

On the ambiguities of the BLM/PMC procedure for hadron collider processes

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In perturbative Quantum Chromodynamics calculations, theoretical uncertainties are ascribed to ambiguities over the choice of the renormalisation scale, μ_R . The BLM/PMC scale-setting procedure is one proposed method to remove this ambiguity. In this work, three ambiguities are identified in the BLM/PMC procedure itself and their numerical impact is studied using the example of the inclusive cross-section for $t\bar{t}$ production. One ambiguity is the arbitrary choice of the value of the highest-order PMC scale, q_4 . The numerical impact of the choice of q_4 on the BLM/PMC prediction for the cross-section is found to be comparable to the impact of the choice of μ_R in the conventional scale-setting approach.

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