

Perturbative QCD correlations in multi-parton collisions at LHC and Tevatron.

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Tevatron studies of multi-jet production in the back-to-back kinematics corresponding to parton momenta x of order 0.01 have confirmed the presence of double hard interactions in a single hadron hadron collision. The independent parton approximation underestimates the observed cross section by a factor of two. In this paper we point at previously overlooked three-parton Interactions that introduce perturbative correlation between partons and resolve this longstanding puzzle. We give prediction for the MPI rate for different processes at LHC and Tevatron in different kinematics (including 4 jets, $W+2$ jets, WW, ZZ , 3 jets +photon) and show that the MPI rate enhancement is dynamic depending on both on process and on kinematics. We present both basic formalism and numerical data.

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