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All-order amplitudes at any multiplicity in the multi-Regge limit

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We propose an all-loop expression for scattering amplitudes in planar N=4 super Yang-Mills theory in multi-Regge kinematics valid for all multiplicities, all helicity configurations and arbitrary logarithmic accuracy. Our expression is arrived at from comparing explicit perturbative results with general expectations from the integrable structure of a closely related collinear limit. A crucial ingredient of the analysis is an all-order extension for the central emission vertex that we recently computed at next-to-leading logarithmic accuracy. As an application, we use our all-order formula to prove that all amplitudes in this theory in multi-Regge kinematics are single-valued multiple polylogarithms of uniform transcendental weight.

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