dark matter with the modified relativistic Michie-King distribution function yielding the relevant equation of state providing the energy momentum tensor for Einstein equation. We analyze the stationary model reformulating it as a dynamical system for which the global Lyapunov function is obtained thus yielding the limit mass for the system predicting gravitational collapse into a black hole.

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