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Scattering from long strings in AdS5 x S5

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Motivated by understanding the scattering of gravitons from extended (or long) strings in type IIB string theory at finite coupling via AdS/CFT, we study an integrated two-point function of stress tensor multiplet operators in the presence of a half-BPS line defect in N=4 SU(N) super-Yang-Mills theory.

We determine this integrated correlator at the five lowest non-trivial orders in 1/\sqrt{N} at fixed Yang-Mills coupling and θ-angle. Our calculations are performed explicitly when the line defect is a Wilson line, in which case we find a finite number of perturbative contributions at each order in 1/\sqrt{N}, as well as instanton contributions.

Using SL(2,Z) transformations, our results can also be applied to Wilson-'t Hooft line defects dual to extended (p, q)-strings in the bulk.

We analyze features of these integrated correlators in the weak coupling expansion by comparing with open-closed amplitudes of type IIB string theory on AdS5 x S5, as well as in its flat space limit.

We predict new higher-derivative interaction vertices on the D1-brane and, more generally, on (p, q)-strings.

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