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Standard Abelian duality transformations in $f(T)$ gravity

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Abstract

According to the perturbation order, the equations related to the motion of low-energy string effective action are, in fact, a type of generalization of Einstein equations. Thus, by using the conformal transformation of the metric tensor, the low-energy string effective action into $f(T)$ gravity is shown, with a relationship between the dilaton field and the torsion scalar. Considering a homogeneous and isotropic universe for the canonical Lagrangian of $f(T)$ gravity, we show that this lagrangian is kept invariant under the transformations of the metric tensor and abelian duality (scale factor duality). Finally, by the use of the dualized Lagrangian and also, the invariance of torsion scalar T under the transformation of the scale factor duality $a(t) \rightarrow 1/a(t)$, the precise form of the $f(T)$ function is obtained.

Keywords: Abelian duality transformations, string effective action, $f(T)$ gravity

For full article, refer to the Persian section