

# Dijet azimuthal correlations in multijet production at high energy in $k_T$ -factorization

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A new method of consistent merging of jet calculations in  $k_T$ -factorization with higher-order matrix elements is proposed. We study azimuthal correlations between leading and subleading jets in large- $p_T$  multijet production with two, three and four jets in final state within the parton Reggeization approach (PRA). PRA is based on  $k_T$ -factorization of hard processes in the multi-Regge

kinematics, Kimber-Martin-Ryskin unPDFs and Lipatov's effective theory of Reggeized gluons and quarks. Last one allows to treat initial-state radiation in a gauge invariant way. As it was shown earlier in [1] and [2], Reggeized amplitudes in PRA totally agree with off-shell amplitudes from the AVHLIB [3] and calculations of hard cross sections use MC generator KaTie [4] with KMR unPDFs [5] should coincide with direct calculations in PRA. We have checked this statement for production of two and three jets. The final calculations have been done with KaTie MC event generator. We have obtained a good agreement with CMS data [6] for azimuthal correlations between leading and subleading jets for events with more than two, three and four jets.

[1] A.V.Karpishkov, M.A.Nefedov and V.A.Saleev,  $B\bar{B}$  angular correlations at the LHC in parton Reggeization approach merged with higher-order matrix elements, Phys. Rev. D **96** (2017) no.9, 096019.

[2] K.Kutak, R.Maciula, M.Serino, A.Szczurek and A.van Hameren, Four-jet production in single- and double-parton scattering within high-energy factorization, JHEP **1604** (2016) 175.

[3] M. Bury, A. van Hameren, Numerical evaluation of multi-gluon amplitudes for High Energy Factorization, Comput. Phys. Commun. **196** (2015) 592.

[4] A. van Hameren, KaTie: For parton-level event generation with  $k_T$ -dependent initial states Published in Comput.Phys.Commun. **224** (2018) 371-380

[5] M. A. Kimber, A. D. Martin, and M. G. Ryskin, Unintegrated parton distributions and prompt photon hadroproduction, Eur. Phys. J. **C12** (2000) 655.

[6] A.M. Sirunyan, A. Tumasyan, W. Adam, et al., Azimuthal correlations for inclusive 2-jet, 3-jet, and 4-jet events in pp collisions at  $\sqrt{S} = 13$  TeV, Eur. Phys. J. **C78** (2018) 566.

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