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Solitons, bounces, and tunneling with non-canonical kinetic terms

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Scalar fields with non-canonical kinetic terms are ubiquitous in theories of dark energy and modified gravity. This naturally raises the question of how non-perturbative effects, like domain walls and quantum tunneling, are modified in the presence of these kinetic terms. Focusing on galileons, which appear in the decoupling limit of massive gravity and DGP, I will discuss the construction and stability of solitonic solutions, as well as the effect of these terms on tunneling decay rates. We confirm for the first time that the WKB approximation and Coleman tunneling approach are valid in the presence of galileon-type and $P(X)$ kinetic terms. This can shed light on tunneling rates and non-perturbative solutions in modified gravity theories with screening mechanisms and non-trivial non-linear effects.

Presentation type

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