ResBos-A

Monte Carlo Code with QCD Resummation and Leading QED Corrections to W Boson Observables at the Tevatron

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ResBos -A

- The improved ResBos including final state

  NLO QED corrections to W and Z production

- Interference between photon (A) and Z boson in Drell-Yan pair production

- Example:

  $$p\bar{p} \to W^+ \to e^+\nu(\gamma)$$

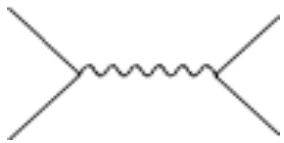
  Including

  QCD Resummation

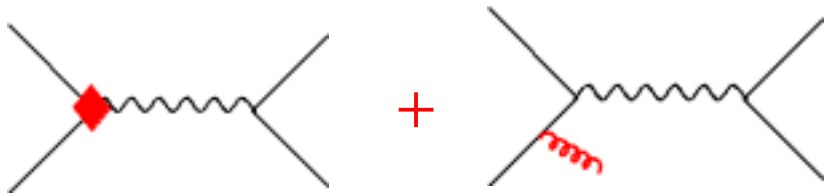
  and

  NLO QED correction in the final state

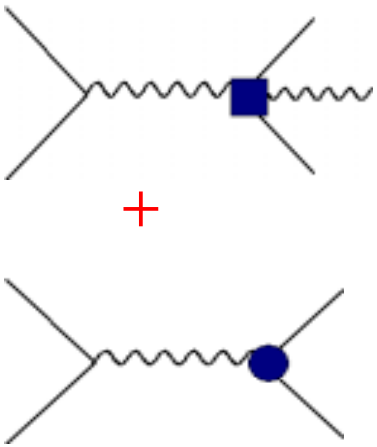
Born



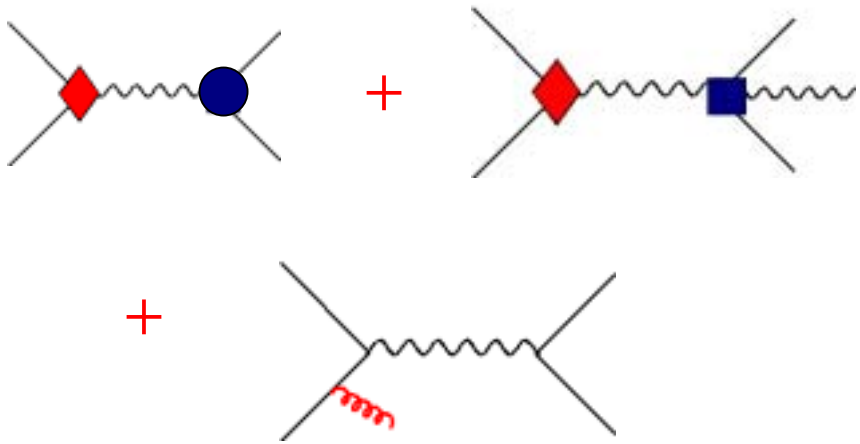
Resum+Born



NLO



Resum+NLO



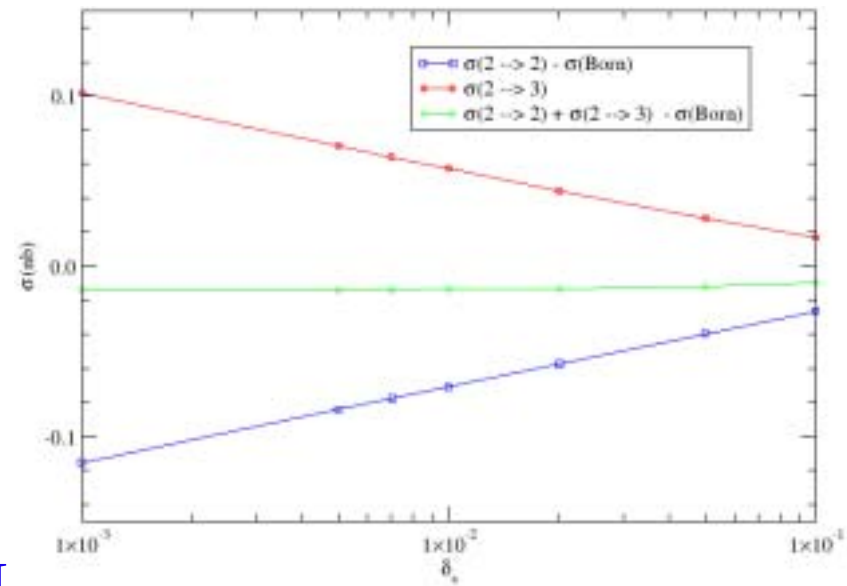
Parameters:

$\sqrt{S} = 1.96$ TeV $\quad M_W = 80.35$ GeV

$\Gamma_W = 2.0887$ GeV $\quad G_\mu = 1.16639 \times 10^{-5}\,\mathrm{GeV}^{-2}$

$\delta_s = 0.01 \quad BR\left(W \to e^+\nu\right) = 0.11$

δ_s independence



With Running Width:

$$\frac{1}{\hat{s} - M_W^2 + i\, M_W \Gamma_W(\hat{s})}$$

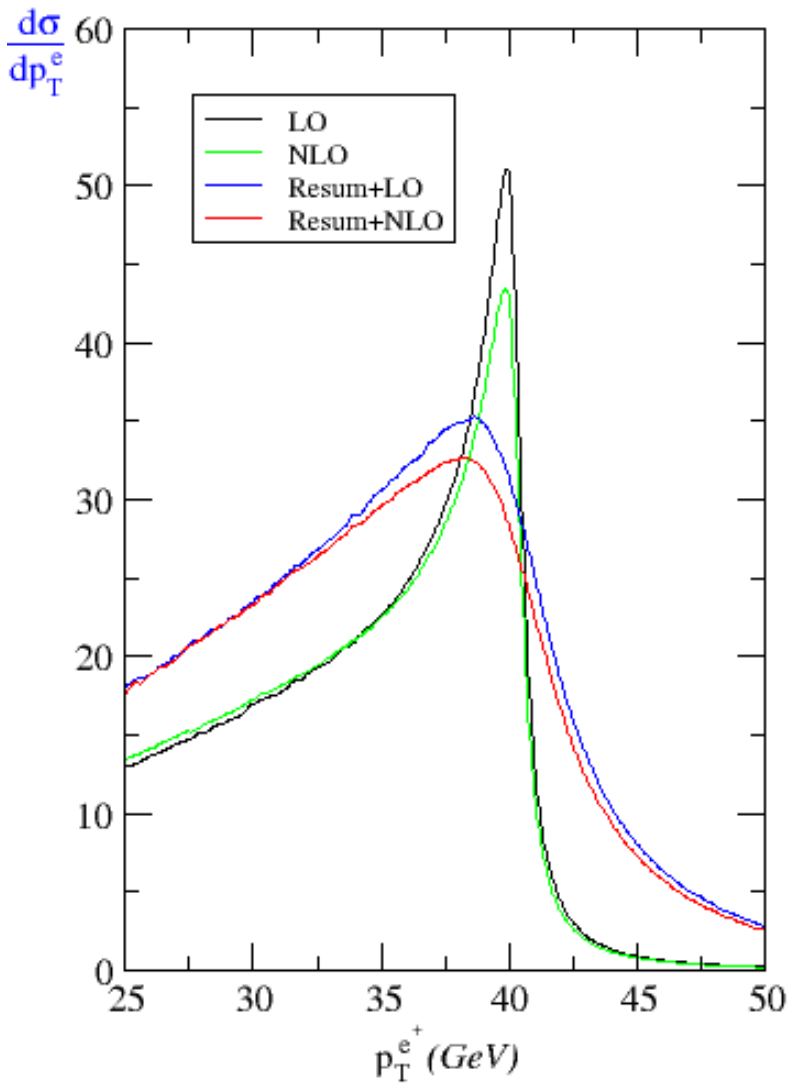
$$\Gamma_W(\hat{s}) = \Gamma_W \frac{\hat{s}}{M_W^2}$$

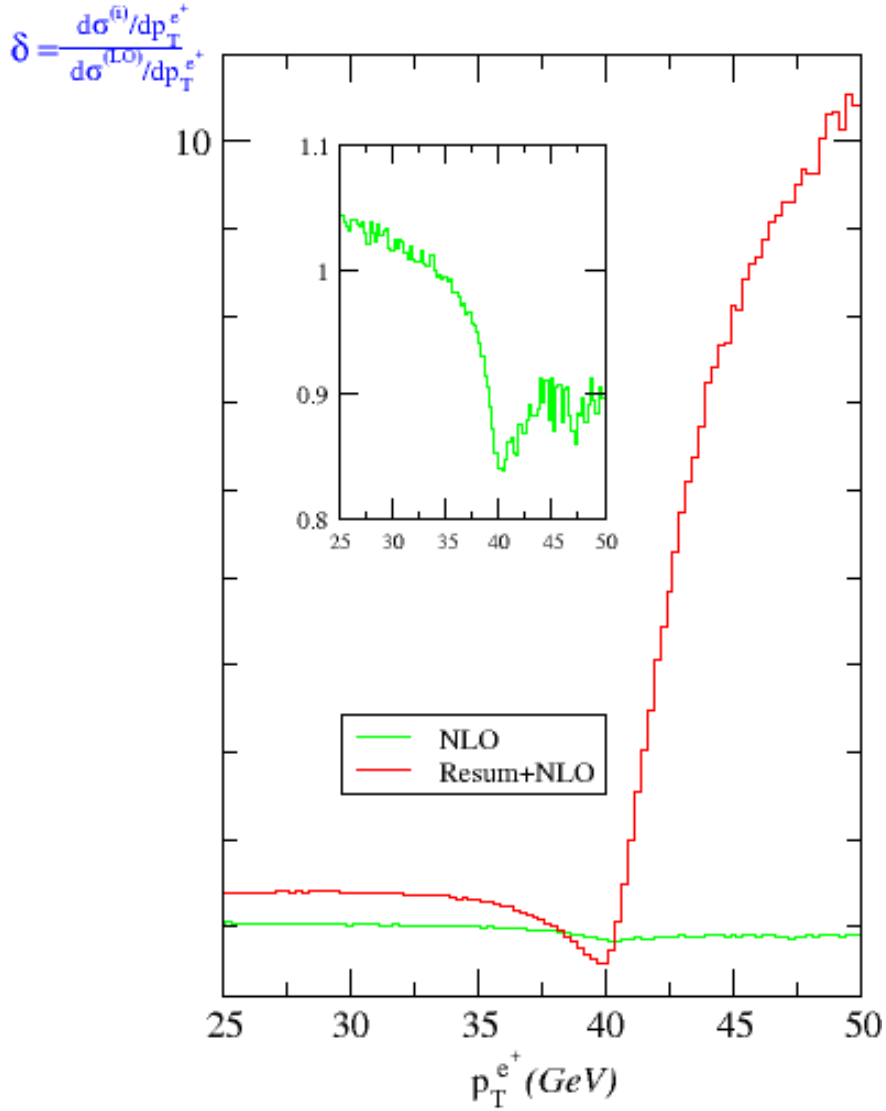
Rate (after cuts) : Using CTEQ6M

	LO	NLO	Res+LO	Res+NLO
σ(pb)	440	424.6	532.4	506
K-factor	1	0.965	1.21	1.15

CTEQ6L $\sigma_{LO} = 378\,\mathrm{pb}$

Cuts: $p_T^e > 25\mathrm{GeV}, \quad \not{E}_T > 25\mathrm{GeV}, \quad |\eta_e| < 1.2$





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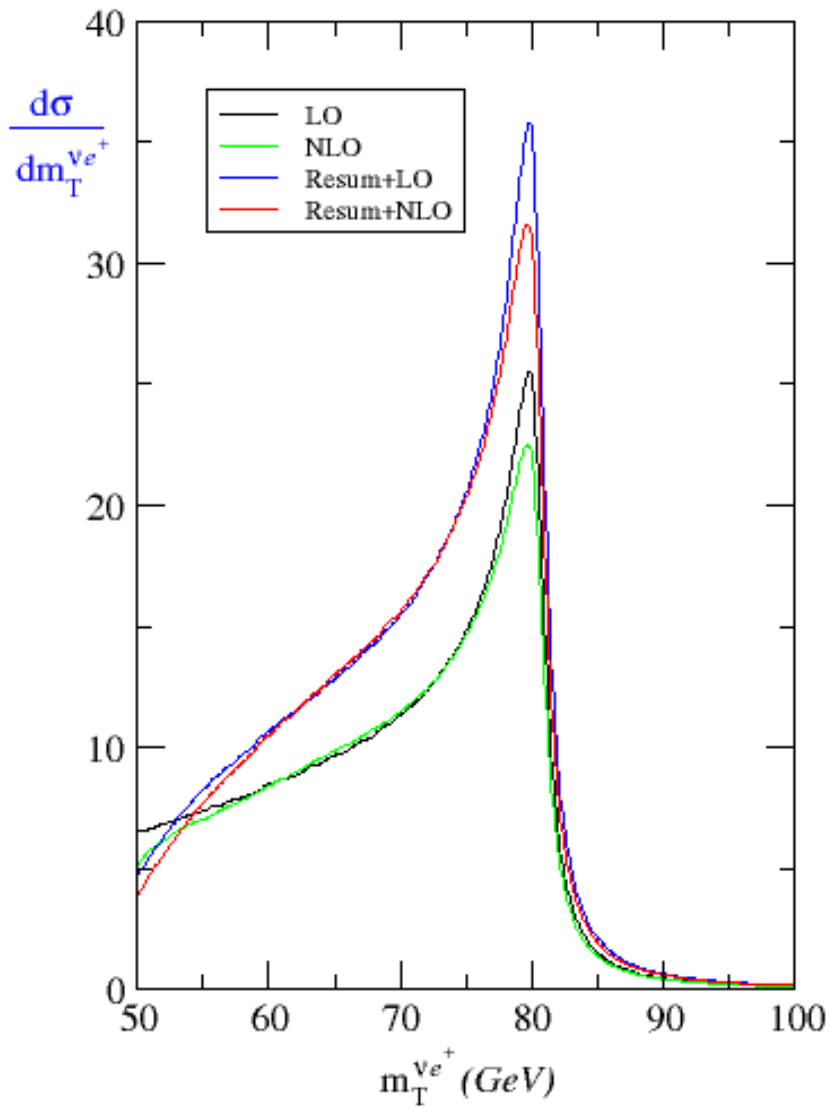

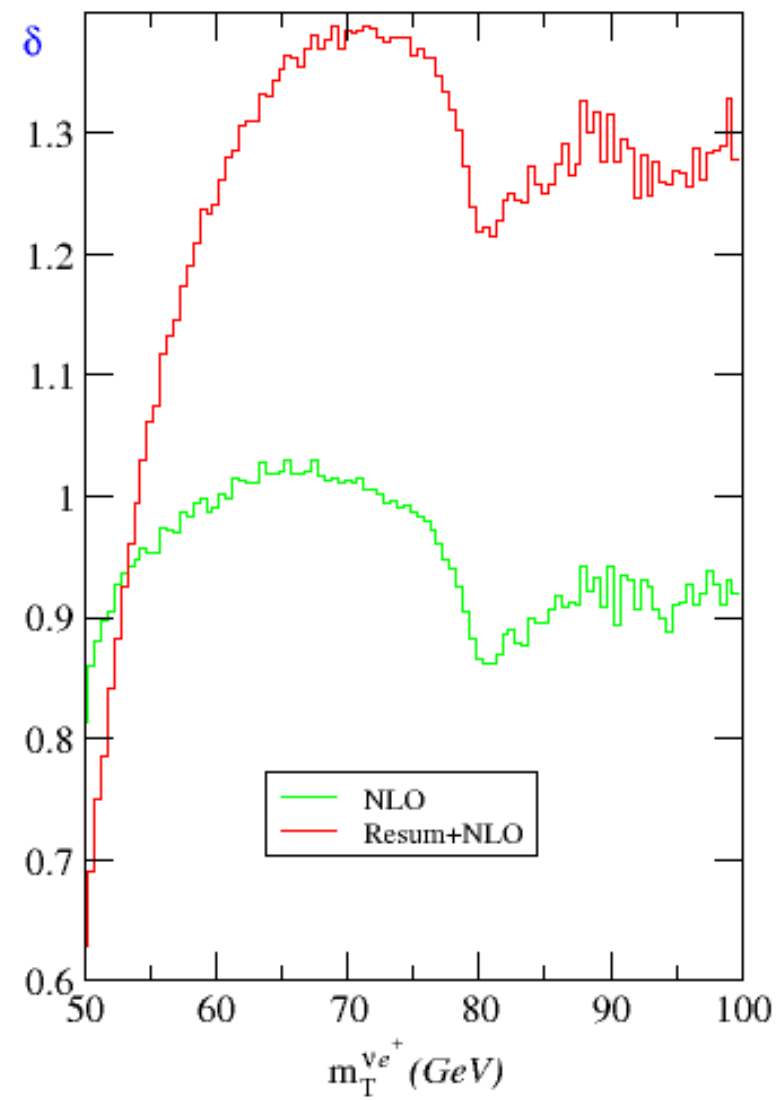

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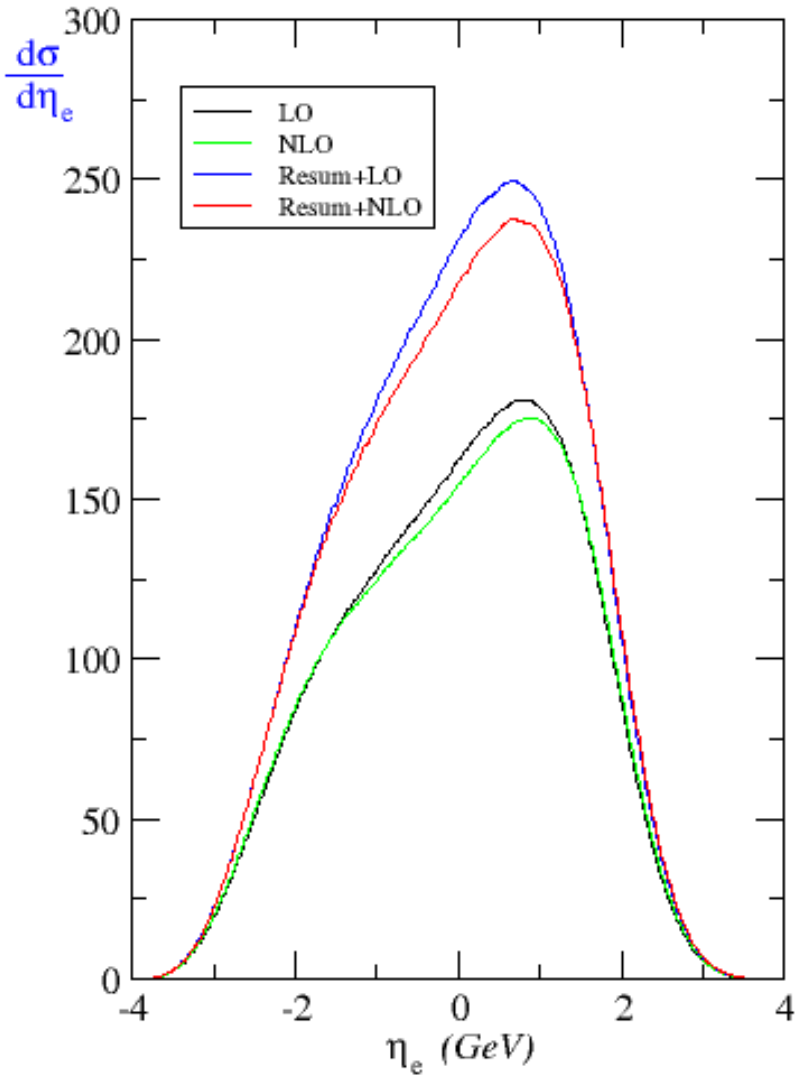

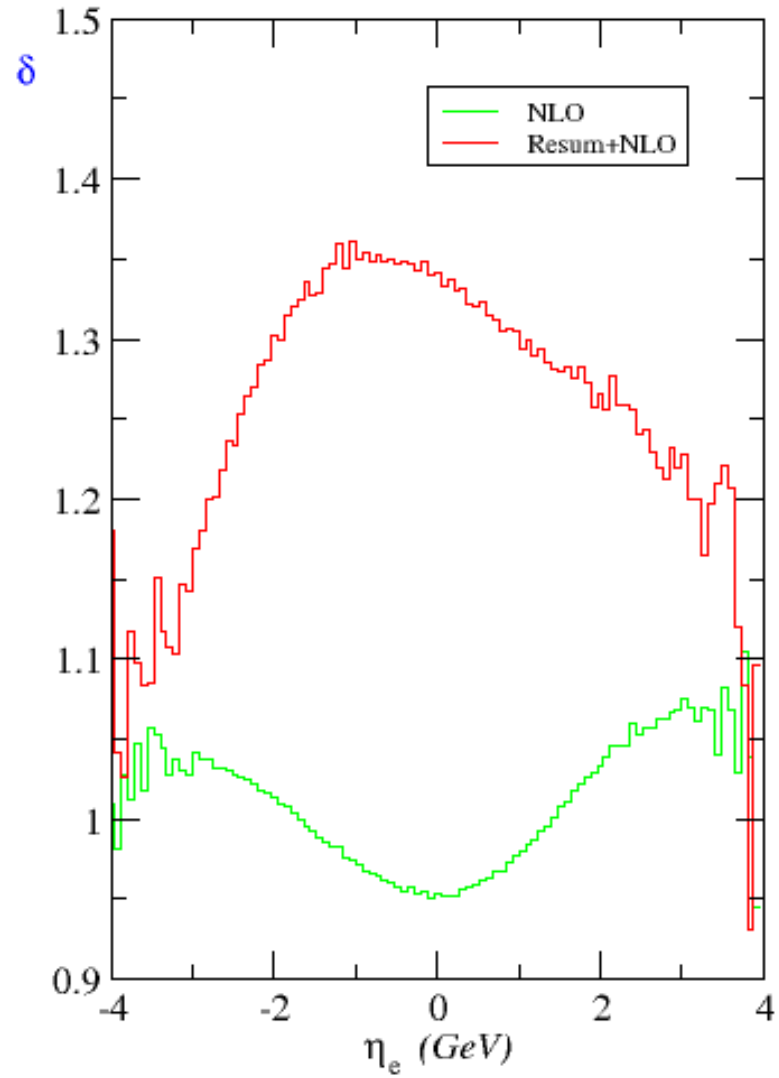

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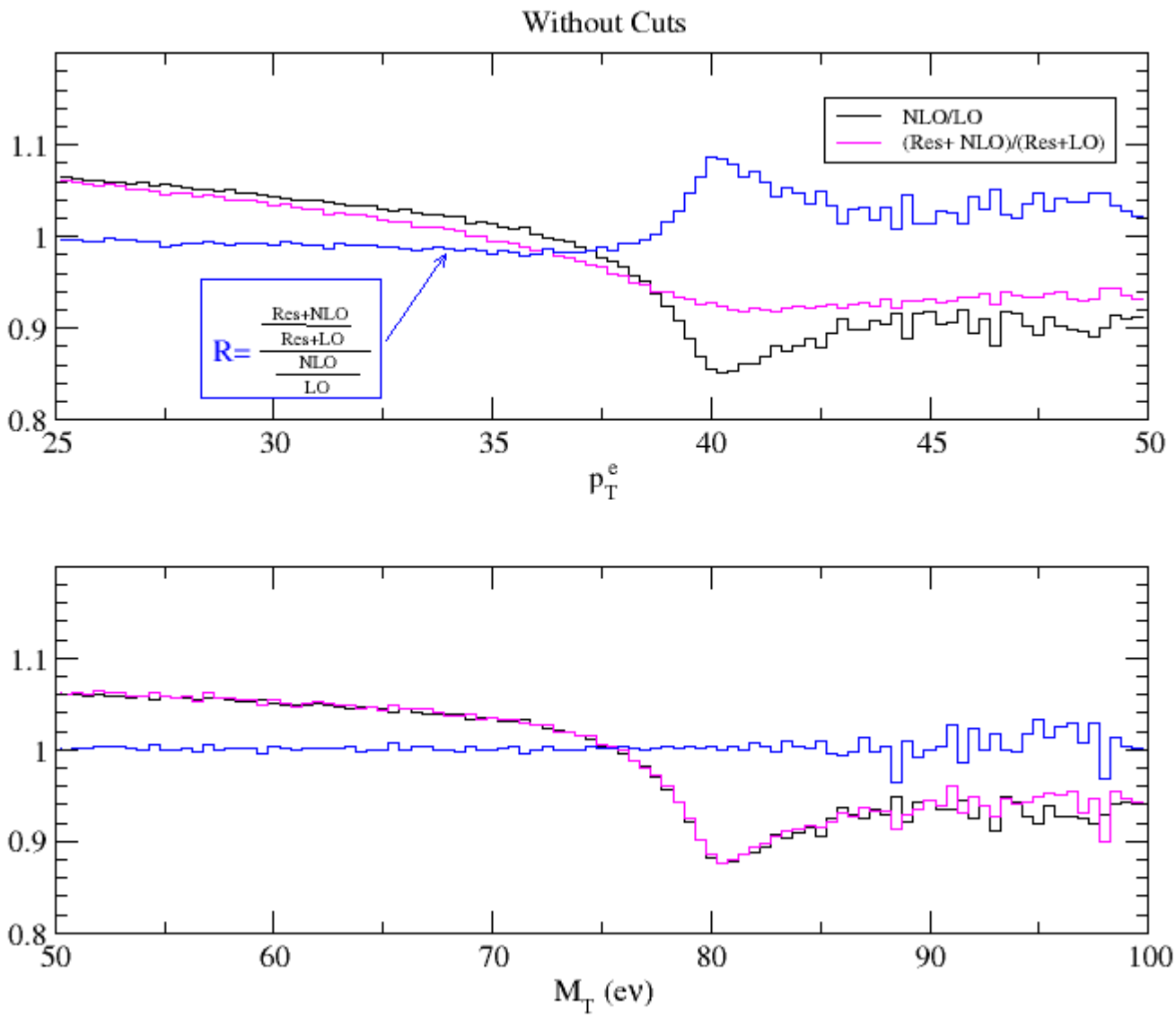
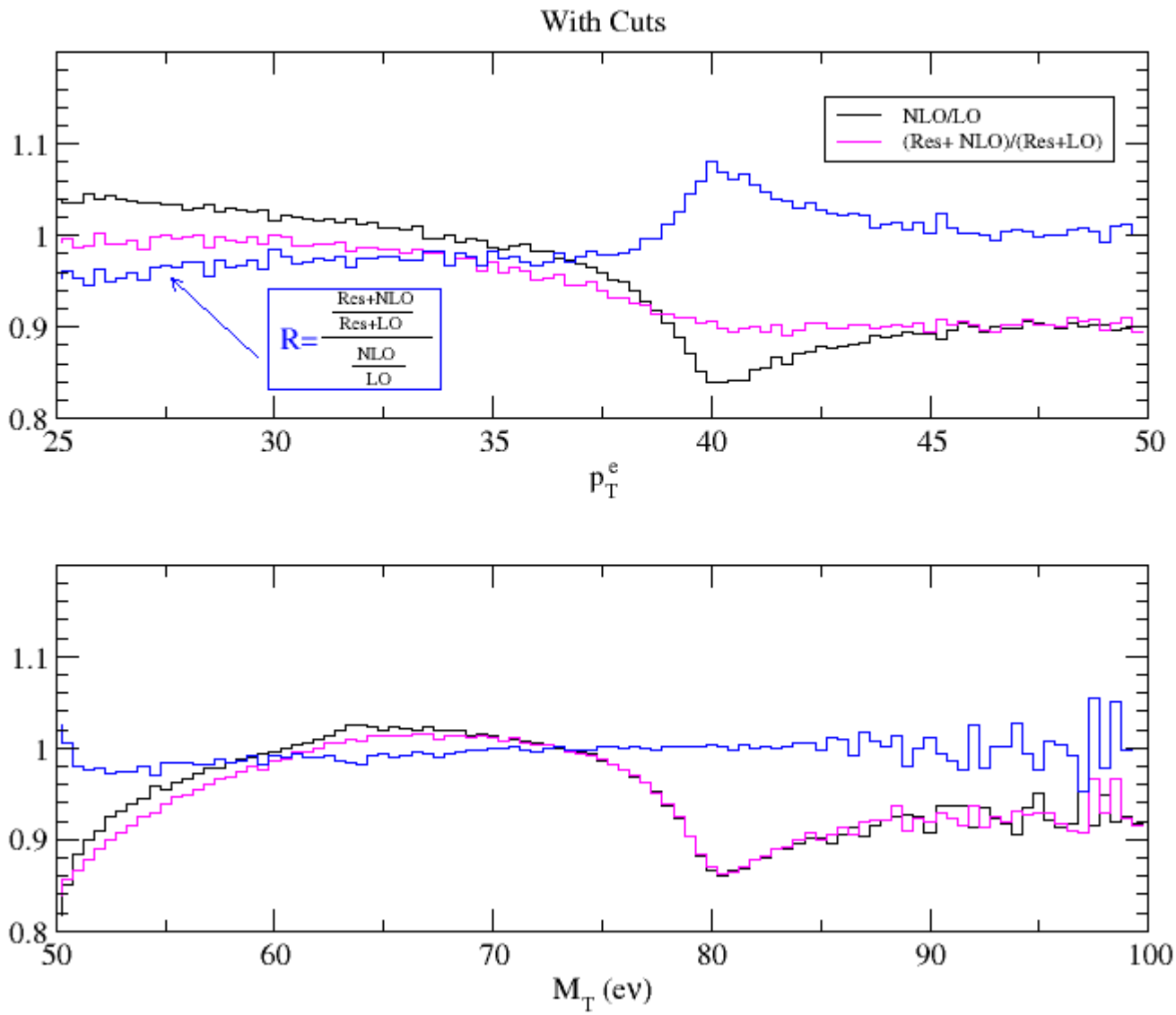
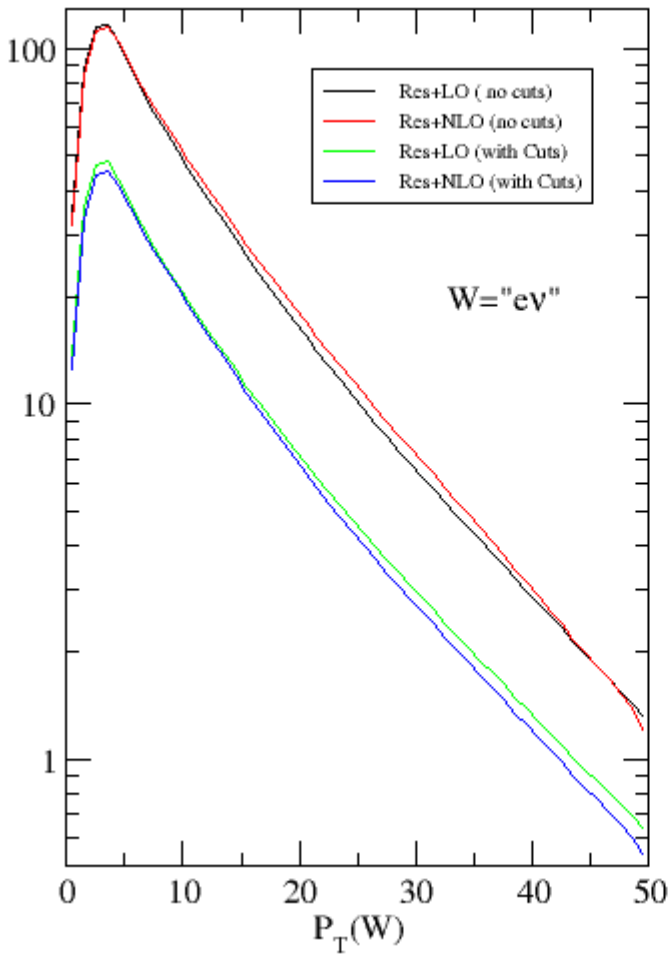
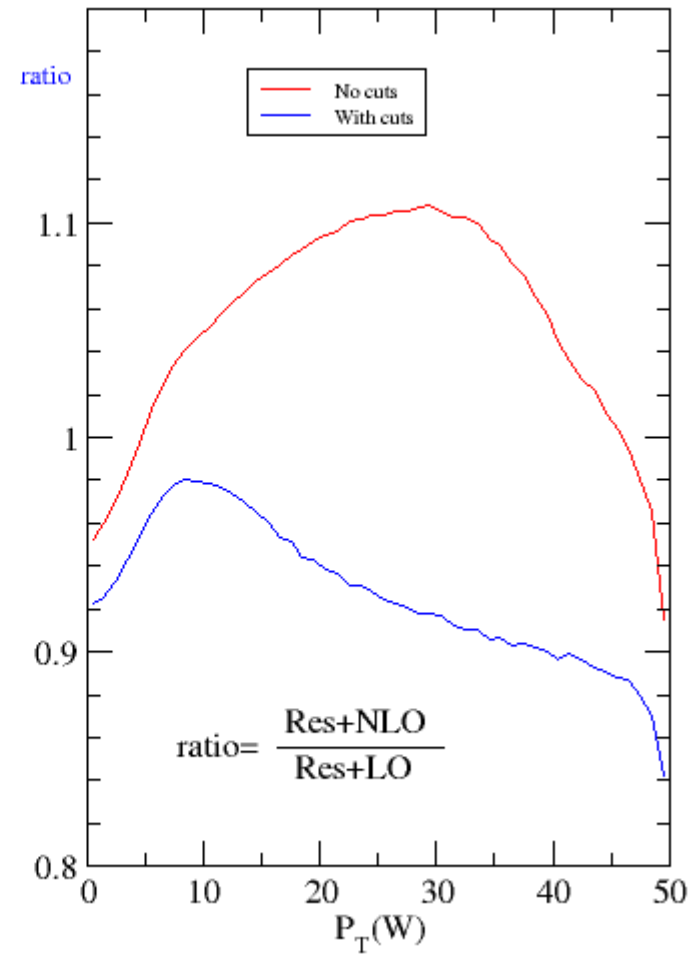

Without Cuts
NLO/LO
(Res+ NLO)/(Res+LO)
R= (Res+NLO)/(Res+LO) / (NLO)/(LO)
1.1
1
0.9
0.8
25
30
35
40
45
50
p_T^e
1.1
1
0.9
0.8
50
60
70
80
90
100
M_T (ev)


With Cuts
NLO/LO
(Res+ NLO)/(Res+LO)
R= (Res+NLO)/(Res+LO) / (NLO)/(LO)
1.1
1
0.9
0.8
25
30
35
40
45
50
p_T^e
1.1
1
0.9
0.8
50
60
70
80
90
100
M_T (ev)


Res+LO (no cuts)
Res+NLO (no cuts)
Res+LO (with Cuts)
Res+NLO (with Cuts)
W="eν"
100
10
1
0
10
20
30
40
50
P_T(W)


ratio
No cuts
With cuts
ratio= Res+NLO / Res+LO
1.1
1
0.9
0.8
0
10
20
30
40
50
P_T(W)