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Cosmological tensions and strong coupling issue in the f(T) gravity

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By incorporating torsional gravity into the effective field theory (EFT)perspective, the model offers a unified and By Incorporating torsional gravity into the EFT perspective offers a unified and consistent framework to fit observations solving the two tensions. Both the H0 and 8 tensions can simultaneously be alleviated within torsional gravity by the EFT approach. Further, we investigate the scalar perturbations and the possible strong coupling issues of f(T) around a cosmological background. We apply the EFT framework by considering both linear and second-order perturbations for f(T) theory. We find that no new scalar mode is present in both linear and second-order perturbations in f(T) gravity, which suggests a strong coupling problem. However, based on the ratio of cubic to quadratic Lagrangians, we provide a simple estimation of the strong coupling scale, a result which shows that the strong coupling problem can be avoided at least for some modes. In conclusion, perturbation behaviors that at first appear problematic may not inevitably lead to a strong coupling problem, as long as the relevant scale is comparable with the cutoff scale M of the applicability of the theory.

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