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Title:

“Two-loop cusp anomaly in light-cone gauge $\text{AdS}_4 \times \text{CP}^3$ superstring”

Abstract:

We compute the strong coupling one- and two- loop corrections to the ABJM cusp anomalous dimension by evaluating the corresponding corrections to the string partition function for the Euclidean surface ending on the null cusp on the boundary of AdS_4 . The calculation is performed using the $\text{AdS}_4 \times \text{CP}^3$ action of D.V. Uvarov in arXiv:0912.1044, obtained from the dimensional reduction of the $D = 11$ coset superspace $\text{OSp}(8|4)/\text{SO}(7) \times \text{SO}(1, 3)$, where the κ -symmetry light-cone gauge is such that both light-like directions lie in AdS_4 . All occurring one- and two-loop UV divergencies are shown to cancel, with a mechanism that closely resembles its $\text{AdS}_5 \times \text{S}^5$ counterpart. The result is in full agreement with the prediction for the universal scaling function as obtained from the $\text{AdS}_4/\text{CF T}_3$ Bethe ansatz, where the interpolating function $h(\lambda)$ in the dispersion relation is the (strong coupling expansion of) the exact expression recently proposed in arXiv:1403.1894. This work provides thus a non-trivial perturbative test of the latter, as well as evidence for UV-finiteness and quantum integrability of the space, which - as the classical string moves entirely in AdS_4 - is not described by the classically integrable $\text{OSp}(6|4)/\text{U}(3) \times \text{SO}(1, 3)$ sigma-model.