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Consequences of Pilgrim Dark Energy in $f(T, T_G)$ **cosmology**

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Pilgrim dark energy (PDE) model is studied in this paper and Hubble horizon has been used as an IR cutoff. The basic assumption of this model is that phantom acceleration prevents the formation of the BH. The said PDE is considered in a modified gravity $f(T, T_G)$, which has been constructed by Kofinas and Saridakis (2014) on the basis of T (old quadratic torsion scalar) and T_G (new quartic torsion scalar T_G that is the teleparallel equivalent of the Gauss-Bonnet term). We have compiled our work in two phases: Firstly, we have assumed different scale factors such as $a(t) = a_0 t^m$, $H = H_0 + \frac{H_1}{t}$, $a(t) = exp(At^m)$ and $a(t) = a_0 + \alpha(t - t_0)^{2n}$. We have reconstructed f and subsequently w_{DE} in this scenario. Secondly, we have assumed analytic function such $f = b_0 + b_1 t + b_2 t^2 + b_3 t^3$ and reconstructed Hubble parameter and w_{DE} without any choice of scale factor.

Throughout the study, we have considered s = -2 and s = 2, separately. We have observed that s = -2, as described in PDE (Wei, 2012), seems more realistic choice for s than s = 2 and this outcome of the present reconstruction work is consistent with Wei (2012). Moreover, it has been observed that the reconstructed w_{DE} , irrespective of choices of scale factor or a choice of f, exhibit a more aggressive phantom-like behavior for s = -2 than s = 2. This result also matches the study of Wei (2012). Hence, it is finally concluded that PDE, when considered in $f(T, T_G)$ gravity is capable of attaining the phantom phase of the universe.

Summary

We work on the reconstruction scenario of pilgrim dark energy" (PDE) in $f(T, T_G)$. In PDE model it is assumed that a repulsive force that is accelerating the Universe is phantom type with $(w_{DE} < -1)$ and it so strong that prevents formation of the black hole. We construct the $f(T, T_G)$ models and correspondingly evaluate equation of state parameter for various choices of scale factor. Also, we assume polynomial form of $f(T, T_G)$ in terms of cosmic time and reconstruct H and w_{DE} in this manner. Through discussion, it is concluded that PDE shows aggressive phantom-like behavior for s = -2 in $f(T, T_G)$ gravity.

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