$$G_{\mu\nu} - \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

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Anisotropic Spherically Symmetric Collapsing Star From Higher Order Derivative Gravity Theory

Tuesday, 15 December 2015 18:25 (0:03)

Collaboration

Content

Combinations of Lovelock polynomials $R^2, R_{\mu\nu}R^{\mu\nu}$ and $R_{\mu\nu\eta\delta}R^{\mu\nu\eta\delta}$ is added with Einstein-Hilbert action to obtain interior metric of an anisotropic spherically symmetric collapsing (ASSC) stellar cloud. We assume that time dependent interior metric of the ASSC cloud is flat Minkowski at beginning of the collapse. We solved linearized metric equation and obtained convergent series solutions for the interior metric components, mass density, radial, transverse and isotropic pressures, time dependent barotropic index and dimensionless anisotropic parameter. Ricci and Kretschmann scalars for our solutions are not singular at the beginning and duration of the collapse. Mathematical calculations predict that the collapsing cloud reach to its final state (compact object) and the collapse will be stopped at a finite time t_C. Also we obtain particular times t_E and t_A where the singularity and apparent horizon are formed. Singularity can not be observed by an external observer because of $t_E > t_A > t_C$.

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