

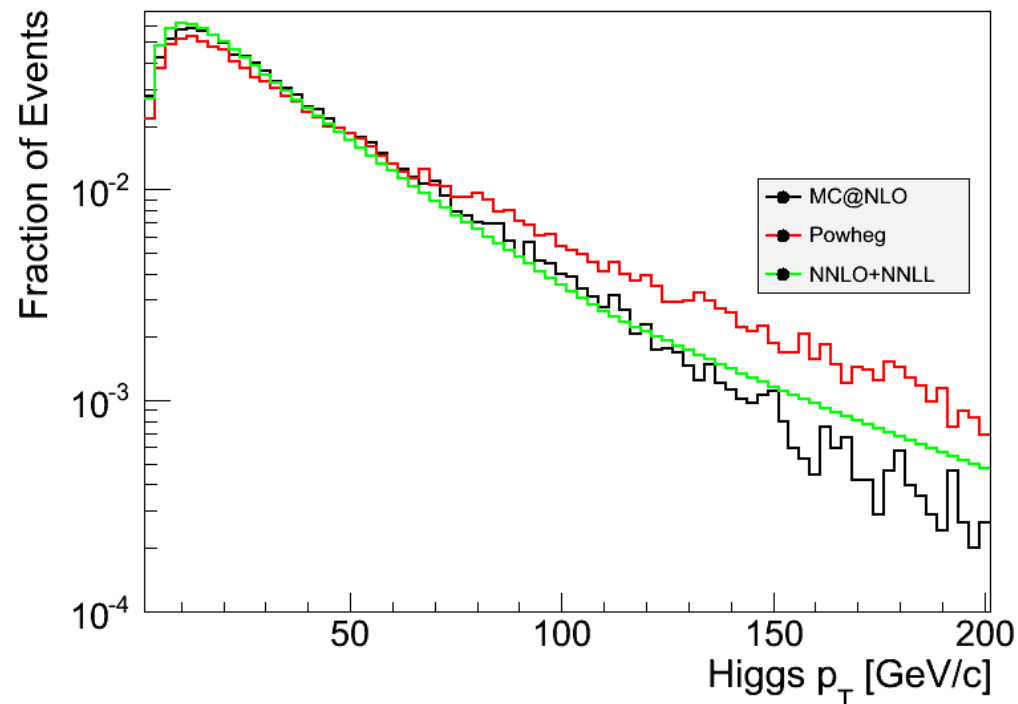
Jet Veto Efficiency Discussion : What does CMS do?

Si Xie for
CMS HWW Group

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Higgs Pt Reweighting

- There exists a reference resummed Higgs Pt spectrum computed to NNLO+NNLL (Grazzini et. al)
- To make apples-to-apples comparisons, we reweight all MC Higgs predictions to the reference pT spectrum.



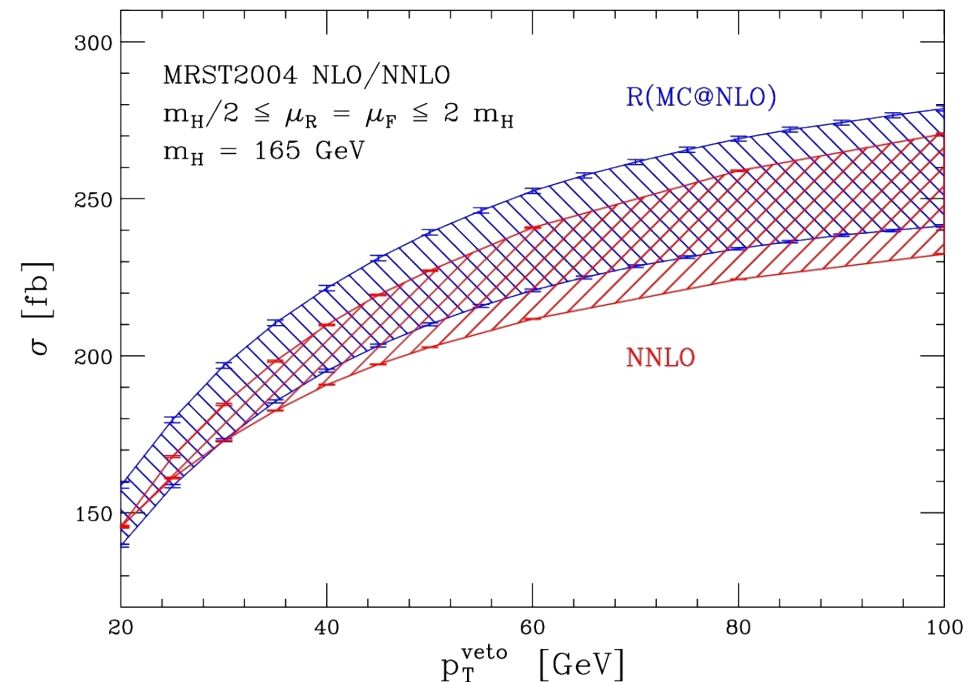
Jet Veto Efficiency Estimate

- HWW Jet Veto Efficiency = $(\epsilon_{Z \text{ Data}} / \epsilon_{Z \text{ MC}}) * \epsilon_{\text{HWW}}$
- Jet energy response in signal simulation largely corrected by Z data

- Gain Faith in the estimate by verifying overlap of the MC (Parton Shower) prediction vs. fixed order NNLO calculation.

Anastasiou et al., JHEP 0803:017,2008

$pp \rightarrow H + X \rightarrow WW + X \rightarrow e^+ \nu e^- \nu + X$



Systematic Uncertainty

- Estimate theoretical uncertainties on ratio $R = (\epsilon_{\text{HWW}} / \epsilon_{\text{Z MC}})$
 - **Higher order corrections**
 - vary factorization & renormalization scale in NLO MC, evaluate change in R
 - **PDF**
 - standard PDF reweight procedure, evaluate change in R
 - **Higher order log terms**
 - There does not exist resummed calculations, differential in jet momenta.
 - We account for large log terms via MC parton shower.
 - Higher order log terms may affect R – particularly at low jet pt threshold!!
 - With lack of better calculations, we account for this effect by using the difference between two MC (Powheg+Pythia vs. MC@NLO + Herwig) which use very different models to account for large logarithms
- **Jet energy correction uncertainty**
 - Vary the jet veto threshold by the uncertainty of the jet energy measurement, evaluate the change in R