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Weinberg's Soft Theorem to Three Loops in QCD and

cal N = 4SuperYang – MillsTheory

According to the soft theorem, the scattering amplitude with soft emissions is factorized into the product of a hard function and a soft current. The soft current is process independent. We calculate the soft current with two hard-scattering particles and a single soft gluon emission to three loops in both QCD and cal N = 4 super Yang-Mills theory. To calculate the relevant Feynman integrals, we develop a systematic method to calculate Feynman integrals recursively based on the Feynman-parameter representation.

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