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Heavy flavour production in general-mass variable flavour number scheme

The hadroproduction of heavy-flavoured mesons has recently attracted a growing interest within the groups involved in global analysis of proton and nuclear parton distribution functions (PDFs). In particular, the D- and B-meson measurements of LHCb at forward direction are sensitive to gluon PDFs at small x and are one of the few perturbative small-x probes before the next generation DIS
experiments.

Theoretically, there are several ways to calculate the cross sections for heavy-flavoured mesons. On one hand, parton-level heavy-quark cross sections can be folded with phenomenological, scale-independent parton-to-meson fragmentation functions (FFs), or the fragmentation is adapted offline from an event generator like PYTHIA or equivalent. Alternatively, one can work fully within the framework of collinear factorization where the fragmentation is described with universal, scale-dependent FFs.

In this talk, I will concentrate on the collinear-factorization approach and describe a novel implementation of the general-mass variable flavour number scheme (GM-VFNS) which retains the mass dependence of the cross sections at low p_{T}, but reduces to ordinary zero-mass results towards high p_{T}. The novelty of the present implementation amounts to a proposal of how to render the cross sections finite even in the limit of very small p_{T} - the region that has been particularly problematic in the previous versions of GM-VFNS - and to thereby obtain a well-behaved GM-VFNS descrpition of the cross sections across all p_{T}.

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