

The Hubble parameter of the Local Distance Ladder from dynamical dark energy with no free parameters

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The H_0 -tension problem challenges our conventional application of general relativity to cosmology, otherwise well-described by FLRW universes in terms a Hubble parameter $H(z)$ and a deceleration parameter $q(z)$. A finite dark energy density is expected from the Sitter temperature associated with the de Sitter background scale of acceleration $a_{dS} = cH$, where c is the velocity of light. Normalizing the propagator by the total phase of the Hubble horizon, this predicts a dynamical dark energy $\Lambda = g(1 - q)H^2$, where $g = 1 - \xi\alpha < 1$ refers to a gravitational coupling constant modified on the order of the fine-structure constant α . Preserving the astronomical age of the Universe and the BAO, we infer $\xi = 0.49 \pm 0.1$. Specifically, $\xi = 1/2$ predicts $H_0 = (73.37 \pm 0.54)\text{km/s/Mpc}$ (van Putten, 2021, PLB, 823, 136737) consistent with $H_0 = (73.30 \pm 1.04)\text{km/s/Mpc}$ of the Local Distance Ladder (Riess et al. 2022, ApJ, 934, L7).

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