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Asymptotics of 5d Supergravity Theories and the Emergent String Conjecture

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Using supergravity string probes, we study infinite distance boundaries in the vector multiplet moduli space of 5d N=1 supergravities. By imposing consistency of their worldsheet theories, we derive several constraints on the 5d Chern-Simons couplings, including their non-negativity. These constraints allow us to classify all infinite distance limits without having to assume any geometric origin of the theory. Our findings are in perfect agreement with the predictions of the Emergent String Conjecture and imply that every consistent 5d N=1 supergravity with a non-compact vector multiplet moduli space either descends from six dimensions or comes from string theory.

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