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TMD splitting functions in k_T factorization

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We calculate the transverse momentum dependent gluon-to-gluon splitting function within k_T -factorization, generalizing the framework employed in the calculation of the quark splitting functions in [1205.1759, 1511.08439, 1607.01507] and demonstrate at the same time the consistency of the extended formalism with previous results. While existing versions of k_T factorized evolution equations contain already a gluon-to-gluon splitting function i.e. the leading order BFKL kernel or the CCFM kernel, the obtained splitting function has the important property that it reduces both to the leading order BFKL kernel in the high energy limit, to the DGLAP gluon-to-gluon splitting function in the collinear limit as well as to the CCFM kernel in the soft limit. At the same time we demonstrate that this splitting kernel can be obtained from a direct calculation of the QCD Feynman diagrams, based on a combined implementation of the Curci-Furmanski-Petronzio formalism for the calculation of the collinear splitting functions and the framework of high energy factorization.

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