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# Connecting Early Dark Energy to Late Dark Energy by the Diluting Matter Potential

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In this work we study a scale invariant gravity theory containing two scalar fields, dust particles and a measure defined from degrees of freedom independent of the metric. The integration of the degrees of freedom that define the measure spontaneously break the scale symmetry, leaving us in the Einstein frame with an effective potential that is dependent on the density of the particles. The potential contains three flat regions, one for inflation, another for early dark energy and the third for late dark energy. At a certain point, as the matter dilutes, tunneling from the early dark energy to the late dark energy can start efficiently.
This mechanism naturally alleviated the observed Hubble tension by modifying the sound horizon prior to recombination while preserving late-time cosmology. Moreover, the model predictions are consistent with observations from the reduced CMB, BAO, and local measurement of $H_0$, providing a coherent and unified description of the universe. In this context, the Bayesian analysis of these datasets confirms the viability of our scenario, with the best-fit parameters indicating an early dark energy fraction of $f_{\rm NEDE} \approx 0.3$ at a redshift of $z' = 5000$. This preliminary estimate, obtained
using the reduced CMB dataset, is expected to be tightened
once the full CMB likelihood is considered.

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