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Exploring M-theory on AdS7×S4: Mellin amplitudes with composite operators

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Abstract

We bootstrap mixed correlators in M-theory on AdS7×S4, focusing on tree-level correlation functions involving one double-particle operator and three single-particle operators. Combining inputs from AdS/CFT, the chiral algebra, and the OPE at large central charge, we uniquely determine the Mellin amplitude for ⟨[2q],2,p,p+q−2⟩ for generic p and q. While our main focus is the N=(2,0) SCFT in six dimensions, we also derive the analogous result in AdS5×S5, applying the same bootstrap approach to N=4 SYM. Despite their different dynamics, the resulting Mellin amplitudes exhibit a strikingly similar structure, with non-trivial OPE predictions for low-twist protected operators providing a key input. Our work is motivated by recent developments in the study of Kaluza-Klein correlators in bubbling geometries, where four-point functions involving single- and multi-particle operators are computed as response functions to smooth deformations of the vacuum geometry. While well tested in AdS5×S5, we aim to extend this framework to M-theory.

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