

Which scale for parton densities? Perspective from ktfactorization

Heavy flavours are useful probes for the study of cold and hot QCD matter. Therefore, having a good understanding and control on the formulas describing their production is primordial.

We will start with the detailed analysis of the following 4 statements:

1. At small- x the main contribution comes from $gg \rightarrow Q\bar{Q}$
2. At small- x the gluon distribution is much bigger than the charm distribution
3. The gluon distribution grows faster than the quark distribution
4. At leading order, one needs a K-factor to take into account higher orders

The logical connection between these statements will be also analyzed. We will show that within the collinear factorization formalism, statements 1. is wrong. This is known since 2002 (R. D. Field, PHYS. REV. D 65) but sometimes forgotten.

Doing the same analysis for kt-factorization, we will arrive to the same conclusion. This is an issue since current calculations include only unintegrated gluon densities, implying that in current calculations the main contribution is ignored. The reason why it is not observed in the comparison between models and data will be explained. Finally quantitative results obtained with a recent implementation of the kt-factorization will be given thus confirming theoretical expectations.

Summary

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Session Classification: Poster Session