

Heavy-flavor production at hadron colliders

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We develop Simplified-ACOT scheme with Massive Phase Space (SACOT-MPS), which is a general-mass variable flavor number scheme (GM-VFNS), to deal with heavy-flavor production at hadron colliders. By following the idea of Simplified-ACOT-chi scheme in the deep inelastic scattering (DIS), we categorize the open heavy-flavor diagrams into Flavor Excitation (FE) and Flavor Creation (FC). The overlapped diagrams are subtracted by the collinear splitting in order to avoid double-counting. The Flavor Creation terms can be extracted from Fixed Flavor Number Scheme (FFNS), while the Flavor Excitation terms and Subtraction (SB) terms involve the initial heavy-flavor parton scattered by another light parton (light quark or gluon). We introduce the massive phase space for the FE and SB, which accounts for the threshold effect of massive heavy quark. The massive phase space regulates the singular behavior for $p_T \rightarrow 0$, which stabilizes the cancellation between FE and SB in this limit and leads a smooth transition to the FFNS as a result. The numerical results provide a good agreement with the LHCb measurement of B-meson production.

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