MADGRAPH_MC@NLO vs FO incl./2jet

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- Goal: performance of MC@NLO for inclusive and 2-jet jet production vs NLO / NLO+NLL
- Generator: MG5_aMC_v2_7_2
- Process: p p > j j [QCD] (p, j = g u c d s b u~ c~ d~ s~ b~)
- NLO Monte Carlo subtr. terms included for Pythia8
- Jet algorithm anti-kT, R=0.7, p_T^{jet} > 60 and >300 GeV (to populate the spectrum)
- QCD Scales: leading parton p_T (jet p_T is technically tricky)
  scales in FO NLO (+NLL) calculations: inclusive jets p_T^{max}, 2-jet $p_T^{max} \cdot e^{0.3\, y^*}$ ($y^* = |y_1 - y_2| / 2$)
- PDF: 13100 (CT14nlo)
- LHC 8 TeV (data + corresponding FO predictions available), MG ~ 10 M Events
- LHE files showered with Pythia8
- Rivet plugins used for the analyses (CMS_2016_I1487277, CMS_2017_I1598460)

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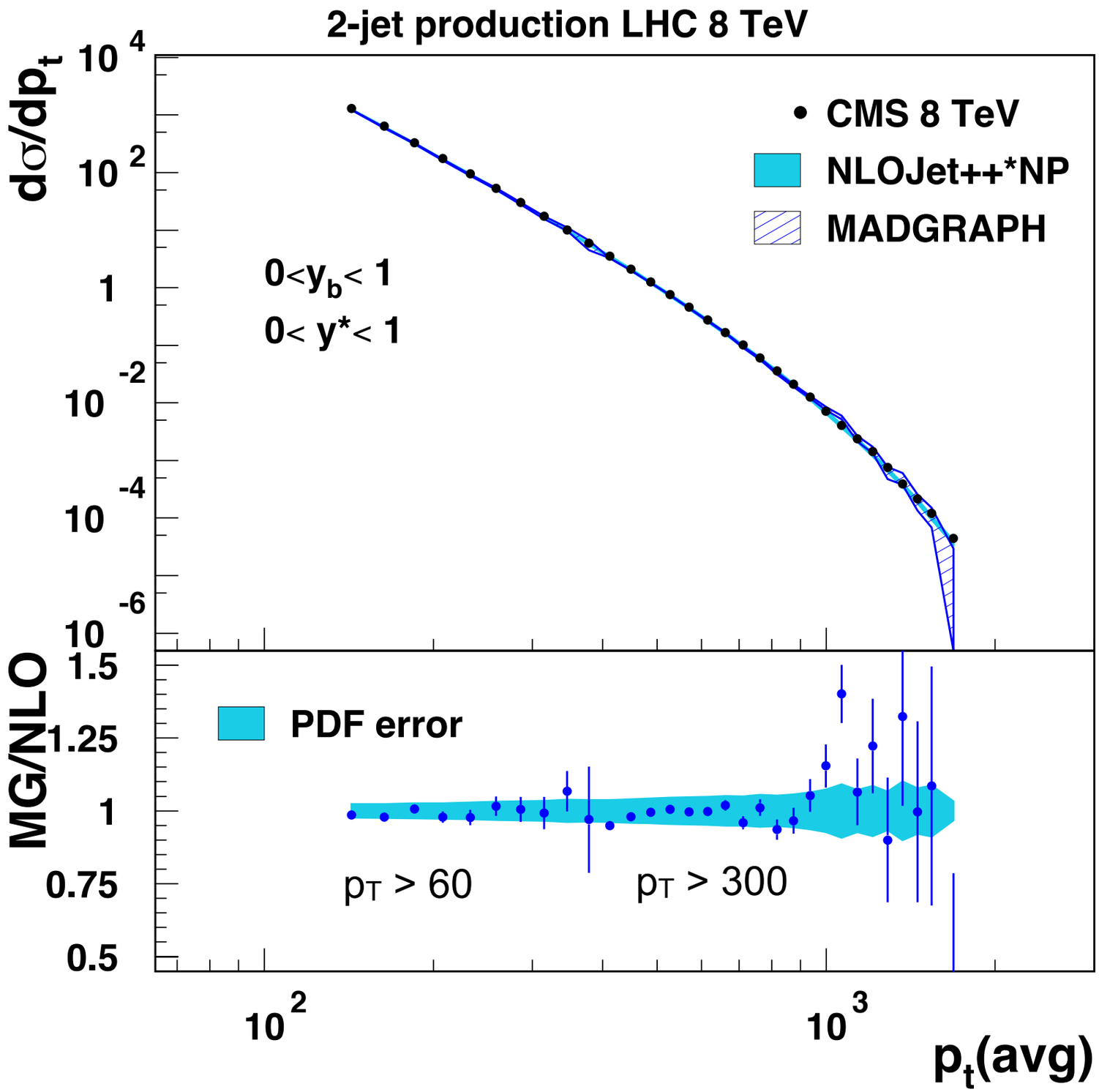
Di-jet production



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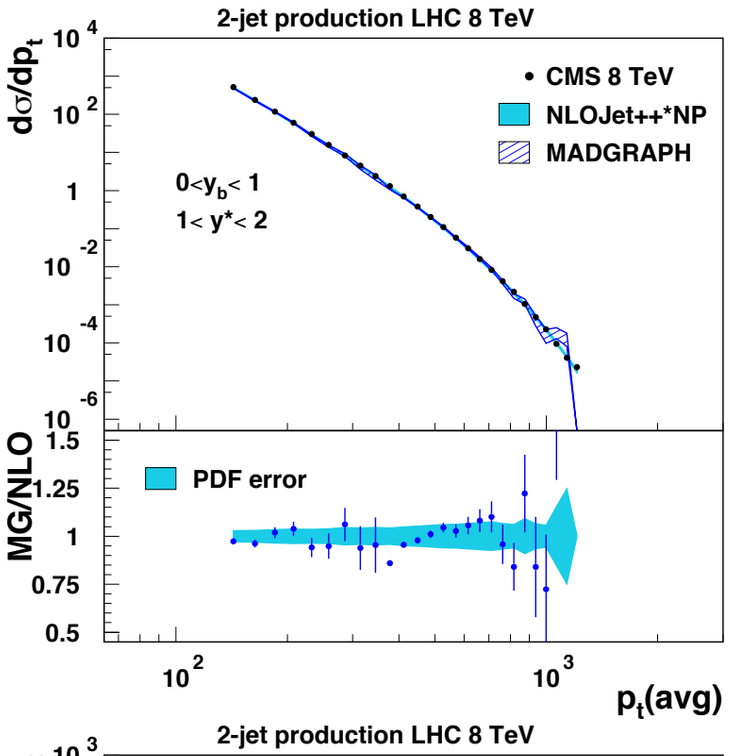

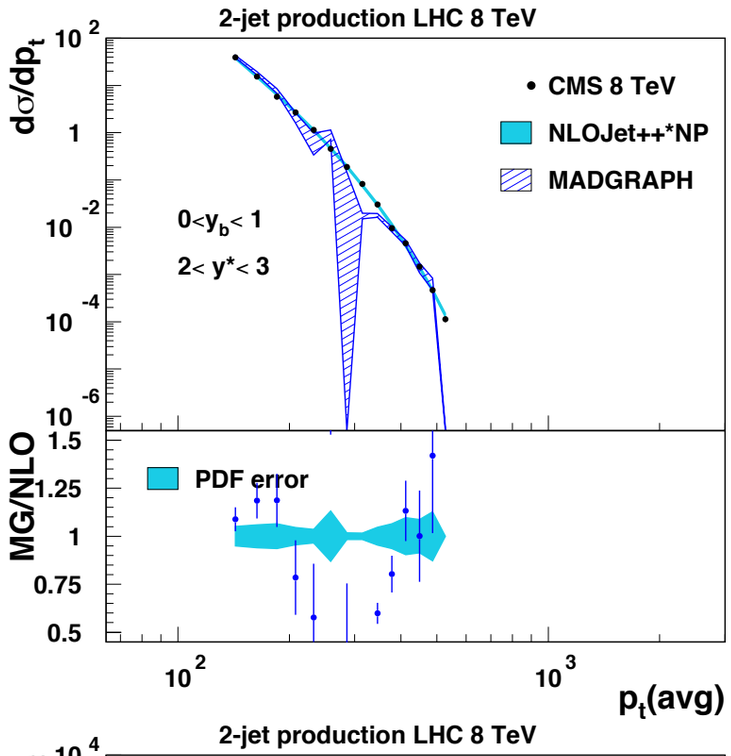

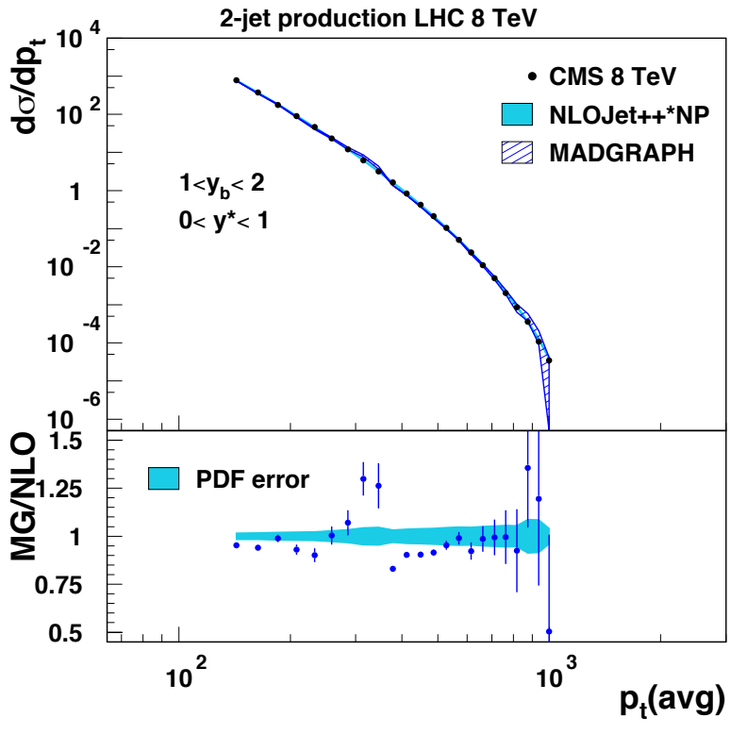

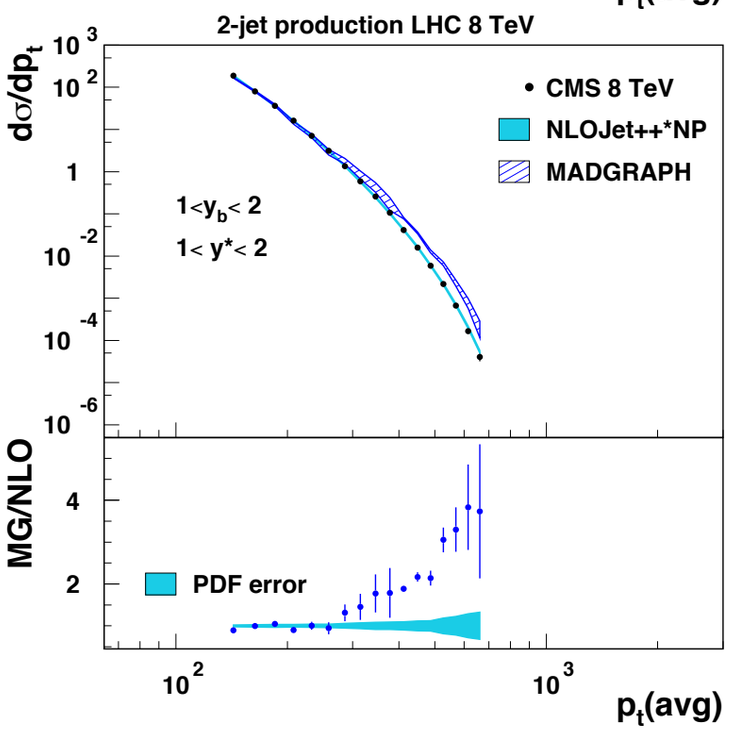

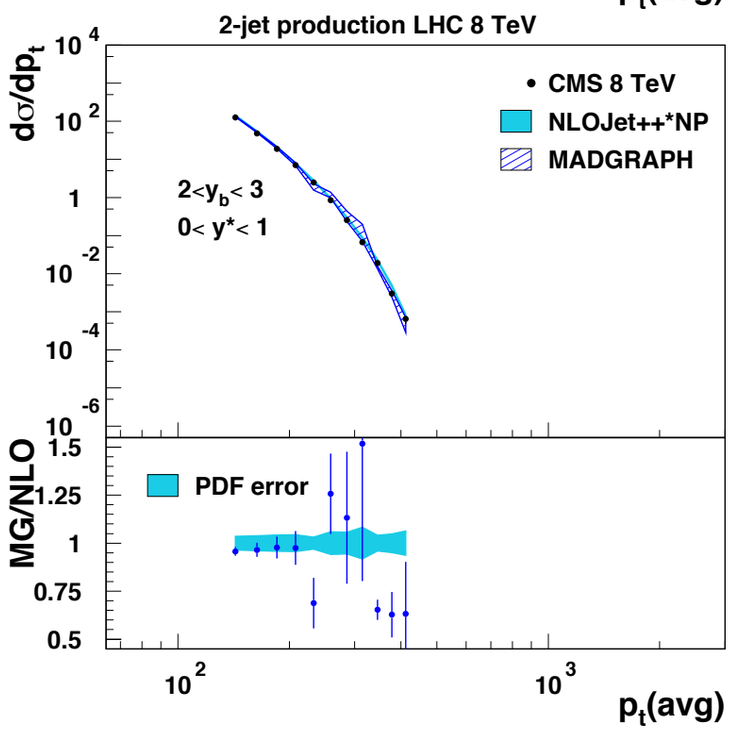

in general good agreement,
5-th bin is not well described @ high p_T

difficulties to populate the spectrum

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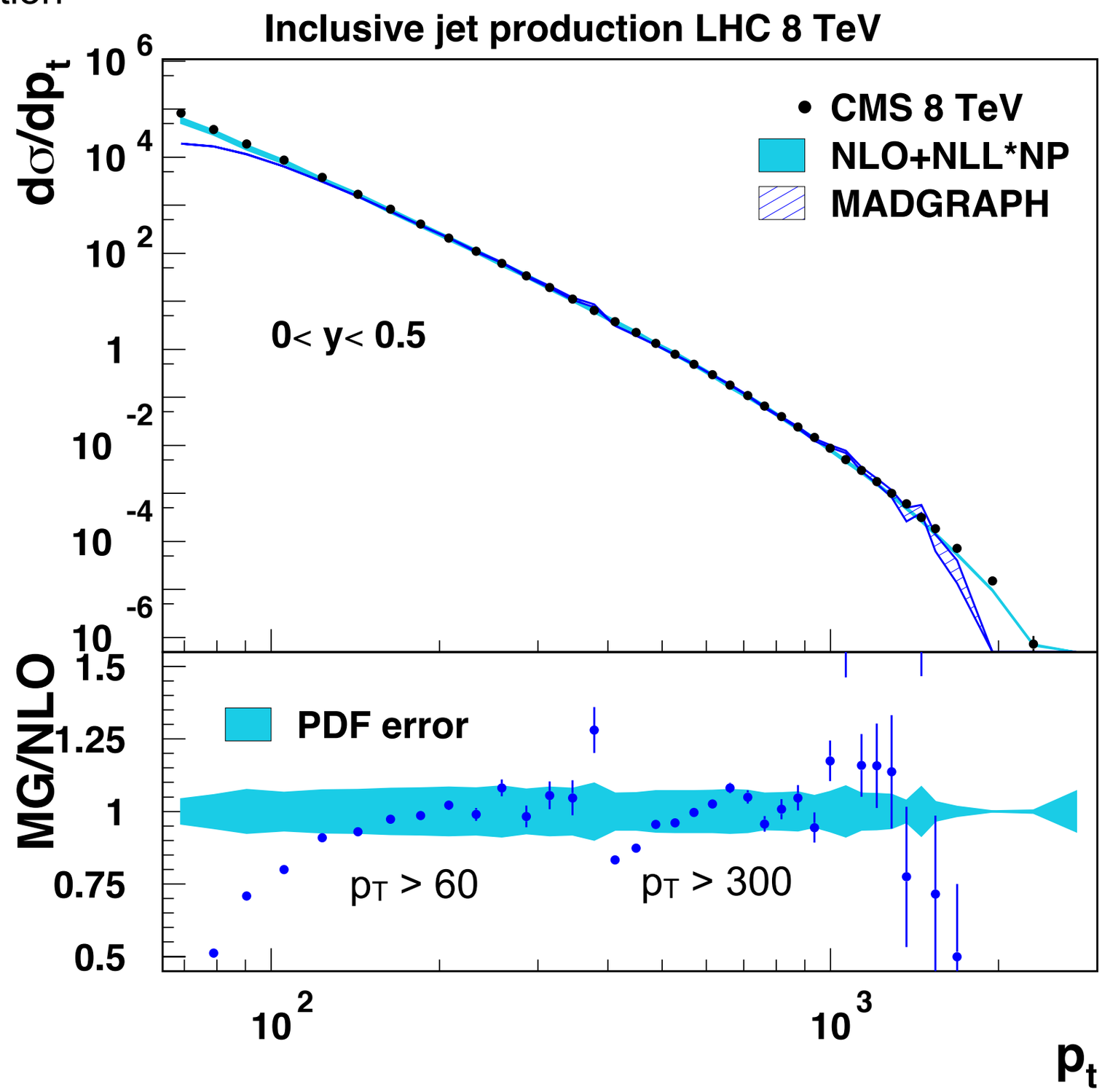
Inclusive-jet production



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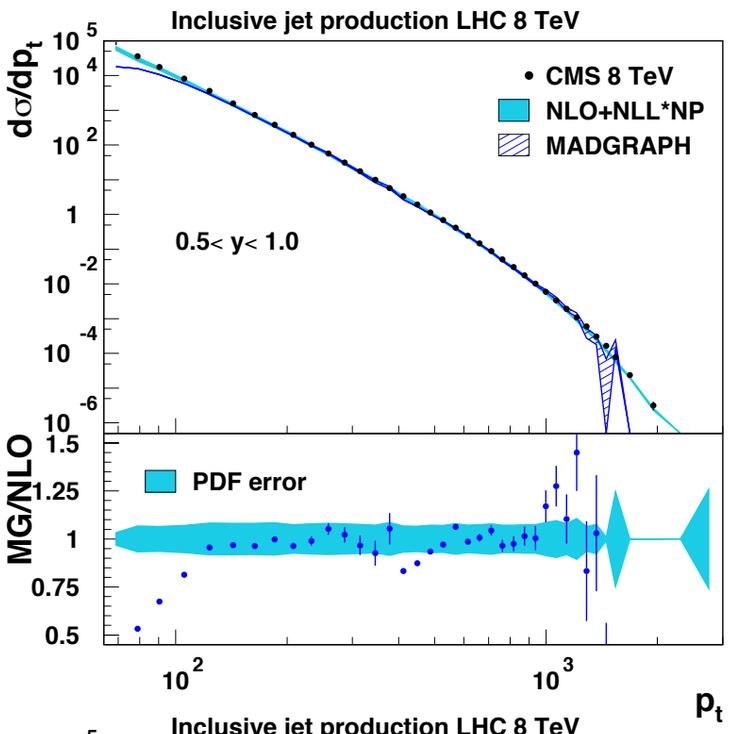
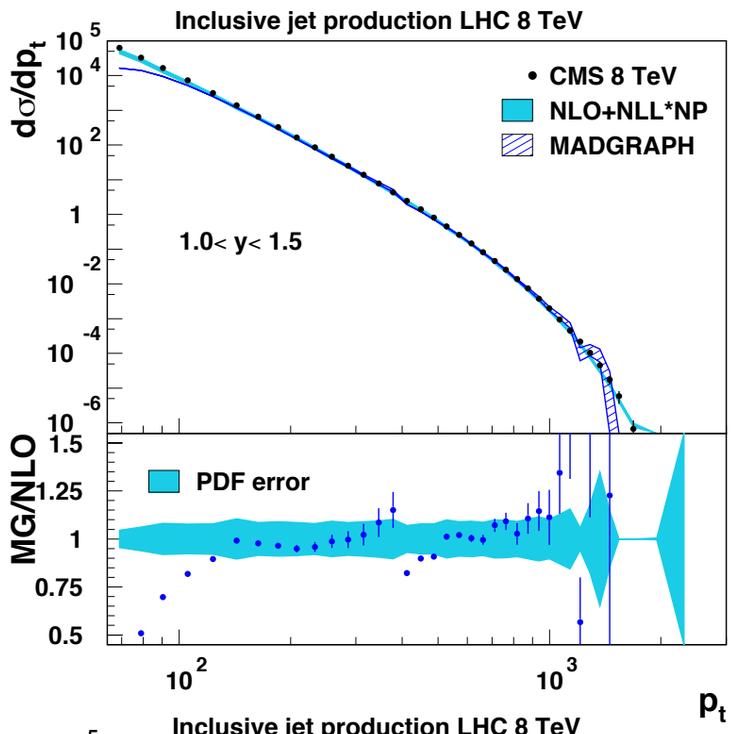
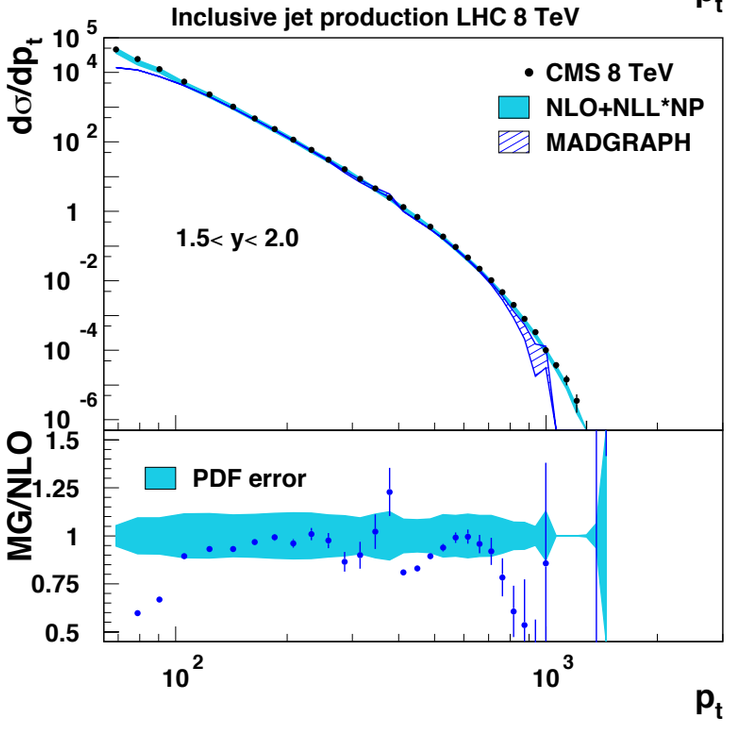
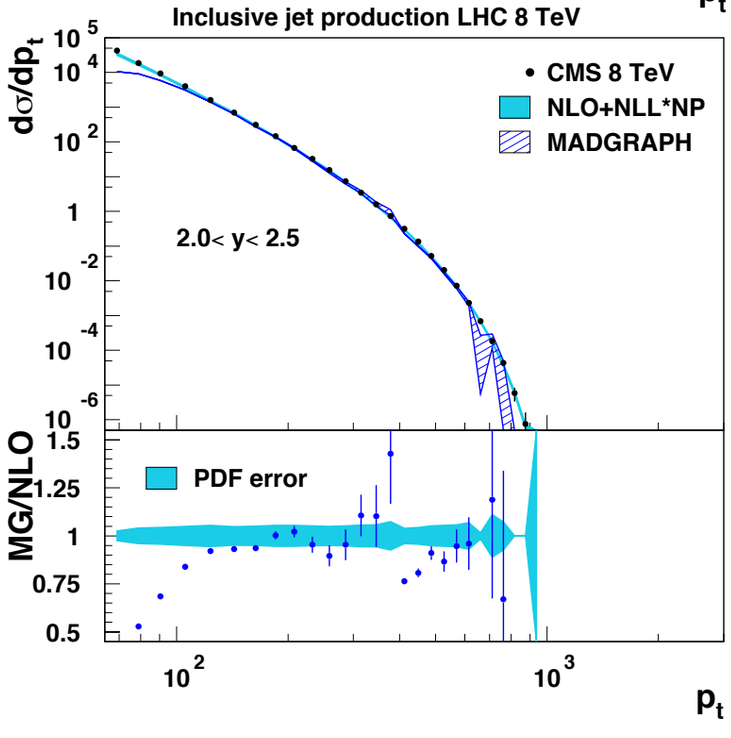
Inclusive-jet production









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- For 2-jet production, pp->jj MG aMC@NLO is doing quite well
- Inclusive jet production is more difficult
- Generation in pt-bins is not preferred
- (As expected) MC statistics is an issue
  > 100M events would be needed to populate the spectra properly

For interpretation, FO calculations are still preferred wrt aMC@NLO
(time & CPU consumption, scale choice, possibility of PDF/α_S fits etc.)