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DPDs in colour space: perturbative splitting and positivity

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Double parton scattering (DPS) - the situation where two individual hard interactions happen during a single hadron-hadron collision - is sensitive to all sorts of correlations between two partons inside a hadron, e.g.~spin, colour, or spatial separation. Therefore DPS gives access to information about hadron structure not accessible in single parton scattering (SPS). This information is encoded in double parton distributions (DPDs) which are the DPS counterpart of PDFs in SPS.
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 the unpolarized perturbative splitting DPDs at next-to-leading order (NLO) for all possible colour correlations and study their numerical importance compared to the leading order (LO) splitting DPDs.
With these NLO splitting DPDs we can show that positivity bounds for colour space DPDs can be violated. 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.

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