

Higher-order computations for top-quark production at hadron colliders: implications for top-quark mass and PDF fits

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One of the motivations underlying the efforts towards higher-order computations of heavy-flavour production is the possibility to better constrain parton distribution functions as well as heavy-quark mass values. In this contribution we focus on the top-quark case and we discuss the impact of including higher-order corrections to top-antitop and single-top production at hadron colliders on the extraction of the aforementioned quantities. We discuss in particular our recent extractions of top-quark mass values at fixed (PDFs + $\alpha_s(M_Z)$), considering a number of modern PDF fits, as well as our simultaneous fit of top-quark mass, PDFs and $\alpha_s(M_Z)$, using as a basis state-of-the-art collider data on top-quark production compared to NNLO theory predictions. The computation of the latter has been automated through the MATRIX+PineAPPL framework in the case of multi-differential predictions, leading to tables of predictions that can be shared with the collider community and used for any new fit. We also sketch further possible improvements in the theory computations, which would lead to even more precise and accurate PDF and top-quark mass fits.

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