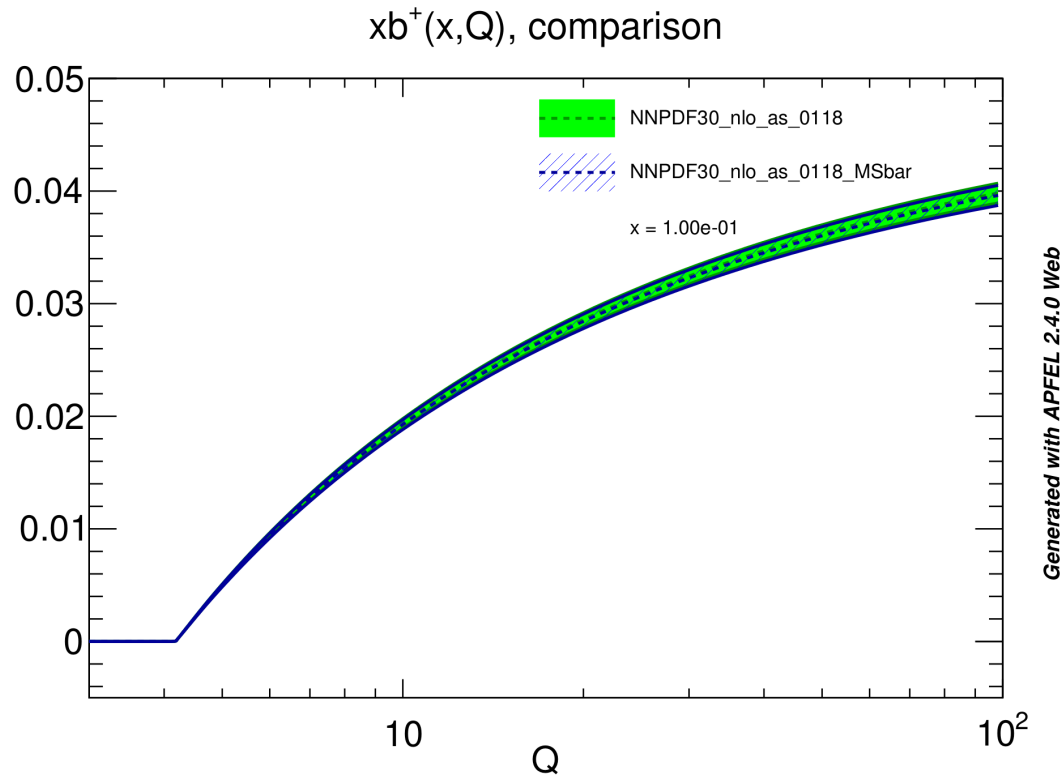


MASS TREATMENT IN (NN)PDF FITS

- MATCHED SCHEME USED
 - “NLO” PDFs: NNLL (STANDARD NLO DGLAP+ $O(\alpha_s)$ C.F.)+ NLO ($O(\alpha_s^2)$) MASSIVE C.F. (FONLL-B)
 - “NNLO” PDFs: NNLL (STANDARD NNLO DGLAP+ $O(\alpha_s^2)$ C.F.)+ NLO ($O(\alpha_s^2)$) MASSIVE C.F. (FONLL-C)
- THE DIFFERENCE BETWEEN $\overline{\text{MS}}$ AND POLE MASS STARTS AT NNLO IN EVOLUTION, AT NLO ($O(\alpha_s^2)$) FOR MASSIVE COEFFICIENT FUNCTIONS
- THE IMPACT OF THE MASS VALUE ON THE PDF FIT IS MUCH LARGER THAN THAT OF THE CHOICE OF MASS SCHEME
- NNPDF3.0 PDF ARE FITTED WITH PDG $\overline{\text{MS}}$ MASS VALUES ($m_c = 1.275$ GeV, $m_b = 4.18$ GeV), THOUGH POLE MASS THEORY IS USED IN THE FIT, WITH THE RECOMMENDATION TO USE THEM IN CONJUNCTION WITH $\overline{\text{MS}}$ THEORY

INCONSISTENCY?

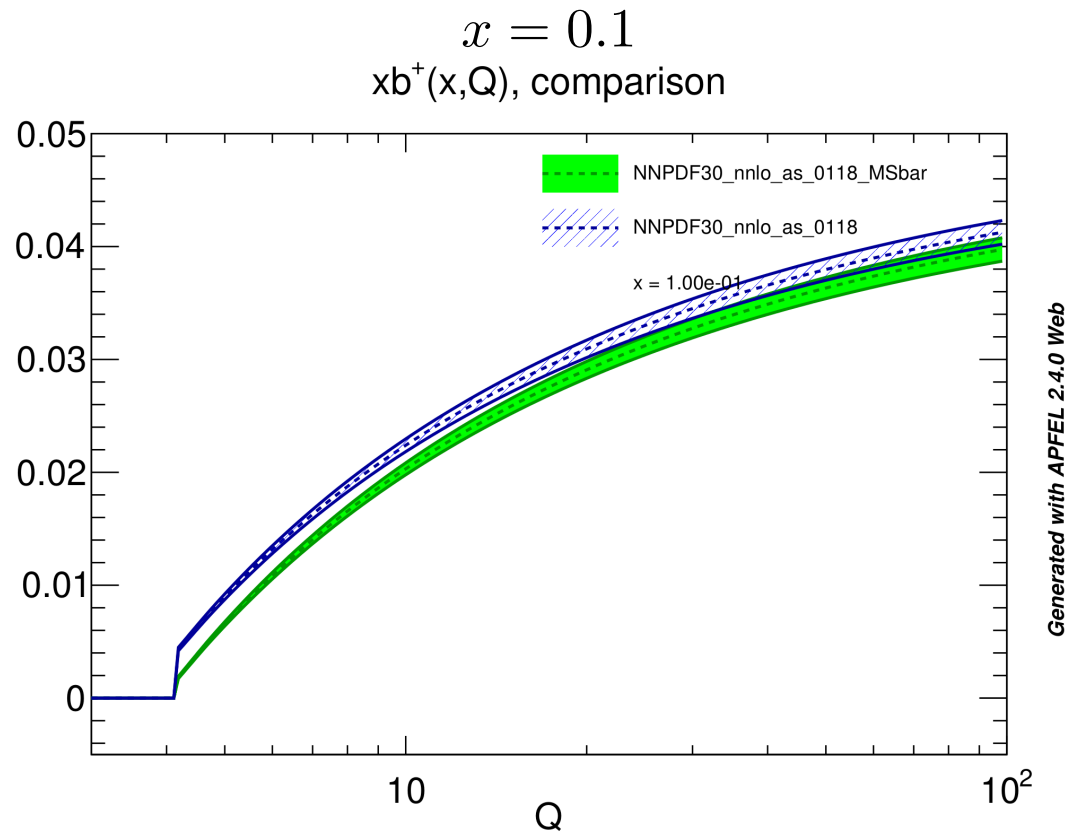
- ONE MAY WORRY ABOUT THE INCONSISTENCY, ESPECIALLY IN EVOLUTION
- AT NLO THERE IS NO INCONSISTENCY IN EVOLUTION



$b + \bar{b}$ PDF generated by evolving up the NLO NNPDF3.0 gluon with the NNPDF code (APFEL) in the pole or $\overline{\text{MS}}$ scheme

INCONSISTENCY?

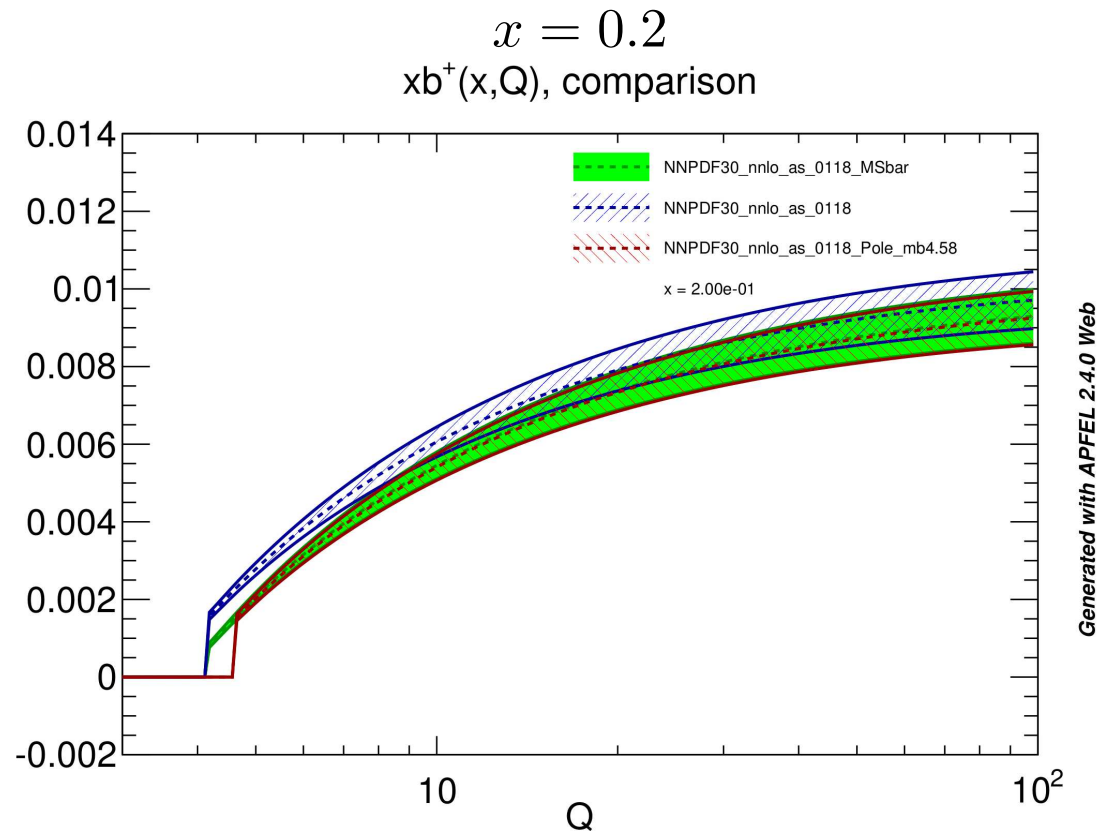
- AT **NNLO** THE **INCONSISTENCY IN EVOLUTION IS VISIBLE**
- NOTICEABLE AT SMALL SCALE, WHERE HOWEVER THE MASSIVE C.F. DOMINATES
- **SMALL** IN COMPARISON TO PDF UNCERTAINTY AT **HIGH SCALE**



$b + \bar{b}$ PDF generated by evolving up the NNLO NNPDF3.0 gluon with the NNPDF code (APFEL) in the pole or $\overline{\text{MS}}$ scheme

INCONSISTENCY?

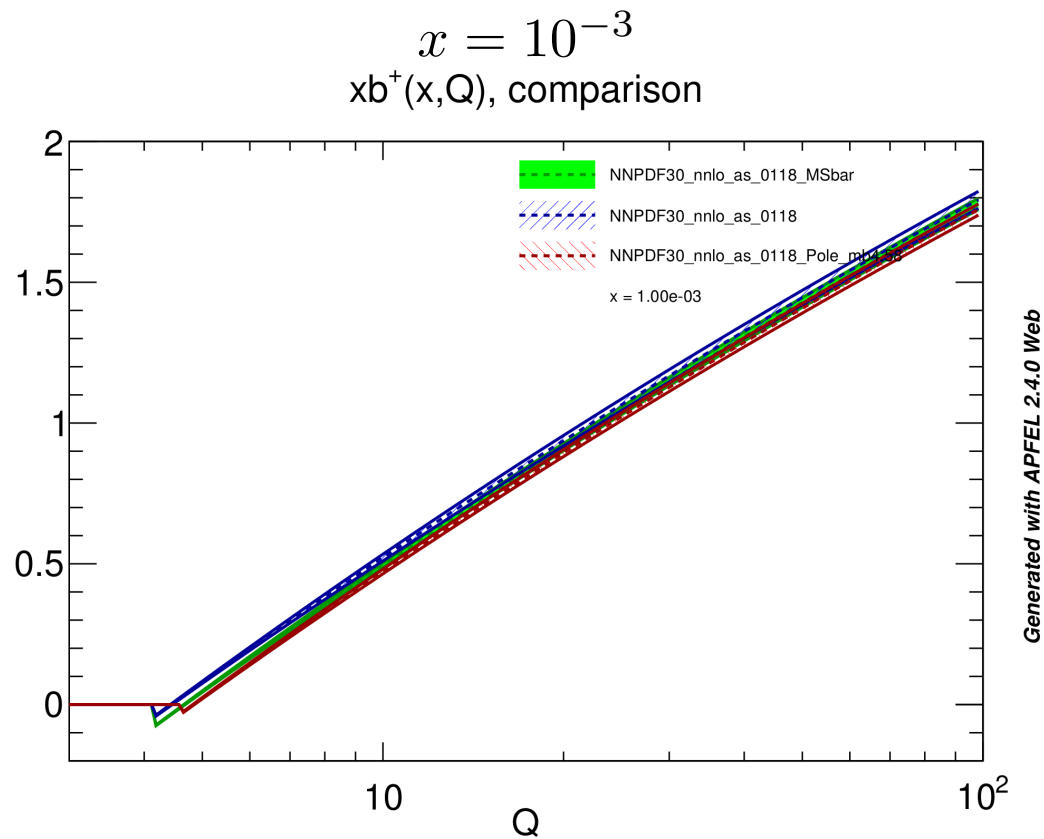
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INCONSISTENCY?

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$b + \bar{b}$ PDF generated by evolving up the NNLO NNPDF3.0 gluon with the NNPDF code (APFEL) in the pole or $\overline{\text{MS}}$ scheme

SUMMARY/QUESTIONS/ANSWERS/RECOMMENDATIONS

- THE NNPDF3.0 SET IS DELIVERED WITH \overline{MS} MASS VALUES AND IS RECOMMENDED FOR USAGE WITH \overline{MS} CALCULATIONS; THIS AT NNLO INTRODUCES A MILD INCONSISTENCY WHICH IS IRRELEVANT FOR REALISTIC APPLICATIONS
- PDFs EVOLVED UP WITH POLE SCHEME ARE AVAILABLE UPON REQUEST
- IT IS FELT THAT IN THE COMBINATION PDF4LHC15 SETS THE EXTRA UNCERTAINTY INTRODUCED BECAUSE OF THIS INCONSISTENCY IS A FEATURE, IN THAT IT LEADS TO A MORE REALISTIC UNCERTAINTY ON THE B PDF