

In this article the authors applied the spinor-helicity formalism to 10-dimensional $\mathcal{N} = 1$ super Yang-Mills theory. Motivation of this study is to find whether or not the 10-dimensional extension also preserves the recently discovered dual conformal symmetry as in the case of 4-dimensional $\mathcal{N} = 4$ super Yang-Mills theory. Since the latter theory is related to the former by a simple dimensional reduction, one guesses that the dual conformal symmetry exists in the 10-dimensional theory as well. This assertion is indeed confirmed in this article by explicitly defining the tree-level scattering amplitudes of the 10-dimensional theory. More concretely, the authors obtain a 10-dimensional analog of the BCFW recursion relations [1, 2] for tree amplitudes of arbitrary helicity configuration and explicitly show that the dual conformal symmetry is preserved in the higher-dimensional BCFW recursion relations.

The confirmation is made at tree level but, as the author argue, these results may have two implications for lower-dimensional loop calculations in the context of recent studies. One is for the calculations in six-dimensional theories in the spinor-helicity formalism [3]. The other is for a regularization scheme of the $\mathcal{N} = 4$ super Yang-Mills theory in four dimensions by moving to the so-called Coulomb branch of the theory [4].

References

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