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Generalizing the coupling between spacetime and matter

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We construct a new class of extension of General Relativity starting from the idea that the coupling between spacetime and matter is the key to understand dark phenomenology. We then focus on one of the simplest examples of such a class of theories which contains only one additional parameter dubbed “MEMe model”. We show that this theory is able to offer a unified framework for dark energy and inflation. The MEMe model requires an extension of the classical Post-Newtonian expansion to be analyzed in the weak field, slow-motion approximation. We find that in the context of the MEMe model the structure of compact objects can be different from the ones of GR, whereas, if one considers only one type of fluid, the circular orbits of the fluid particles differ significantly from the usual ones only in the center of the matter distribution.

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