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Unparticles and H_0 -tension in the late-time universe

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Λ CDM is increasingly challenged by observations in the late-time Universe. Here we consider unparticle cosmology for its potential to alleviate some of these issues. Unparticles offer a scale invariant contribution by an extra parameter δ , here studied for $\delta \in [-6, 1]$ (corresponding to scaling dimension $d_u \in [-2, 3/2]$). For most values of δ , the model predicts the distant future to be Minkowski or stable de Sitter, the latter in common with Λ CDM. For some $\delta \approx -3$, it predicts a diverging $H(z)$ in the future of universe accompanied by a turning point at some $-1 < z < 0$. However, in a detailed confrontation with $H(z)$ -data within the radius of convergence of this model, the data show a clear preference for the holographic limit $\delta = -2$ without any additional assumptions. This pointer to holography is remarkable because of recent studies suggesting it may ameliorate H_0 -tension, even though in unparticle cosmology this limit fails to resolve this tension evidenced by a pronounced gap in our qQ -diagram.

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