

Constraining über gravity with recent observations and elucidating the H_0 problem

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This work [1] studies both Λ CDM and CDM models under the über gravity theory [2], named $\ddot{\Lambda}$ CDM and \ddot{C} DM respectively. We report bounds over their parameter phase-space using several cosmological data, in particular, the recent Pantheon+ sample. Based on the joint analysis, the best fit value of the über characteristic parameter is $z_{\oplus} = 0.046_{-0.032}^{+0.047}$ and $z_{\oplus} = 1.382_{-0.021}^{+0.020}$ at 68% confidence level for $\ddot{\Lambda}$ CDM and \ddot{C} DM respectively. Although über gravity can successfully mimics the cosmological constant, we find that the $\mathbb{H}0(z)$ diagnostic suggests the H_0 tension is not alleviated. Finally, both models are statistically compared with Λ CDM through the Akaike and Bayesian information criteria. Both über gravity models and Λ CDM are equally preferred for most of the single samples, in particular, $\ddot{\Lambda}$ CDM is not rejected by the CMB data. However, there is strong evidence against them for the joint analysis.

Keywords: cosmological models, uber gravity, bayesian analysis, Hubble tension.

[1] G. A. Concha, C. Quintanilla, M. García-Aspeitia, A. Hernández-Almada and V. Motta (2023), arXiv:2301.07044v1 [astro-ph.CO].

[2] N. Khosravi, S. Baghran, N. Afshordi, and N. Altamirano, Phys. Rev. D **99**, 103526 (2019), arXiv:1710.09366 [astro-ph.CO].