W mass: DYRes studies (status)

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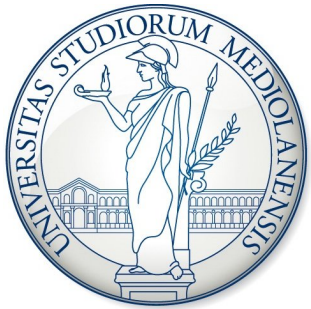
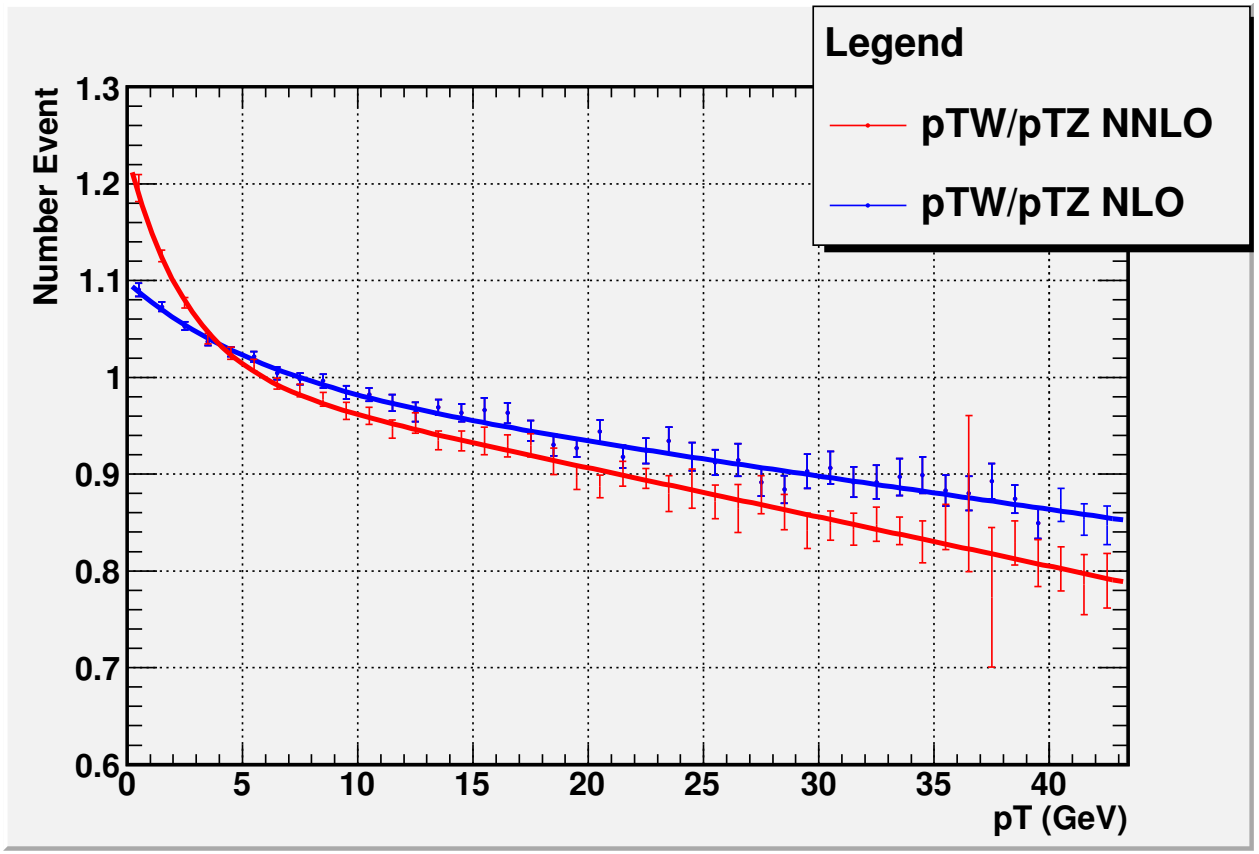


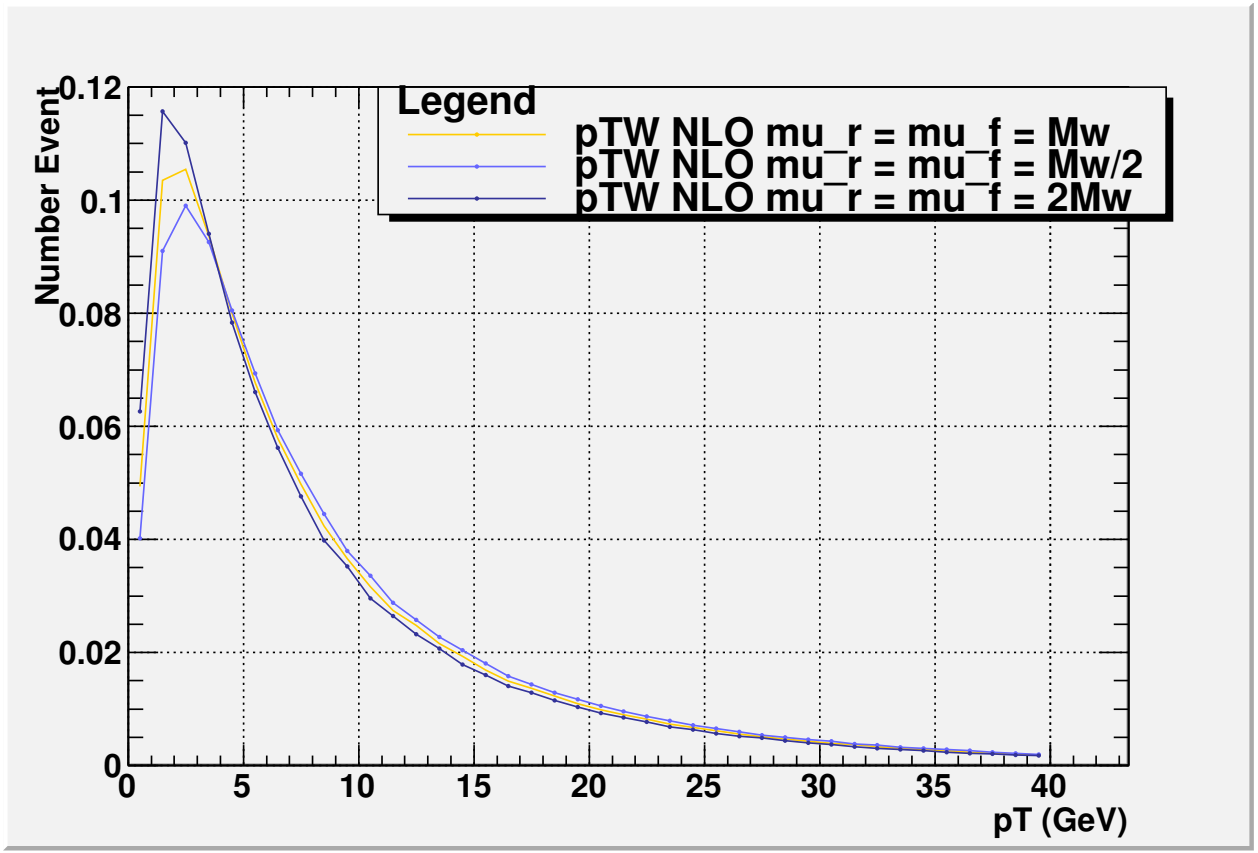
CDF Physics Meeting - Batavia - Aug. 27th 2015

- pT W/pT Z: NLO vs NNLO



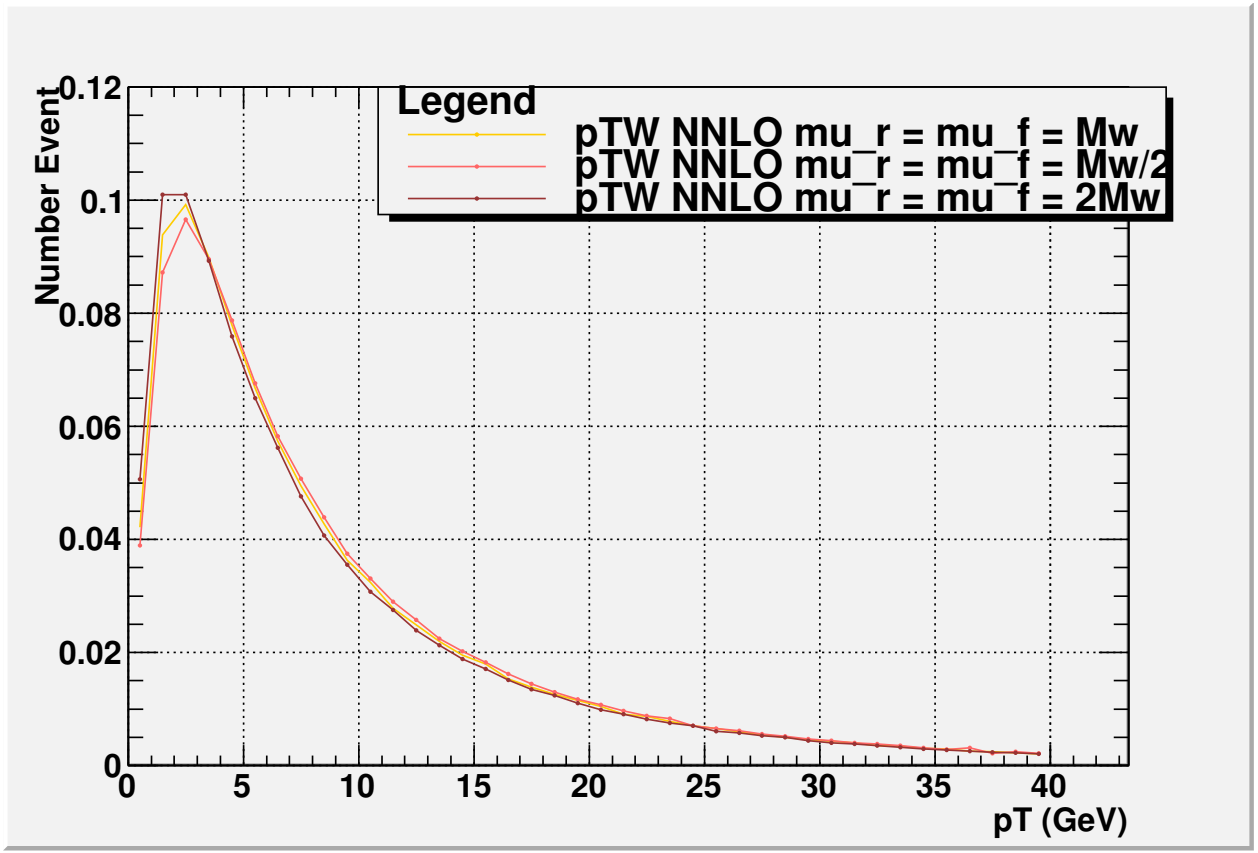
- *Fitting functions*: $f(x) = a + bx + c\exp(dx)$.

- pT W transverse-momentum distributions, variation of theoretical scales μ_r, μ_f: NLO



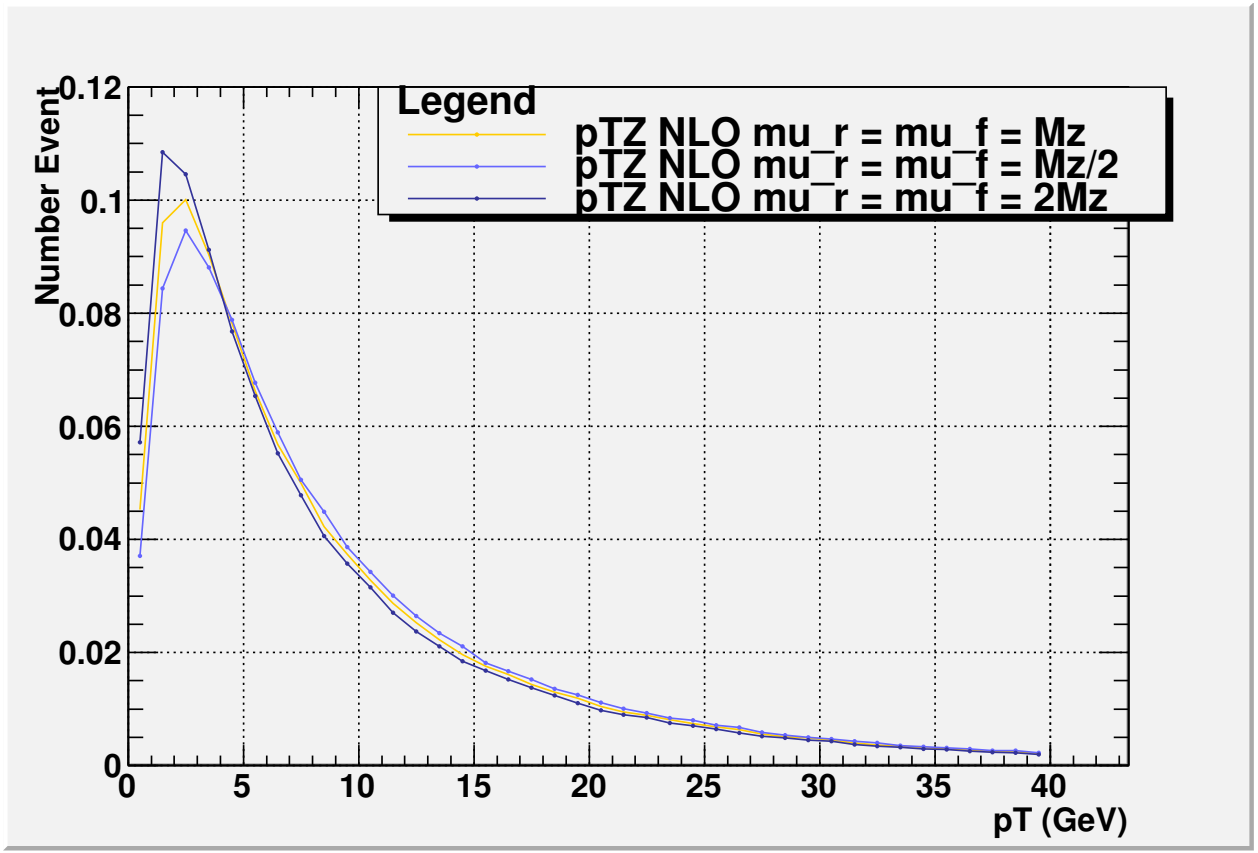
- *Process*: $p\overline{p} \rightarrow W^+ \rightarrow l^+\nu$,$\sqrt{s} = 1.96$ TeV, W cuts $60 - 100$ GeV, $M_w/2 \leq \mu_r, \mu_f \leq 2M_w$.

- pT W transverse-momentum distributions, variation of theoretical scales μ_r, μ_f: NNLO



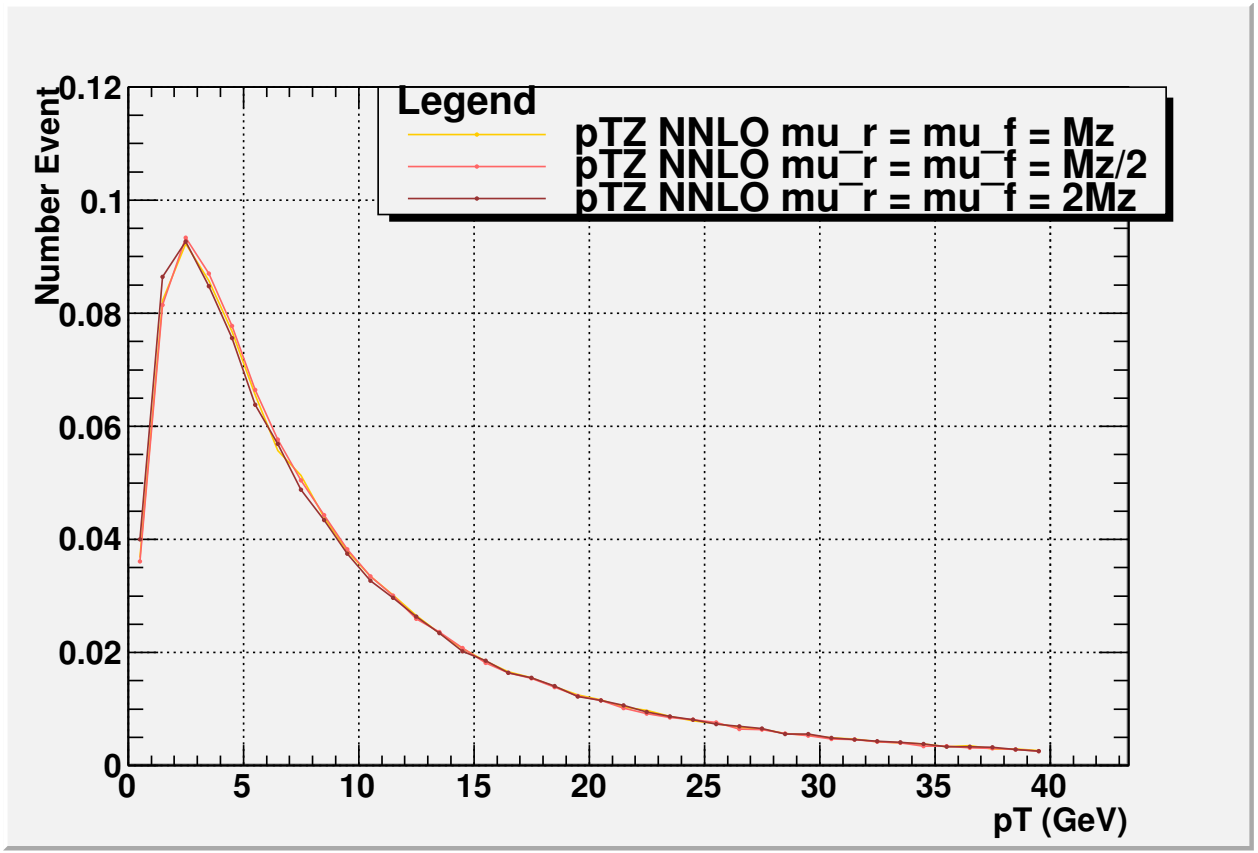
- *Process*: $p\bar{p} \to W^+ \to l^+\nu$,$\sqrt{s} = 1.96$ TeV, inv. mass cuts $60 - 100$ GeV, $M_z/2 \leq \mu_r, \mu_f \leq 2M_z$.

- pT Z transverse-momentum distributions, variation of theoretical scales μ_r, μ_f: NLO



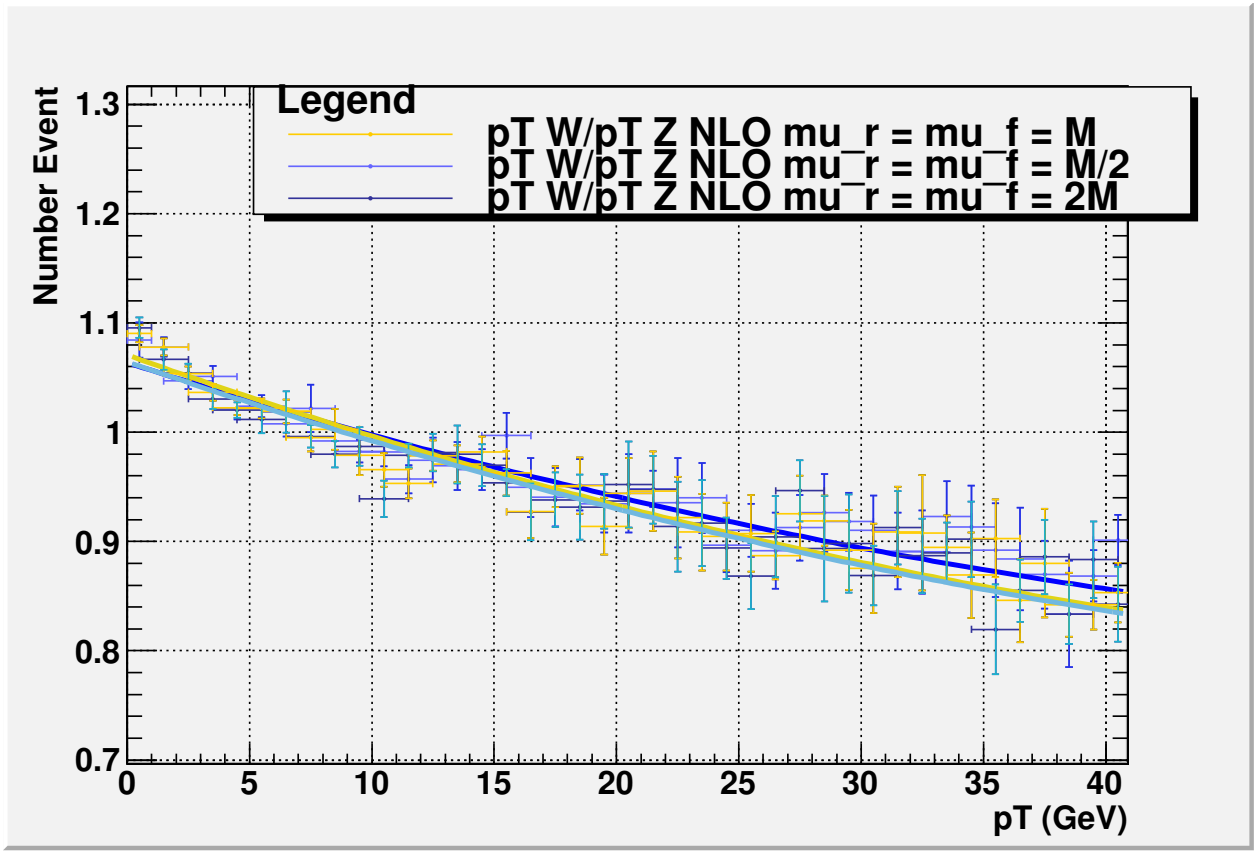
- *Process*: $Z/\gamma^* \to l^+ l^-$, $\sqrt{s} = 1.96$ TeV, inv. mass cuts $70 - 110$ GeV, $M_z/2 \leq \mu_r, \mu_f \leq 2M_z$.

- pT Z transverse-momentum distributions, variation of theoretical scales μ_r, μ_f: NNLO

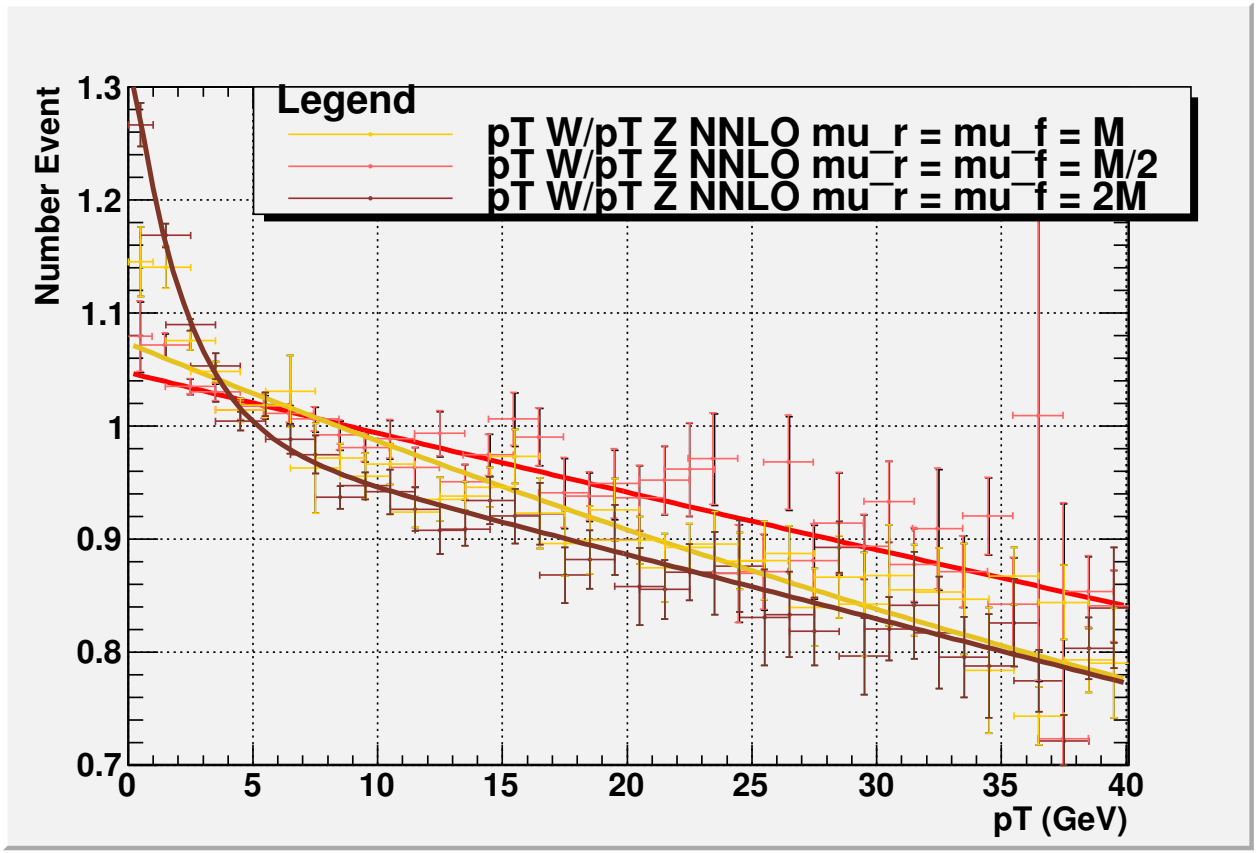


- *Process*: $Z/\gamma^* \to l^+l^-$,$\sqrt{s} = 1.96$ TeV, inv. mass cuts $70 - 110$ GeV, $M_z/2 \leq \mu_r, \mu_f \leq 2M_z$.

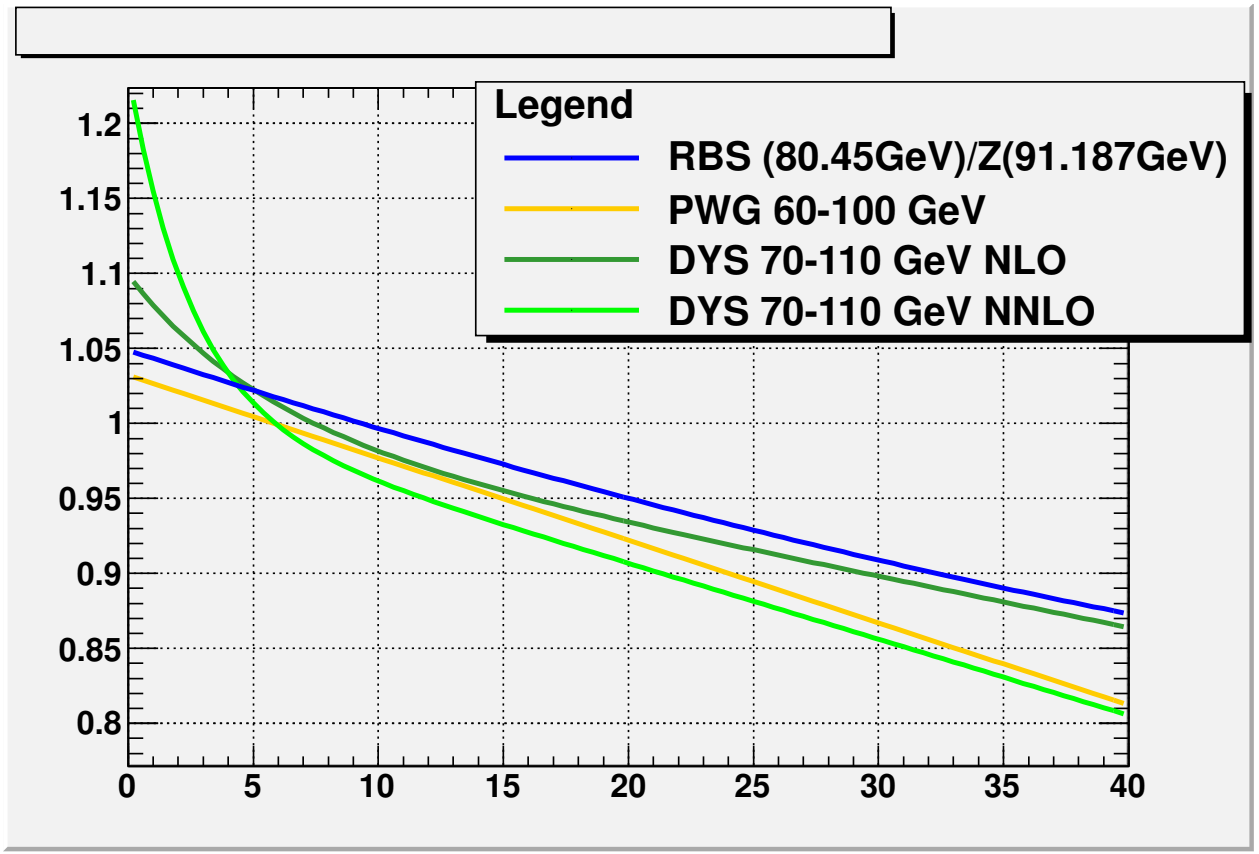
- pT W/pT Z at NLO



- pT W/pT Z at NNLO



- DYRes, POWHEG and RESBOS fits



- **DYRes Conclusion**
- NLO $\longrightarrow$ both for W and Z more affected by scales variations;
- NNLO $\longrightarrow$ both W and Z less affected by scales variations;
- Ratio NLO $\longrightarrow$ no difference changing scales;
- Ratio NNLO $\longrightarrow$ necessity of more statistics and spread at pT $\leq$ 5 GeV;

- **State of the Art**
- DYRes needs more statistics for suitable comparison;
- POWHEG and RESBOS ratios have similar trends.