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Testing $f(Q)$ gravity as a solution for the H_0 and S_8 tensions

The persistent discrepancies between early and late universe cosmological measurements of the Hubble parameter (H_0) and the matter clustering parameter (S_8) pose significant challenges to current physics. In this study, we take into account such discrepancies to solve through the modified theory of gravity known as $f(Q)$ gravity (a symmetric teleparallel) framework where gravity is described by non-metricity Q, which offers a promising alternative to resolve these tensions. We will investigate the viability of $f(Q)$ gravity confronting the theory with recent cosmological data sets from both early and late measurements. Our analysis determines whether $f(Q)$ gravity can simultaneously reconcile the tensions of the H_0 and S_8 parameters while providing a theoretically compelling alternative to the ΛCDM model. The results provide crucial insights into modified gravity's capacity to address fundamental challenges in modern cosmology.

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Primary author: MITHI, Dumiso

Co-authors: AKALU, Shambel (North-West University); ABEBE, Amare (North-West University)

Presenter: MITHI, Dumiso

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