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Double parton distributions in colour space: perturbative splitting and positivity bounds

Double parton scattering (DPS) and double parton distributions (DPDs) are sensitive to non-trivial colour correlations between partons inside a hadron. At small inter-parton distances the leading contribution to DPDs is due to a perturbative splitting mechanism, which makes it possible to calculate DPDs in perturbation theory in this regime. We compute this contribution at next-to-leading (NLO) order for all possible colour correlations.

With these NLO DPDs we can show that positivity bounds for colour space DPDs can be violated at NLO. We furthermore find that even at LO positivity can be violated by evolution from lower to higher scales, in contrast to the situation for ordinary PDFs and for colour singlet DPDs.

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