

Physical Running in Conformal Gravity and Higher Derivative Scalars

Wednesday, 18 December 2024 17:00 (30 minutes)

We compute the physical running of a general higher derivative scalar coupled to a nondynamical metric and of higher derivative Weyl-invariant gravity with a dynamical metric in four dimensions. The physical running differs from the μ -running of dimensional regularization due to infrared divergences, unlike in standard two-derivative theories. Using the higher derivative scalar as a toy model, we explore the conformal limit and its relation to the trace anomaly. Despite this difference, higher derivative Weyl gravity remains asymptotically free, suggesting it is a viable completion of Einstein's gravity, at least from the point of view of its renormalization group properties.

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