

# Emergence of kinetic terms in String Theory

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The Emergence Proposal proposes that kinetic terms for fields in quantum gravity are emergent from integrating out towers of heavy states, and that this physics underlies some of the central Swampland constraints on effective theories. We provide evidence for this idea in the context of type IIA string theory on Calabi-Yau manifolds. We argue that the full kinetic terms for the vector multiplets, as controlled by the prepotential, arise from integrating out massive non-perturbative states at one-loop. The leading, tree-level, contribution to the prepotential arises from integrating out the ultraviolet modes of these states. At those energy scales, the degrees of freedom are strongly-coupled but can be captured in some cases by Fermi gas models.

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