

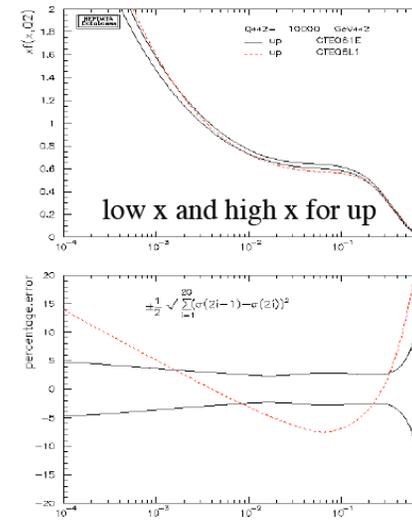
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# CTEQ plans for modified LO pdf's

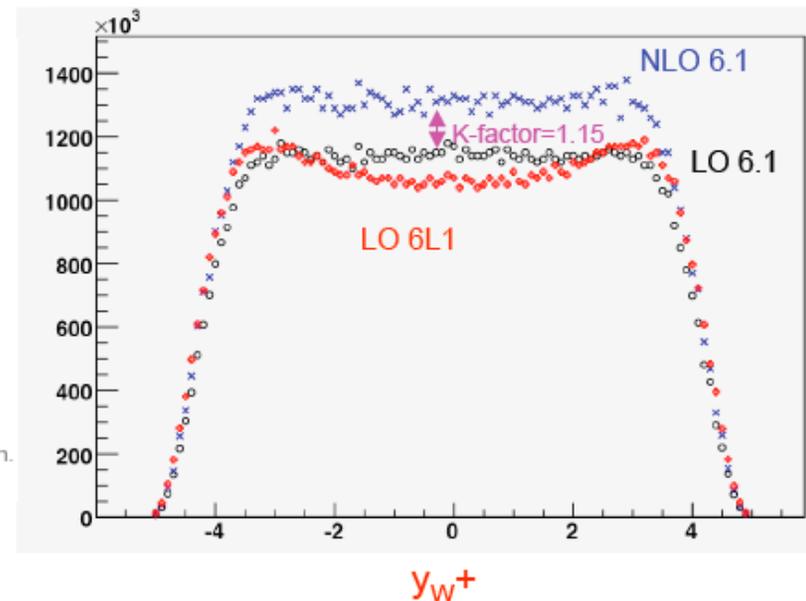
J. Huston

# PDF's for Monte Carlos

- Experimenters tend to use LO Monte Carlos for everything, including for processes for which NLO calculations are available
  - ◆ in MC@NLO (full event)
  - ◆ in MCFM (parton level)
- The Monte Carlo events are generated with LO pdf's (CTEQ5L at the Tevatron, CTEQ6L at the LHC)
- ...but the errors are estimated using the NLO pdf error sets
  - ◆ almost always CTEQ6.1 error sets
- LO pdf's can create cross sections/acceptances that differ in both shape and normalization from NLO due to influence of HERA data
  - ◆ and are outside NLO error bands
- (My) Previous suggestion was to use NLO pdf's
- Now I would suggest modified LO pdf's



W<sup>+</sup> rapidity distribution at LHC



# CTEQ approach (no public results yet)

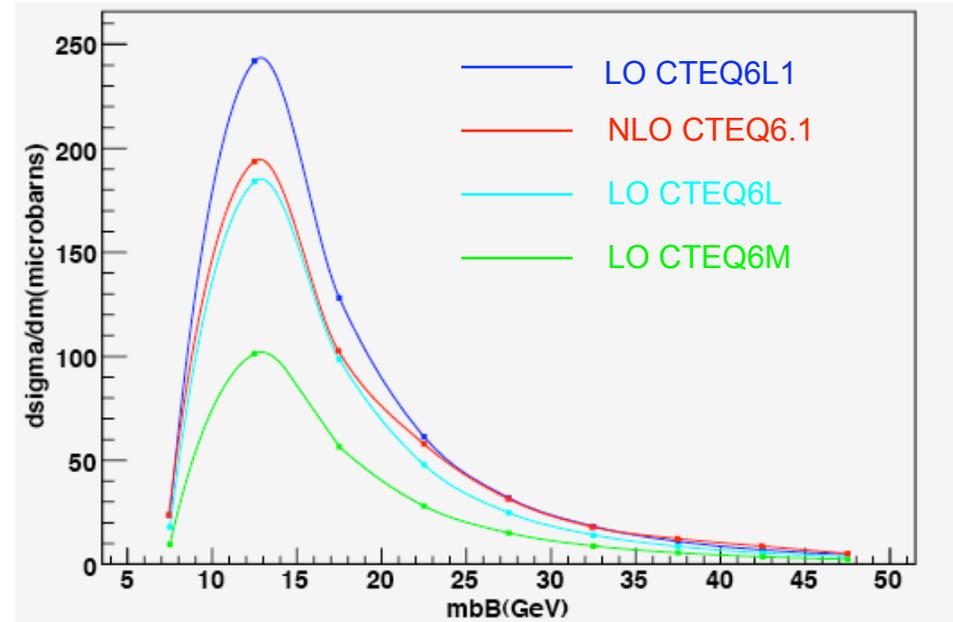
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- Modified LO pdf

- ◆ relax momentum sum rule
- ◆ fit with LO matrix elements (but using 2-loop  $\alpha_s$ ) to standard global pdf data set + NLO LHC predictions for some benchmark processes that explore both low x and high x physics, such as
  - ▲ W,Z rapidity distributions (first slide)
  - ▲ bB
  - ▲ Drell-Yan
  - ▲ gg->Higgs (rapidity distribution)
- ◆ result will be a central pdf at (modified) LO + a generation of corresponding error pdf's at LO using error machinery
  - ▲ similar Sudakov form factors so that pdf re-weighting can be done with minimal (or at least smaller) error
- ◆ with similar UE as generated with current LO pdf's
- ◆ a few more tricks but if I told you now, I would have to kill you

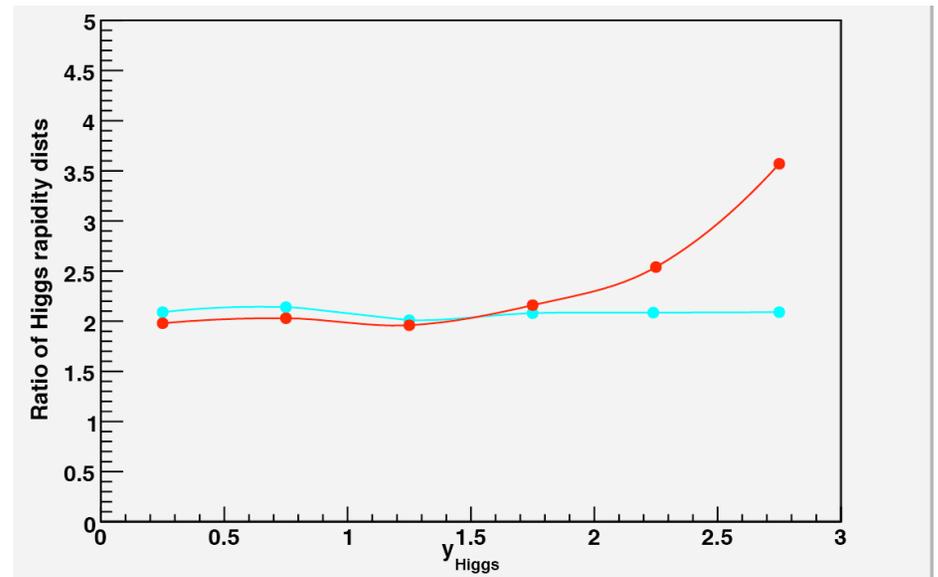
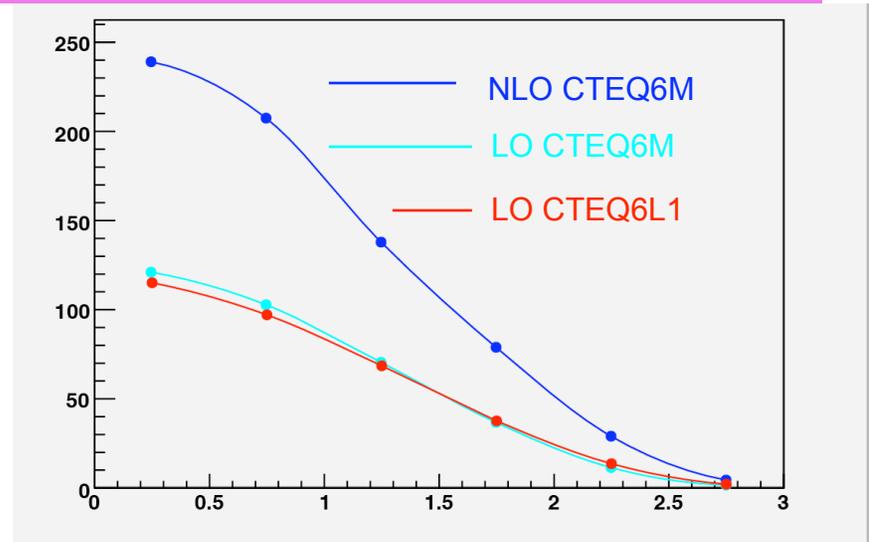
# $m_{bB}$

- Look at  $bB$  masses at low end of range for access to behavior of low  $x$  gluon
- LO with CTEQ6L1 overshoots NLO with CTEQ6.1
- LO with CTEQ6M dramatically undershoots



# gg->Higgs

- Look at the rapidity distributions for a 500 GeV Higgs to access the high  $x$  gluon
- NLO corrections large, but NLO/LO is constant as a function of rapidity if CTEQ6M used for both LO and NLO



# When we will see CTEQ modified LO pdf's

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- Aiming for DIS08