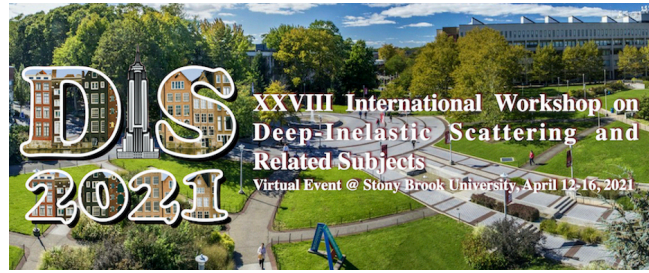


XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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A next-to-leading order method general-mass method for heavy-flavor production at the LHC

Wednesday, 14 April 2021 12:33 (18 minutes)

We develop a systematic treatment of heavy-flavor hadroproduction in the framework of the General-Mass Variable-Flavor-Number Scheme (GM-VFNS). By following the idea of the Simplified-ACOT- $\bar{\alpha}$ Scheme in Deep Inelastic Scattering (DIS), we categorize the open heavy-flavor diagrams into Flavor Excitation (FE) and Flavor Creation (FC) contributions. In order to avoid double-counting, overlapping contributions are subtracted using the collinear splitting approximation. The FC terms are extracted from the Fixed-Flavor-Number Scheme (FFNS), while the FE and Subtraction (SB) terms involve an initial heavy-flavor quark scattering with another parton (a light quark or gluon). We introduce a Massive Phase Space (MPS) for the FC and SB terms, which accounts for the threshold effect of massive heavy-flavor quarks. We dub this novel approach the “S-ACOT-MPS” scheme. The MPS regulates the singular behavior of the FE and SB (differential) cross sections in the limit $\bar{\alpha} \rightarrow 0$, and stabilizes their cancellation, thus reducing the S-ACOT-MPS scheme to the FFNS smoothly. Our numerical results demonstrate good agreement with LHCb data on $b\bar{b}$ production at 7 and 13 TeV.

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