This article explores the possibility of extracting Einstein gravity (or general relativity) out of conformal supergravity in twistor-string theory [1]. An earlier investigation on this issue has been carried out in [2] but, as shown in [3] (see also [4]), the newly proposed methods lead to a chiral supergravity rather than Einstein supergravity.

Motivated by a recent insight [5] into the extraction of Einstein gravity with positive cosmological constant ($\Lambda > 0$) out of conformal gravity, in this article the authors further investigate its twistor-string interpretation. They show that the extraction procedure corresponds to the requirement of the twistor-string relation between the degree of algebraic curves on supertwistor space and the MHV degree of the amplitudes of interest. This proposition is explicitly shown for the cases of three-point MHV and $\overline{\text{MHV}}$ amplitudes (corresponding to the MHV degree 0 and 1, respectively) for $\mathcal{N} = 0$ and $\mathcal{N} = 4$ supersymmetry, and with and without cosmological constant Λ. From the computation, one can readily see that the resultant gravity theories are not chiral. Supportive arguments for the results are also made by use of the standard BCFW recursion relations.

Further understanding of these results is reported by the same authors in [6] where the generalization of the above computation beyond the three-point graviton amplitudes is shown. The interested readers should also refer to the closely related recent progress [7].

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