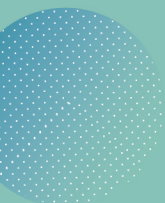




INSTITUTO DE FÍSICA
DE PARTÍCULAS Y DEL COSMOS

IPARCOS



Preprint Series in Particles and Cosmos Physics

n° IPARCOS-UCM-26-046

Leading Logarithms in the Effective Theory of Gravity I: corrections to the scalar mass

by D. Mysliaeva, et al., (including A. Vladimirov)

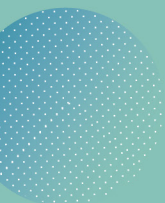
September 2026

Plaza de las Ciencias, 1 28040 Madrid, Spain

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Abstract

In a low-energy effective field theory (EFT), scaling logarithmic terms arise from the renormalization of higher-dimensional couplings that absorb divergences generated by loop integrals with lower-order vertices. Consequently, leading logarithms (LLs) are generated entirely by the leading-order Lagrangian, rendering them universal low-energy predictions. Adapting techniques developed for chiral perturbation theory, we analyze the series of LLs in the EFT of general relativity. As a concrete application, we compute LL corrections to the scalar pole mass up to three-loop order and demonstrate that they can be determined recursively to arbitrary order. To confirm the physical validity of our results, we carry out the calculation using a general gauge-fixing parameter and explicitly verify its complete cancellation in the physical observable.

