Preprint Series in Particles and Cosmos Physics

nº IPARCOS- UCM-23-001

Embedding Unimodular Gravity in String Theory

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January 2023

Plaza de las Ciencias, 1 28040 Madrid, Spain

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Abstract

Unimodular Gravity is a theory displaying Weyl rescalings of the metric and transverse (volumepreserving) diffeomorphisms as gauge symmetries, as opposed to the full set of diffeomorphisms displayed by General Relativity.
Recently, we presented a systematic comparison of both theories, concluding that both of them are equivalent in everything but the behaviour of the cosmological constant under radiative corrections.
A careful study of how Unimodular Gravity can be embedded in the string theory framework has not been provided yet and was not analyzed there in detail.
In this article, we provide such an explicit analysis, filling the gap in the literature.
We restrict ourselves to the unoriented bosonic string theory in critical dimension for the sake of simplicity, although we argue that no differences are expected for other string theories.
Our conclusions are that both a Diff and a WTDiff invariance principle are equally valid for describing the massless excitations of the string spectrum.

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