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Modified Chaplygin gas as early dark energy

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We introduce an effective parametrization of an early dark energy model that mimics radiation at early times and governs the present acceleration of the Universe. We show that such a parametrization can be modeled by a Chaplygin gas and investigate the cosmological viability of the model. We use a Bayesian method and the modular software \textsc{CosmoSIS} to find the best values for the free parameters of the model and some relevant cosmological parameters associated with the evolution of this matter-energy contribution. Our results predict an earlier formation of the structure and a shorter age of the Universe compared with the ΛCDM model. We also explore the likelihood that this kind of dark energy model could alleviate the ongoing tensions in cosmology, the Hubble tension, and the so-called σ_8 tension. Early dark energy models are quite promising for understanding the evolution of the early Universe and add dynamics to this dark component, which is still undetected yet predominant at this stage of the Universe.

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