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Holographic correlators with BPS bound states in $N = 4$ SYM

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Abstract

We compute 4-point correlators in $N = 4$ $SU(N)$ Super-Yang-Mills with both single and double-particle $1/2$ -BPS operators in the regime of large 't Hooft coupling and large N . In particular we give explicit expressions up to $O(1/N^4)$ for the lightest correlator with two double-particle and two single-particle operators built out of the stress-tensor multiplet. Our derivation makes use of the general holographic prescription applied to an asymptotically $AdS_5 \times S^5$ geometry that describes a coherent superposition of multi-graviton operators. The final result can be written in terms of a natural generalisation of the standard D -functions and takes a compact form in Mellin space. The correlator we compute here is the simplest of a more general class of correlators where two inserted operators are multi-particles. These can be derived with the same approach, suggesting that the structure found here is general.

