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Resummed PT spectrum for Drell-Yan including massive bottom quark effect

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We study the resummed transverse momentum spectrum for Drell-Yan production including the bottom mass effect.

The pt-distribution of DY or Z boson is very important observable at the LHC, particularly to the ratio of W boson

and Z boson spectrum to precisely measure of the W boson mass.

The presence of an extra mass scale namely the bottom mass along with the Hard scale and the pt-scale makes it very difficult to study within QCD. The three different mass scales give rise to several mass hierarchies leading to large logarithms which needs to be resummed at all orders to get a meaningful result.

Moreover the different regions have to be properly matched to get a smooth distribution avoiding double counting

or gaps.

For these kind of problem, effective theories show a better grasp onto the problem.

Using SCET based factorisation we resum these large logarithms in a systematic way upto NNLLp accuray.

We discuss different theoretical issues namely order counting, rapidity divergences etc.

We identify two different kind of contributions namely the primary effect where bottom quark initiates the hard process and the secondary effect where bottom quark contributes through loop.

Both these contributions are included into our calculation. Finally we present properly matched pt-distribution which will be useful at the LHC to the measurement of Z boson and W boson properties.

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