Update on including more datasets in the fits

WORK IN PROGRESS

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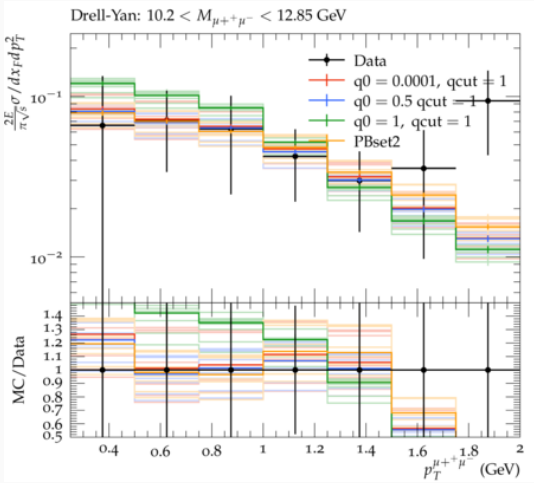
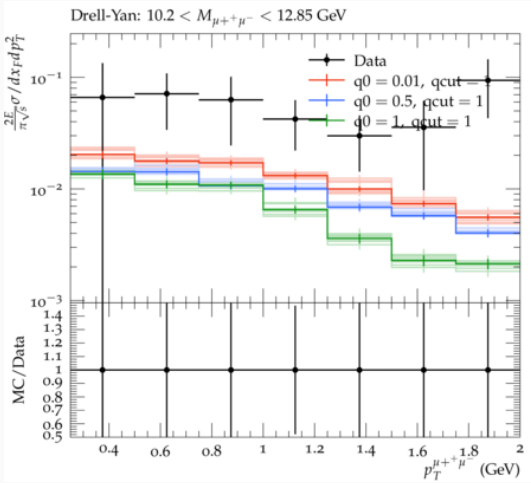
Reminder: result discussed during the last meeting



5 param gluon



3 param gluon

With 3 param gluon last mass windows of the NUSEA measurement not described (for any q0)
Ideas from the meeting:
large mass window $\Leftrightarrow$ large x $\longrightarrow$ large x not well constrained by HERA data $\longrightarrow$ include more data sets in the fit. Maybe ttbar?

- We started to work on including more datasets in the fit

Because of the technical issues with minuit, tolerance etc we didn't get far in this project

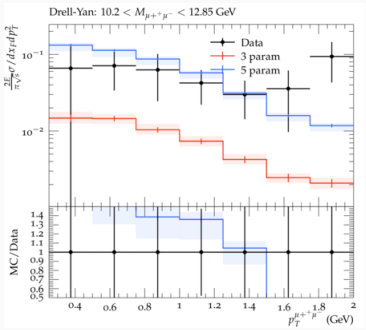
First trial with 5 TeV ttbar datasets from CMS

- quite many technical problems with `--enable-hathor`
  solved by copying the whole Hathor directory compiled by Engin, didn't manage to compile it by myself (Version 1.2.0 of xFitter, Hathor 1.5)

```
 InputFileNames(1) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_920.dat'
InputFileNames(2) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+24_NCep_820.dat'
InputFileNames(3) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_575.dat'
InputFileNames(4) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_460.dat'
InputFileNames(5) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCem.dat'
InputFileNames(6) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_CCep.dat'
InputFileNames(7) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_CCem.dat'
InputFileNames(8) = 'datafiles/lhc/cms/topProduction/cms-pas-top-16-015/cms-5tev_emu.dat'
InputFileNames(9) = 'datafiles/lhc/cms/topProduction/cms-pas-top-16-015/cms-5tev_mumu.dat'
InputFileNames(10) = 'datafiles/lhc/cms/topProduction/cms-pas-top-16-015/cms-5tev_lj.dat'
```

This gives me just 3 extra data points compared to HERA data only

3 vs 5 param gluon with ttbar data:

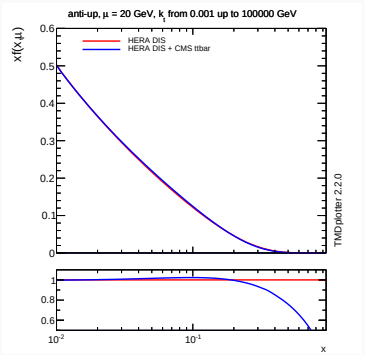


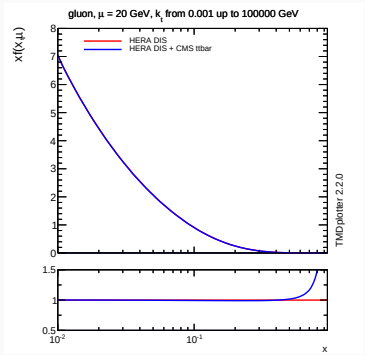
large mass window in NUSEA still not described by 3 param gluon

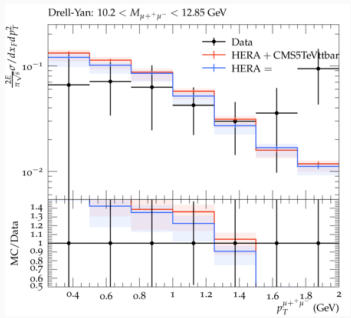
5 param gluon:

$q_0 = 1\mathrm{GeV}$ with HERA+ CMS ttbar data: $\chi^2 = 1.39$

$q_0 = 1\mathrm{GeV}$ with HERA data only: $\chi^2 = 1.38$







Just those 3 extra points caused big differences in the very large x region
this doesn't really change the predictions for NUSEA

disclaimer: in minuit.in.txt the tolerance 3000 used in this study

First results with Tevatron W-asymmetry data

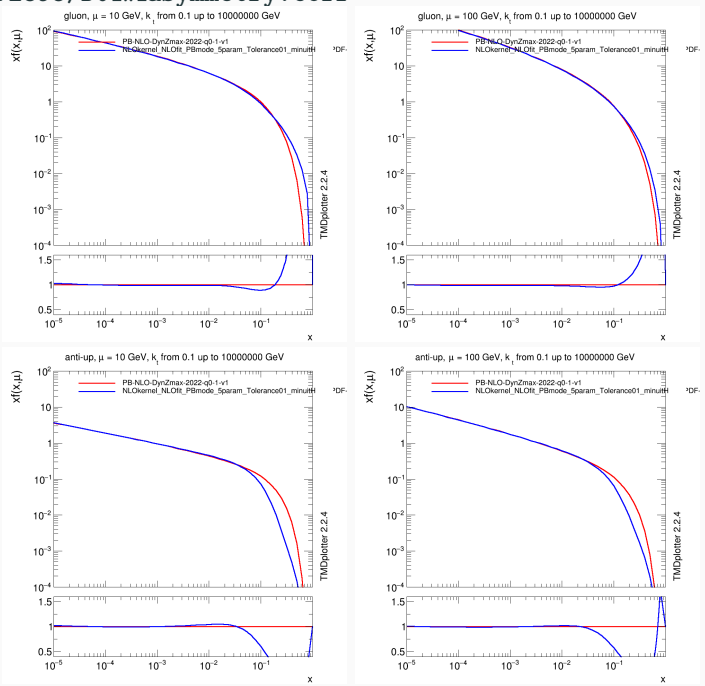
- a lot of problems with compiling "–enable-applgrid" in the old xfitter version
- in the end I installed new xfitter version xfitter-2.0.1-PB-0.1

datasets:

```
InputFileNames(1) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_920.dat'
InputFileNames(2) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_820.dat'
InputFileNames(3) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_575.dat'
InputFileNames(4) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCep_460.dat'
InputFileNames(5) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_NCem.dat'
InputFileNames(6) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_CCep.dat'
InputFileNames(7) = 'datafiles/hera/h1zeusCombined/inclusiveDis/1506.06042/HERA1+2_CCem.dat'
InputFileNames(8) = 'datafiles/tevatron/d0/wzProduction/1312.2895/D0_W_asymmetry.dat'
...
CorrFileNames(1) = 'datafiles/tevatron/d0/wzProduction/1312.2895/D0_W_asymmetry.corr'
```

This gives me just 14 extra data points compared to HERA data only

$q_0 = 1\mathrm{GeV}$ with HERA+ W asymmetry data: $\chi^2 = 1.43$
$q_0 = 1\mathrm{GeV}$ with HERA data only: $\chi^2 = 1.37$
$q_0 = 0.5\mathrm{GeV}$ with HERA+ W asymmetry data: $\chi^2 = 1.38$
$q_0 = 0.5\mathrm{GeV}$ with HERA data only: $\chi^2 = 1.25$



Plans

- apply the TMDs to obtain predictions for DY
- Do we increase our sensitivity to qs? What about q0?
- use ttbar multi-differential cross sections data 1904.05237
- What else can we use?

We would be happy to coordinate our plans with your project on global fit

Appendix