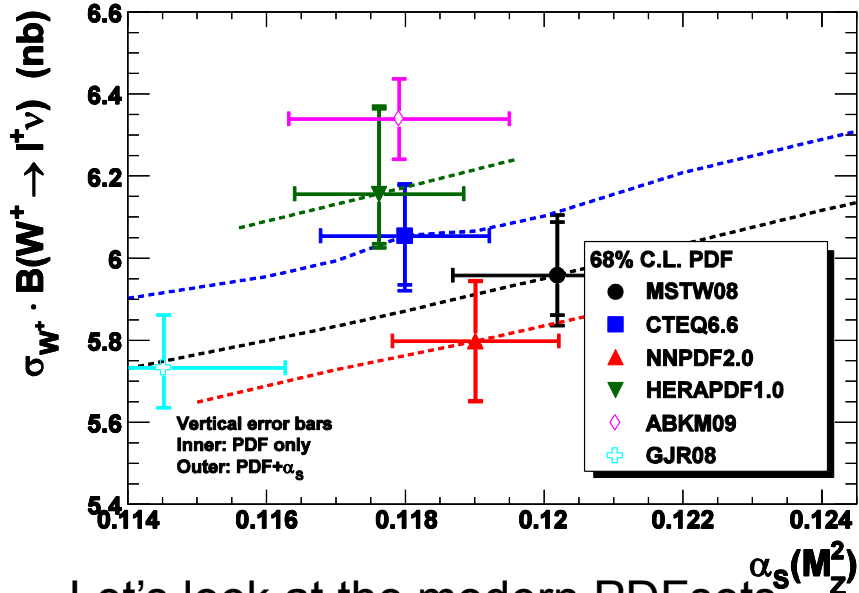


NLO $W^+ \rightarrow \Gamma^+ \nu$ at the LHC ($\sqrt{s} = 7$ TeV)



Let's look at the modern PDFsets

MSTW08

CTEQ66

HERAPDF1.0

NNPDF2.0

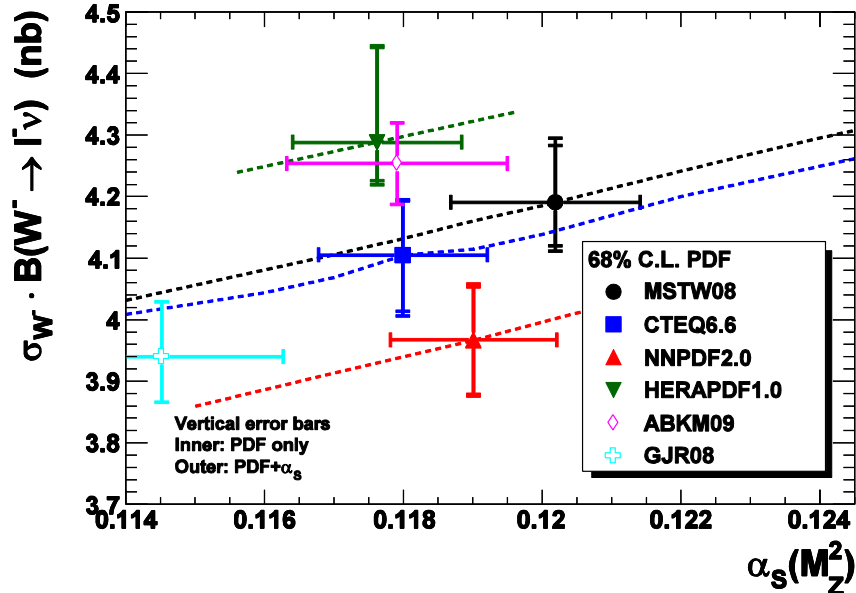
ABKM09

GJR08

Overall disagreement $\sim 8\%$ in W, Z cross-sections

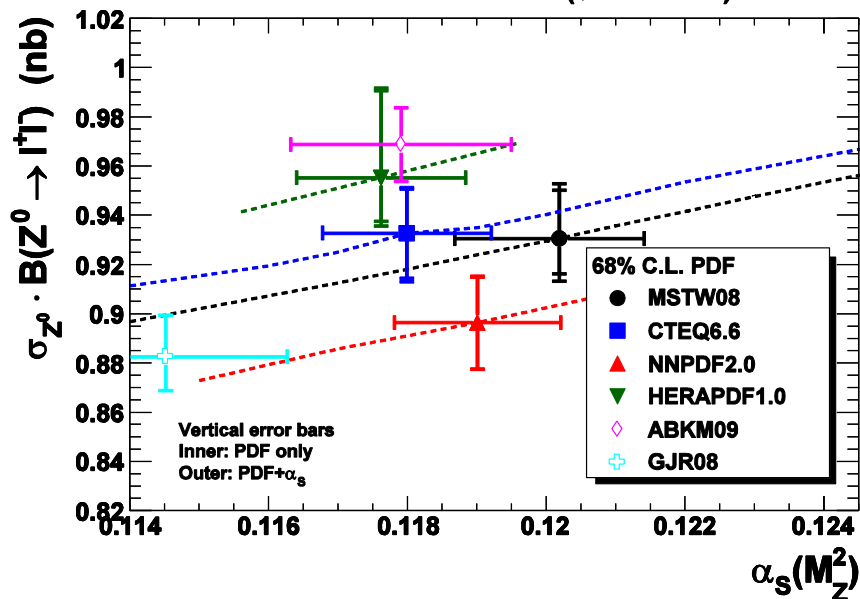
The PDF4LHC recommendation is to take the envelope of the NNPDF, MSTW, CTEQ predictions --even this may not be enough!

NLO $W^- \rightarrow \Gamma^- \nu$ at the LHC ($\sqrt{s} = 7$ TeV)

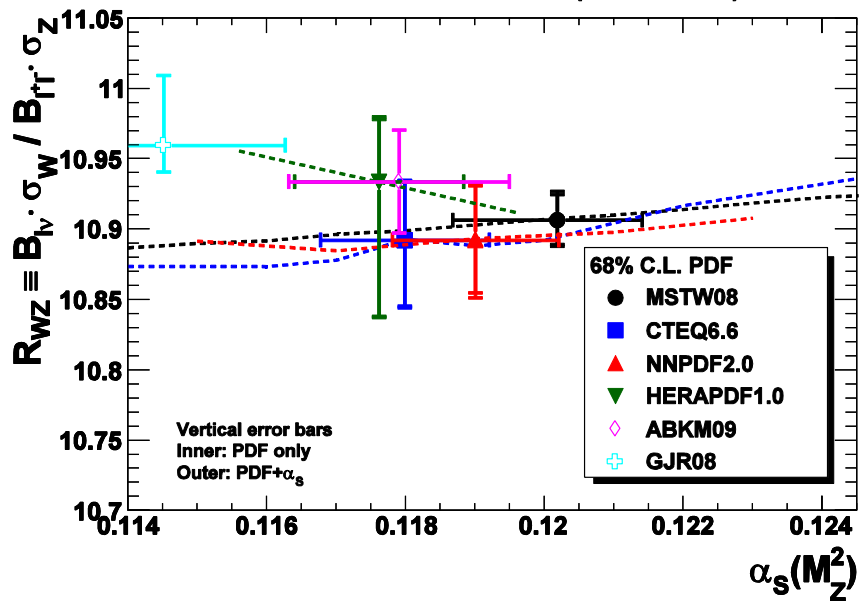


Plots from G.Watt -MSTW

NLO $Z^0 \rightarrow \Gamma^+ \Gamma^-$ at the LHC ($\sqrt{s} = 7$ TeV)

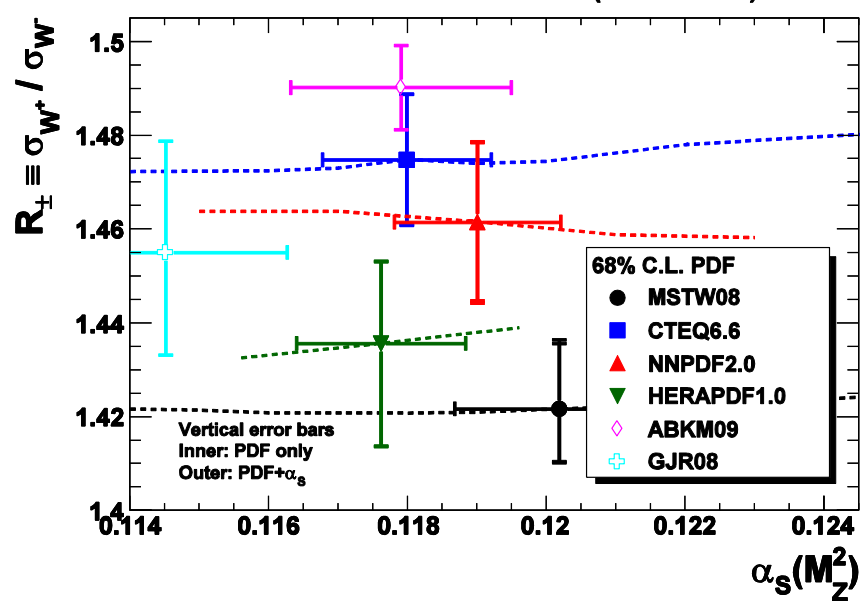


NLO W/Z ratio at the LHC ($\sqrt{s} = 7$ TeV)



W/Z ratio is much better

NLO W⁺/W⁻ ratio at the LHC ($\sqrt{s} = 7$ TeV)

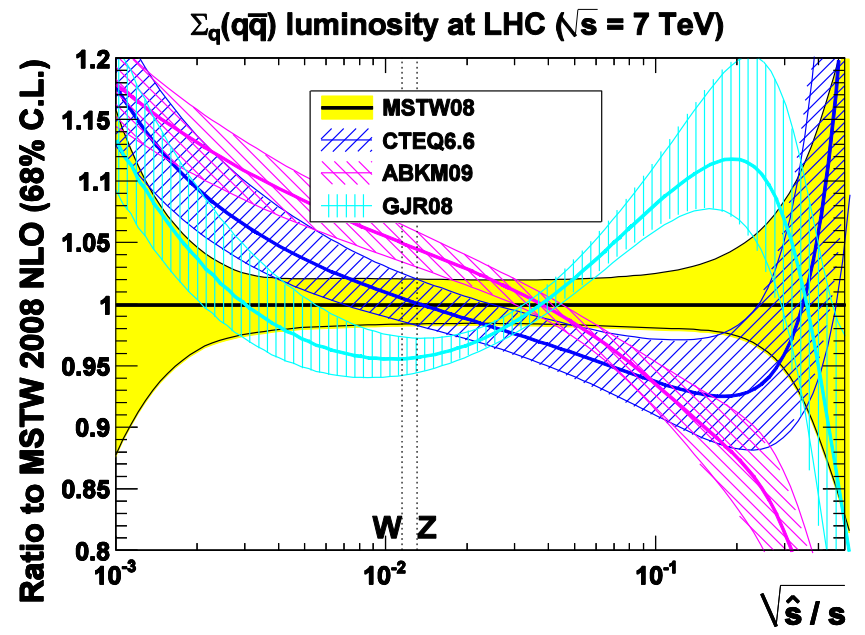
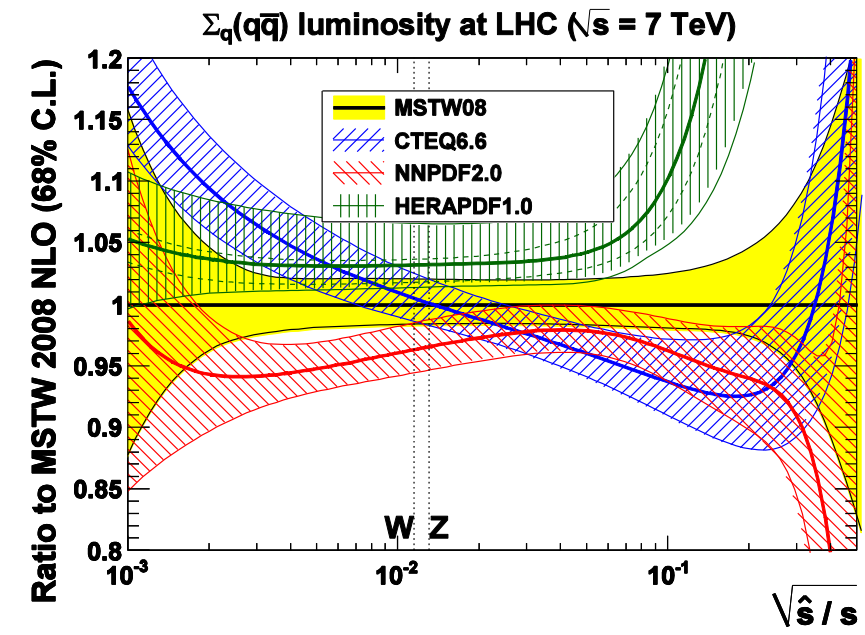


Plots from G.Watt -MSTW

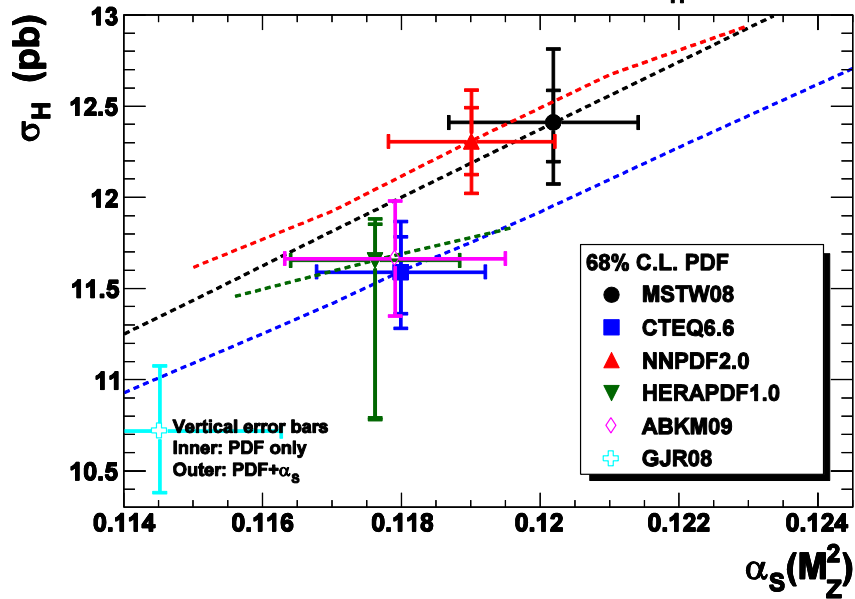
W⁺/W⁻ ratio is worse—

Disagreement in u/d quark shapes

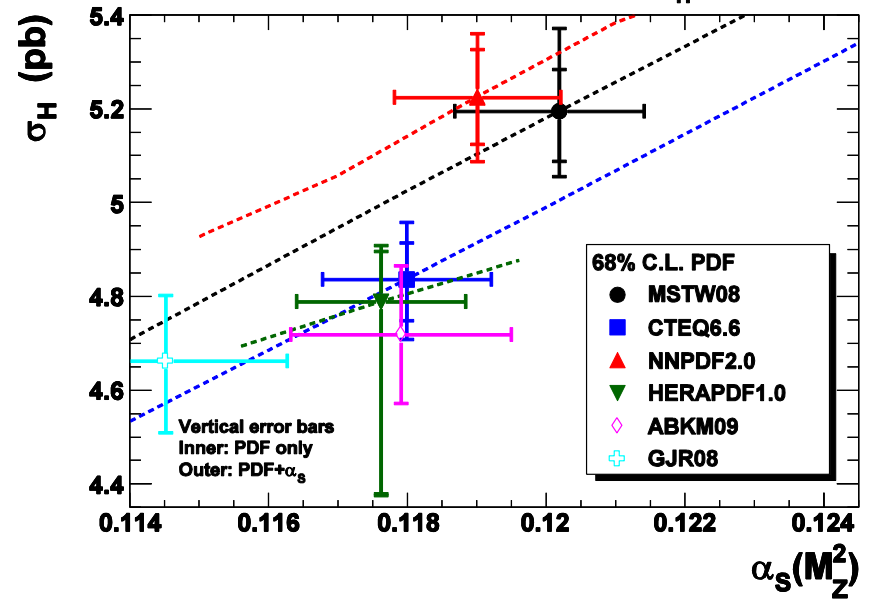
The PDF4LHC group has been comparing PDFs at the level of parton-parton luminosities



NLO $gg \rightarrow H$ at the LHC ($\sqrt{s} = 7$ TeV) for $M_H = 120$ GeV



NLO $gg \rightarrow H$ at the LHC ($\sqrt{s} = 7$ TeV) for $M_H = 180$ GeV



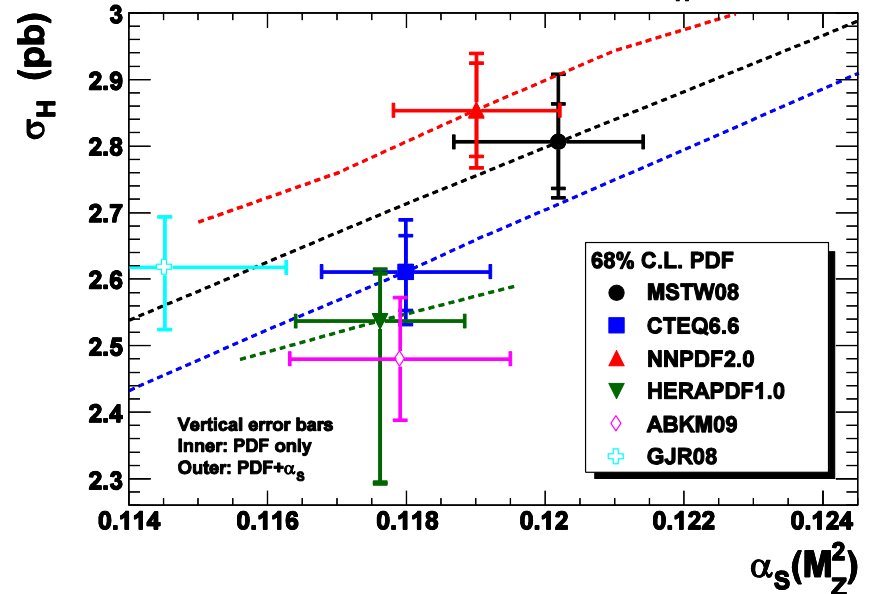
Plots from G.Watt -MSTW

And then there are the gluon-gluon induced cross-sections

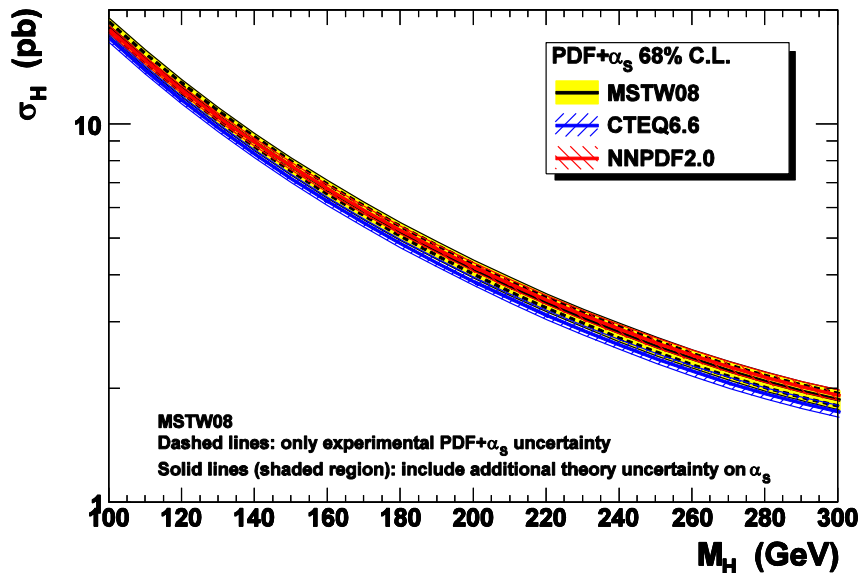
Spread in Higgs production cross-sections is now $> 15\%$

Dependence on α_s is also increased

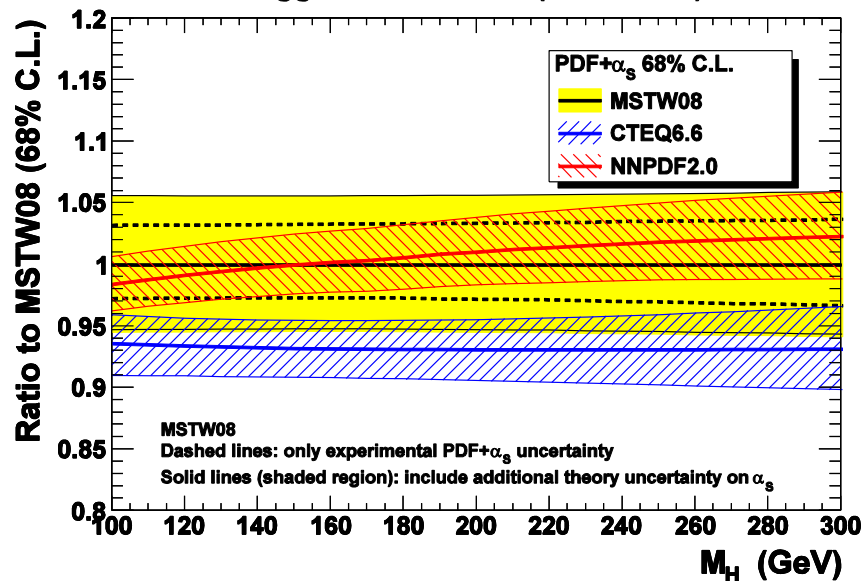
NLO $gg \rightarrow H$ at the LHC ($\sqrt{s} = 7$ TeV) for $M_H = 240$ GeV



NLO $gg \rightarrow H$ at the LHC ($\sqrt{s} = 7$ TeV)



NLO $gg \rightarrow H$ at the LHC ($\sqrt{s} = 7$ TeV)



Plots from G.Watt -MSTW

NLO $t\bar{t}$ cross sections at the LHC ($\sqrt{s} = 7$ TeV)

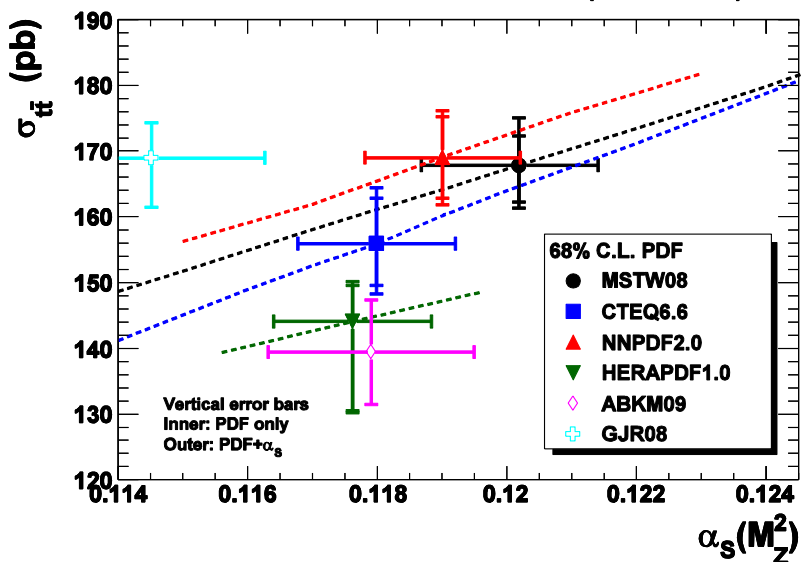
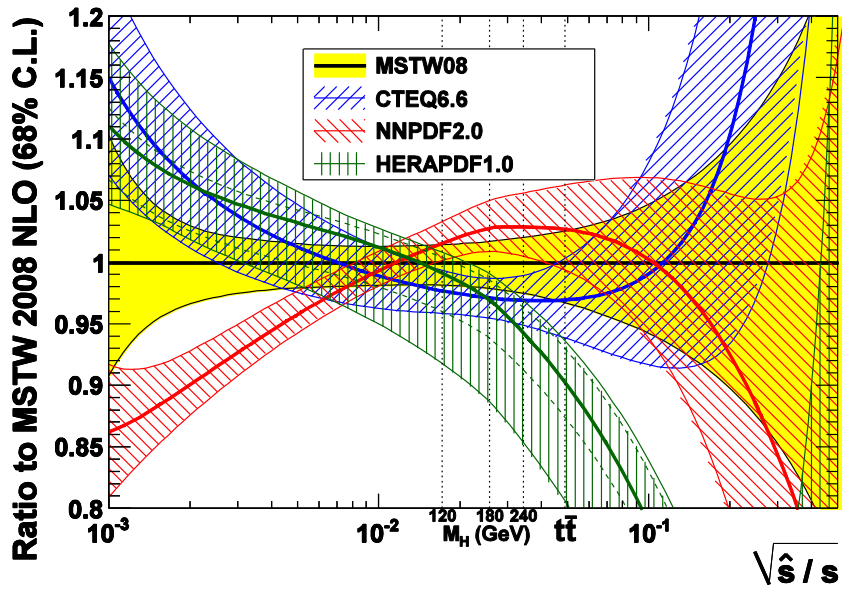
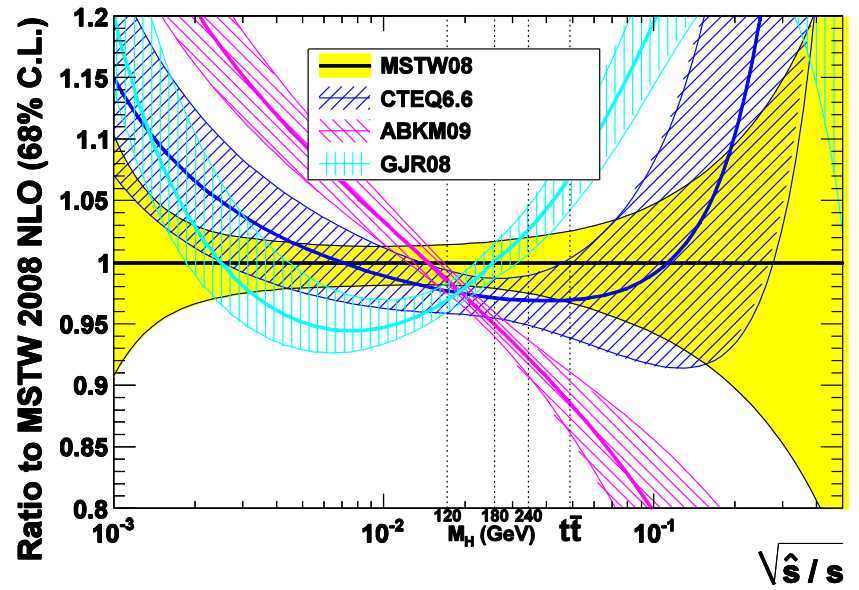


Illustration of uncertainty band for MSTW due to PDFs alone within the dotted lines and total uncertainty due to PDFs +alphas is the full yellow band

gg luminosity at LHC ($\sqrt{s} = 7$ TeV)

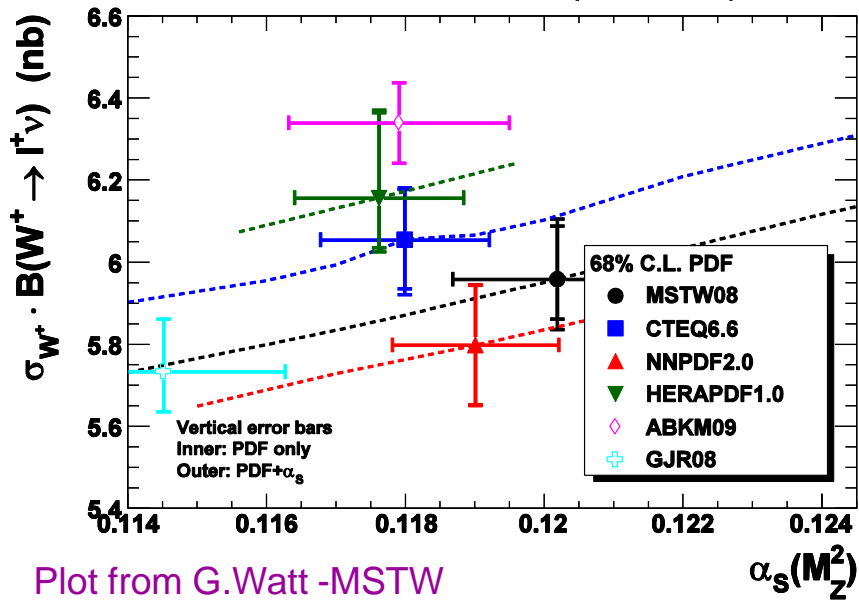


gg luminosity at LHC ($\sqrt{s} = 7$ TeV)



Plots from G.Watt -MSTW

NLO $W^+ \rightarrow \Gamma^+ \nu$ at the LHC ($\sqrt{s} = 7$ TeV)



Can we understand these differences?
Talks by all groups TODAY (TUESDAY)
on current PDFs and updates

Recently the PDF4LHC group has been considering the role that the uncertainty in the value of $\alpha_s(M_Z)$ plays in the overall uncertainty of predictions

This is not a large effect for W/Z production

But the value of m_c AND the scheme used to account for heavy quark production are.. WEDNESDAY

We will also consider areas of disagreement with data

1) are ALL PDFs are including data at low-x, Q2 which are not really well described by (N)NLO DGLAP.. WEDNESDAY

2) Tevatron lepton asymmetry data is not well fitted..THURSDAY

And we ill consider PDFs for MC's– THURSDAY