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General relativity as an attractor for scalar-torsion cosmology

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Abstract

© 2016 American Physical Society.We study flat Friedmann-Lemaître-Robertson-Walker cosmological models for a scalar field coupled nonminimally to teleparallel gravity with generic coupling and potential functions. The goal in this paper is to determine the conditions under which cosmological evolution tends to the limit where the variation of the gravitational "constant" ceases and the system evolves close to general relativity (GR). These conditions can be read off from the approximate analytical solutions describing the process in matter and potential domination eras. Only those models where the GR limit exists and is an attractor can be considered viable. We expect the results to hold in the original "pure tetrad" formulation as well as in the recently suggested covariant formulation of the teleparallel theory. In the former case the GR attractor simultaneously provides a mechanism for how cosmological evolution suppresses the problematic degrees of freedom stemming from the lack of local Lorentz invariance.

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