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Particle production at NLO in pA collisions: the wave function approach

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We present a derivation, within the wave function approach at next-to-leading accuracy, of single-inclusive hadron production in pA collisions considering a dilute projectile composed of collinear partons on a dense target - the hybrid formalism. The separation of collinear divergencies, absorbed into the DGLAP evolution of parton densities and fragmentation functions, and soft divergencies is shown explicitly. Our analysis differs from previous ones in two points. First we are careful to specify unambiguously the rapidity interval that has to be included in the evolution of the leading order eikonal scattering amplitude. This is important, since varying this interval by a number of order unity changes the next to leading order correction, which the calculation is meant to determine. Second, we introduce the explicit requirement that fast fluctuations in the projectile wave function which only exist a short time are not resolved by the target. This Yoffe time cutoff also strongly affects the next-to-leading order terms. Our final result is unambiguous and differs at NLO from the results available in the literature.

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