MAGIC

Science of the Cosmos

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Is f(Q) capable of relieving H0 and S8 tensions?

Yes, the symmetric teleparallel framework brings about the possibility of alleviating cosmological tensions. The current burning issue in cosmological studies is the increase in discrepancies in measurements from several surveys. Here, we have focused on H_0 and S_8 tensions, which are important factors in describing the evolution of the Universe from primordial perturbation to late-time acceleration. Additionally, the consistency of the sound horizon is verified against the Planck results. The $f(Q)$ gravity model is constrained using recently obtained data. Implementing gravitational wave data to study late-time acceleration is one of the key features of our study. Since standard sirens show promising results, the implementation of gravitational waves to probe dark energy is an interesting study. Through our work, we introduce this possibility by performing statistical MCMC analysis for late-time cosmological evolution. Also, the H_0 and S_8 tensions are explored utilizing gravitational wave data alongside other prominent datasets, such as DESI, redshift space distortion, cosmic chronometers, Pantheon+SH0ES, and CMB. With the results obtained, we analyzed the profile of cosmological parameters. Finally, the study presents the tension of the model with observations, which is found to have a much lower magnitude compared to the current trend. Thus, the considered $f(Q)$ model alleviates tension, making it the best candidate for further investigation.

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