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Multi-particle correlators with higher KK modes I: a bootstrap approach

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Abstract

We bootstrap tree-level supergravity four-point correlators on AdS5×S5 with one external half-BPS double-particle operator and three half-BPS single-particle operators. Our only input is the consistency of the operator product expansion of SU(N) N= 4 super Yang-Mills theory at large N and large 't Hooft coupling. Even though the leading order OPE does not close on double-particle operators, but involves triple-particle operators, the CFT data of the double-particle operators, both long and protected, is sufficient to uniquely fix the correlators. We then verify that our results for the four-point correlators with one double-particle and three single-particle operators are reproduced by the appropriate double-particle limit of the five-point tree-level correlators of single-particle operators, with arbitrary Kaluza-Klein levels, recently conjectured in 2507.14124. Our study thus provides further evidence for the latter result.

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