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Glauber Resummation

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The higher-order behavior of logarithmically enhanced contributions in non-global observables is very intricate, in particular as double-logarithmic corrections may arise first at very high orders in perturbation theory. Recently, the resummation of these super-leading logarithms (SLLs) to all orders for generic $2 \rightarrow l$ scattering processes at hardron colliders has been achieved [1]. For realistic values of the low energy scale and the partonic center-of-mass energy the contribution of SLLs is comparable to the one of Glauber phases arising from soft parton exchange in initial- or final-state. Surprisingly, it turns out that these Glauber contributions can be resummed analytically to all orders as well, at least for quark-induced processes. Depending on the considered process, the contribution to the cross section can be of the order of a few percent.
[1] T. Becher, M. Neubert, and D. Y. Shao, Phys. Rev. Lett. 127, 212002 (2021)

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