Jet Energy Resolution for the Dijet Balance Method

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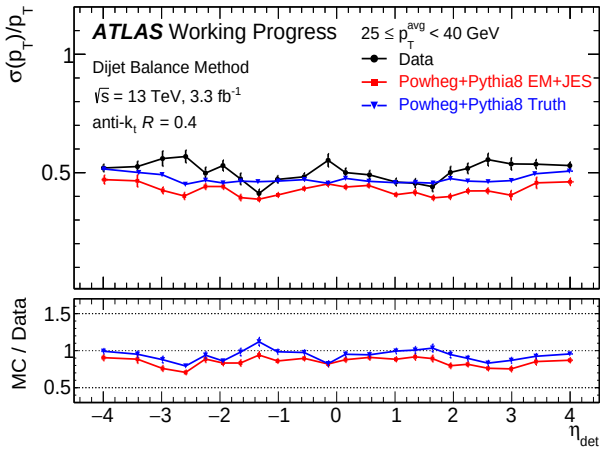
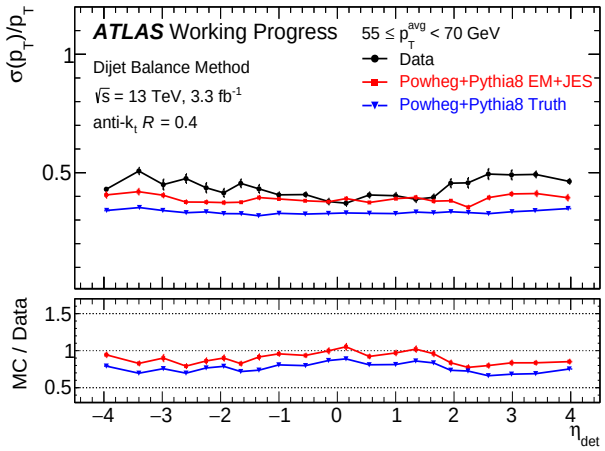
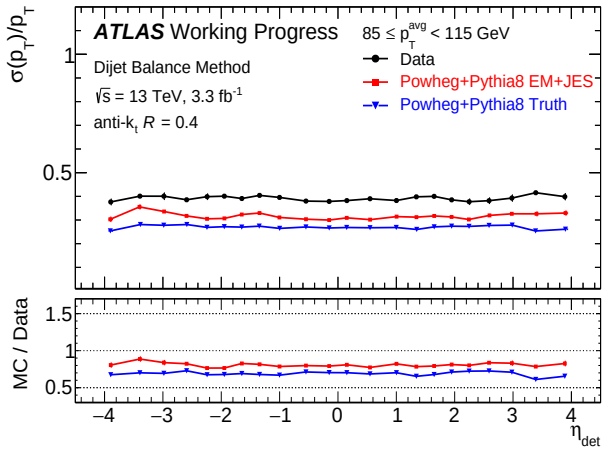
Status

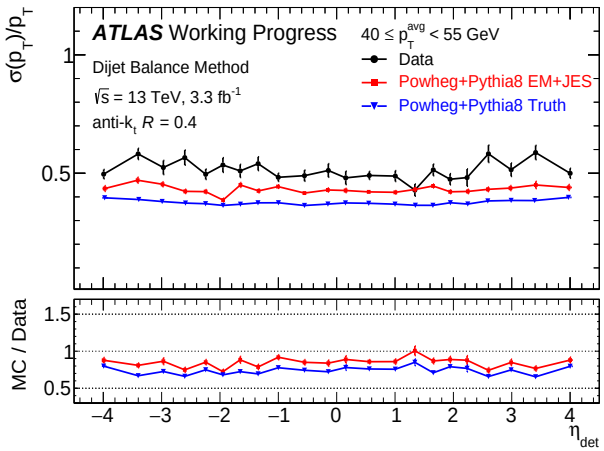
- Produced plots of the fractional jet pT resolutions vs average pT and vs eta for:
  - Data $\sqrt{s} = 13$ TeV
  - Powheg+Pythia8 MC Reco
  - Powheg+Pythia8 MC Truth

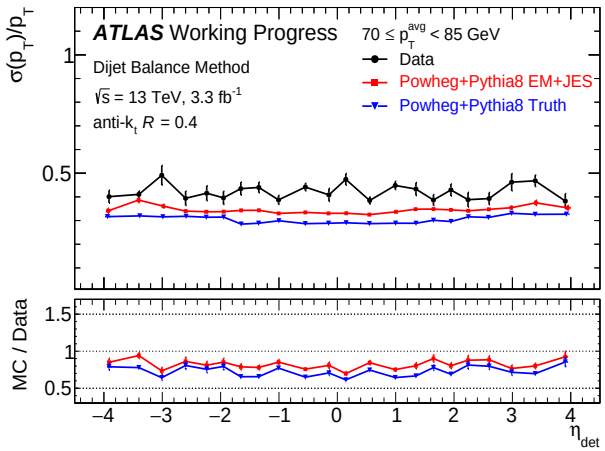
JER vs Eta

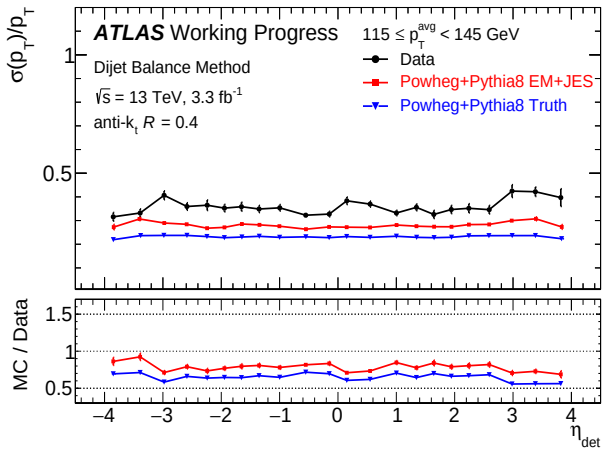

ATLAS Working Progress
25 ≤ p_T^avg < 40 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det


ATLAS Working Progress
55 ≤ p_T^avg < 70 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

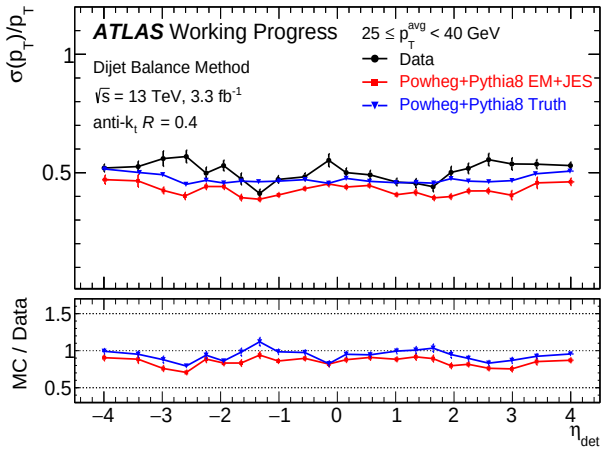

ATLAS Working Progress
85 ≤ p_T^avg < 115 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det


ATLAS Working Progress
40 ≤ p_T^avg < 55 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

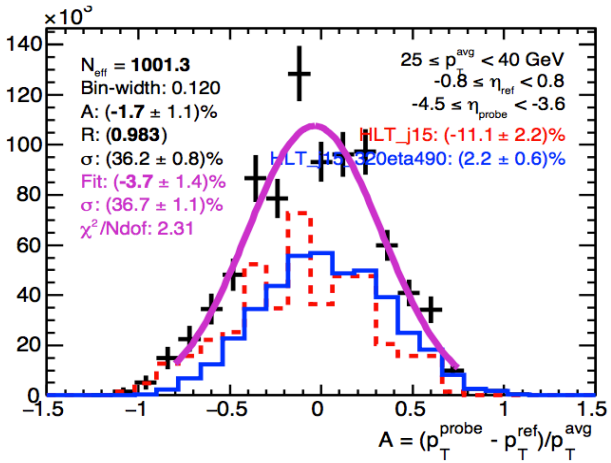

ATLAS Working Progress
70 ≤ p_T^avg < 85 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det


ATLAS Working Progress
115 ≤ p_T^avg < 145 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

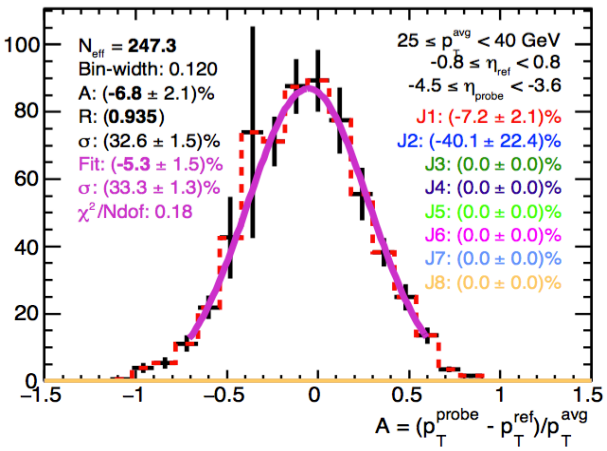
JER vs Eta: 25 < pTavg < 40



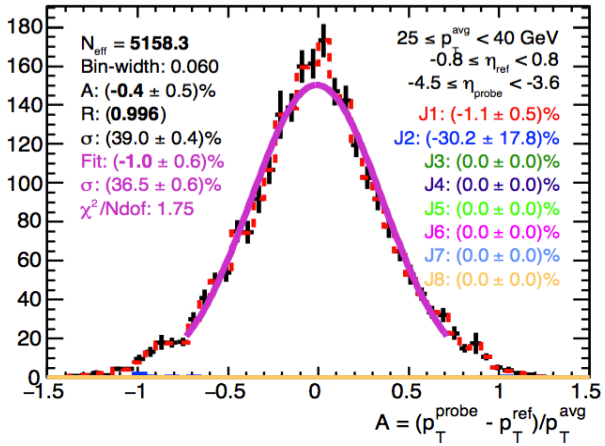
Data



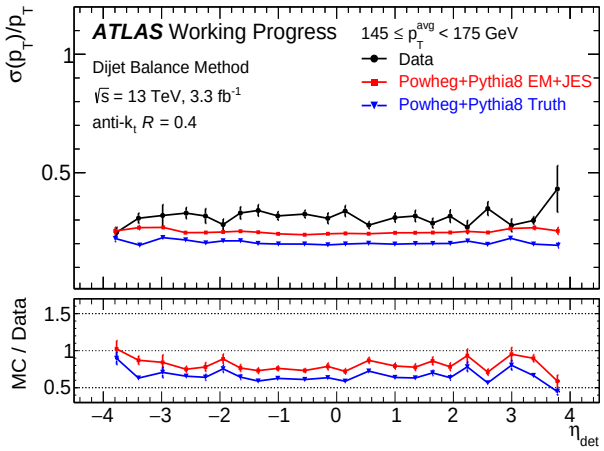
MC EMTopo

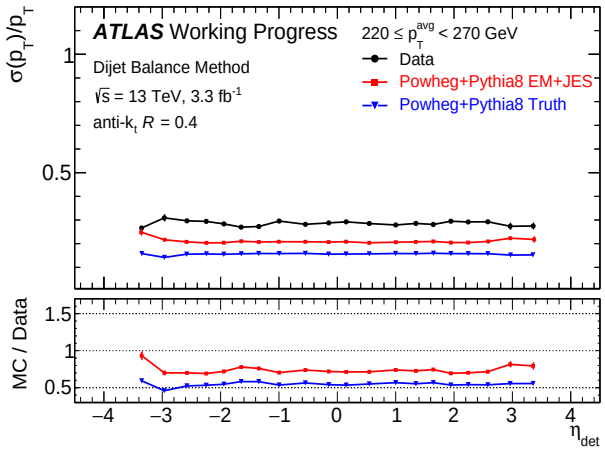


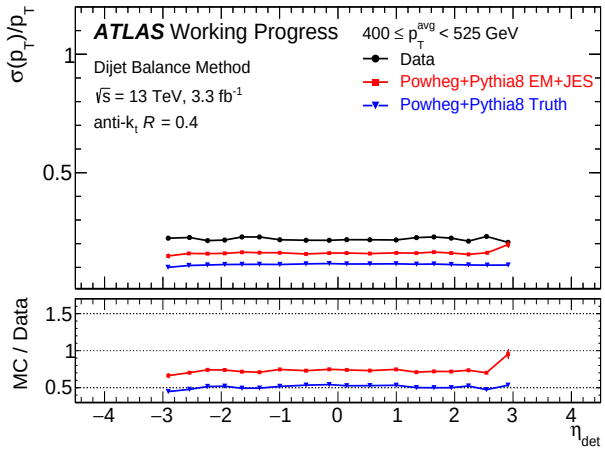
MC Truth

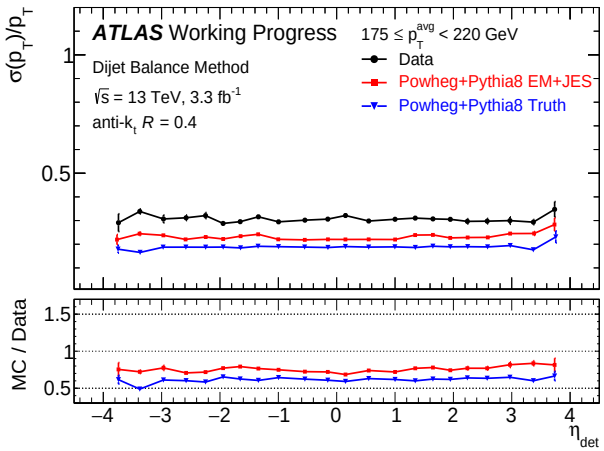


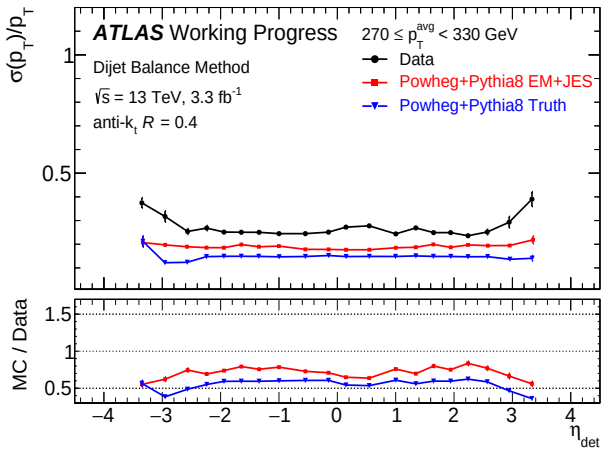
JER vs Eta

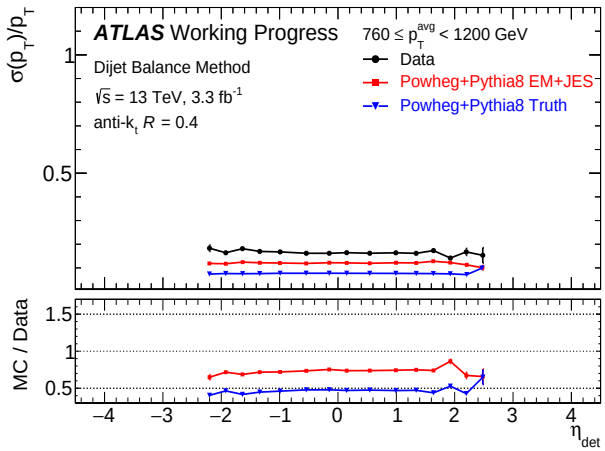

ATLAS Working Progress
145 ≤ p_T^avg < 175 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det


ATLAS Working Progress
220 ≤ p_T^avg < 270 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

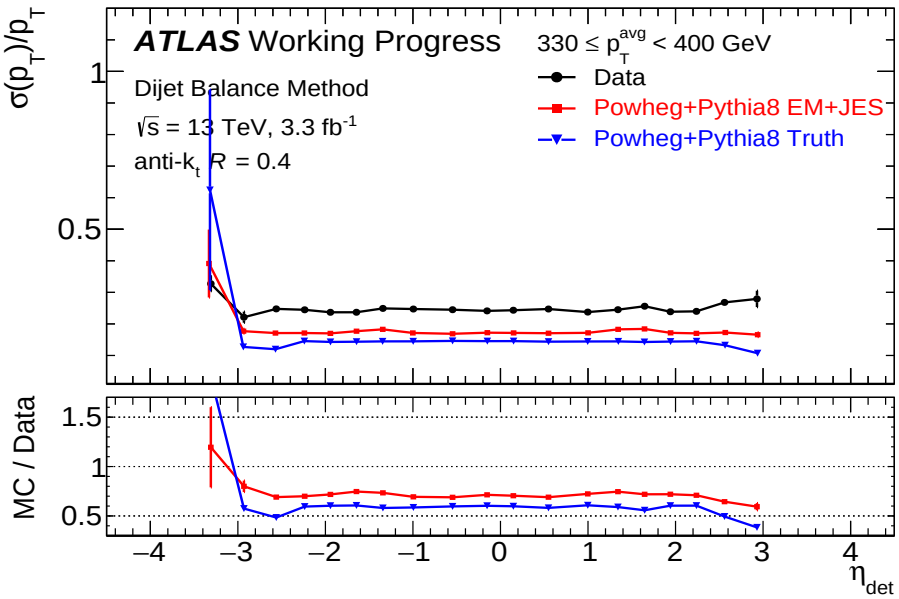

ATLAS Working Progress
400 ≤ p_T^avg < 525 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

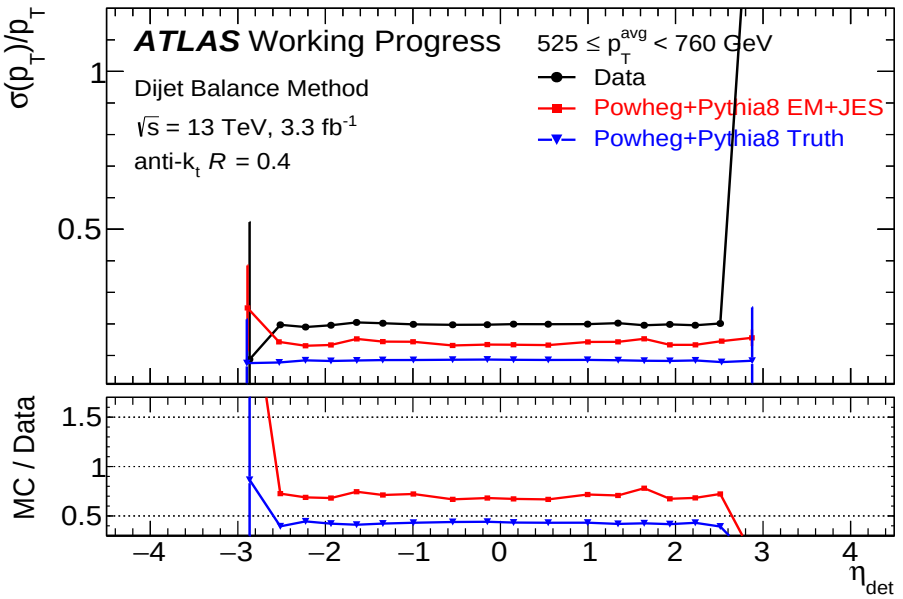

ATLAS Working Progress
175 ≤ p_T^avg < 220 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

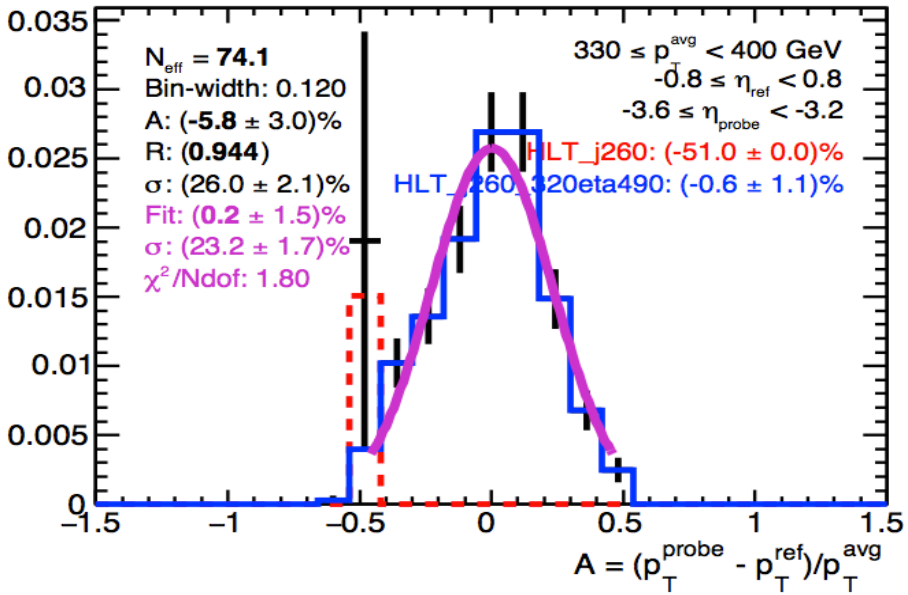

ATLAS Working Progress
270 ≤ p_T^avg < 330 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

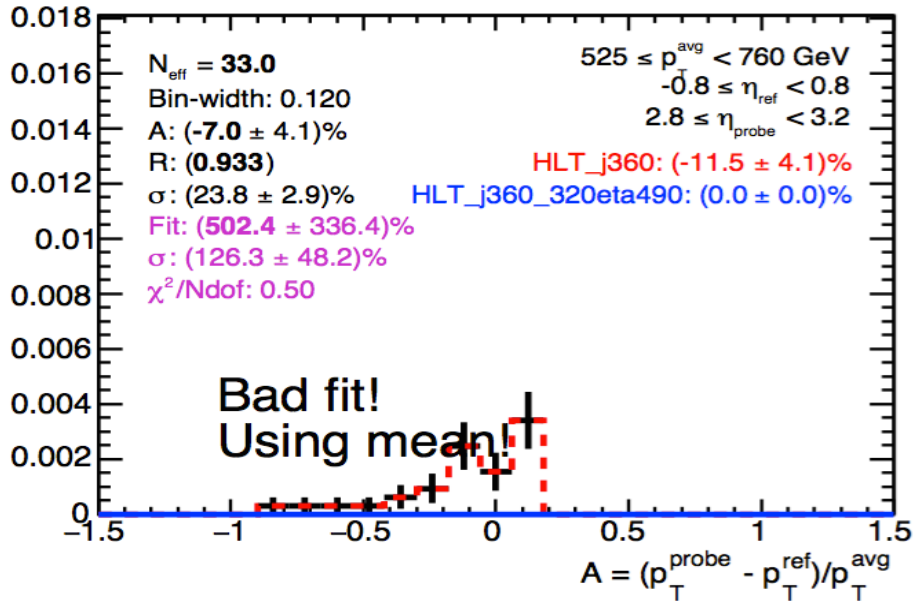

ATLAS Working Progress
760 ≤ p_T^avg < 1200 GeV
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
η_det

Problems with the fit

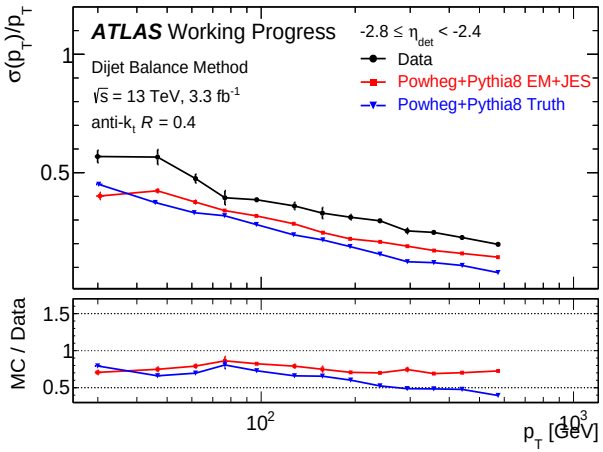


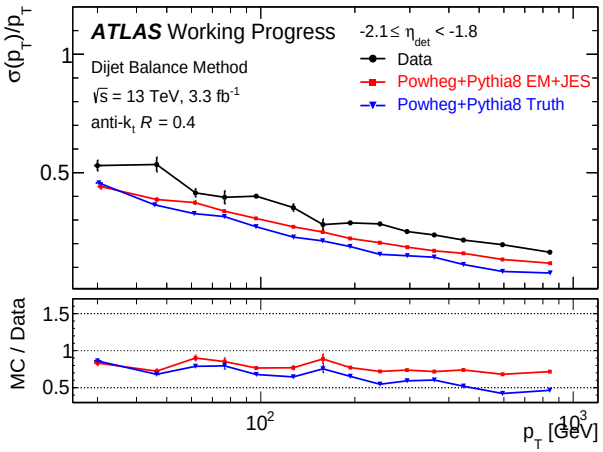


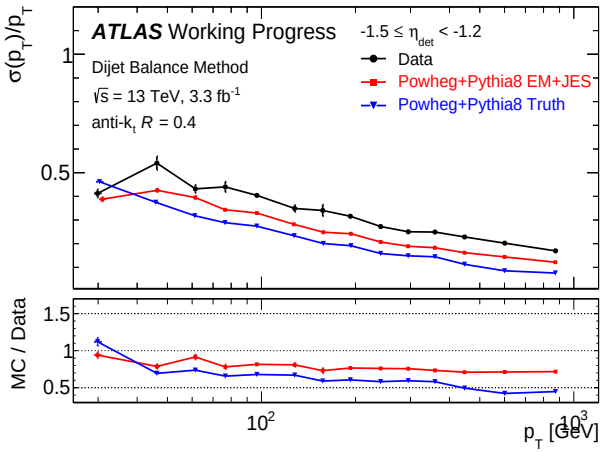


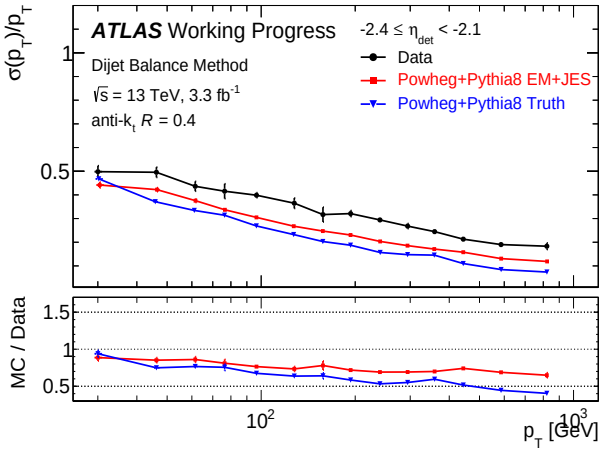


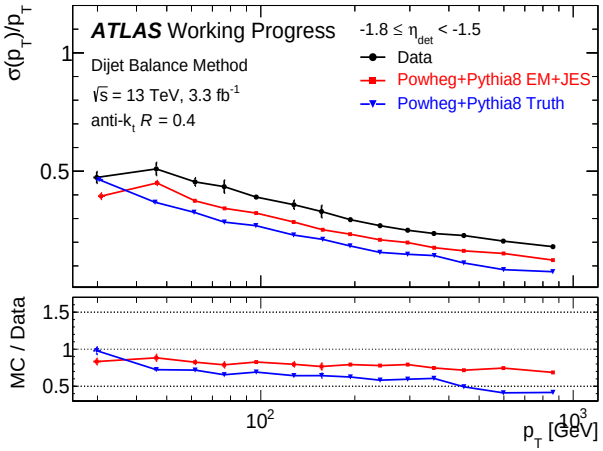
JER vs pT

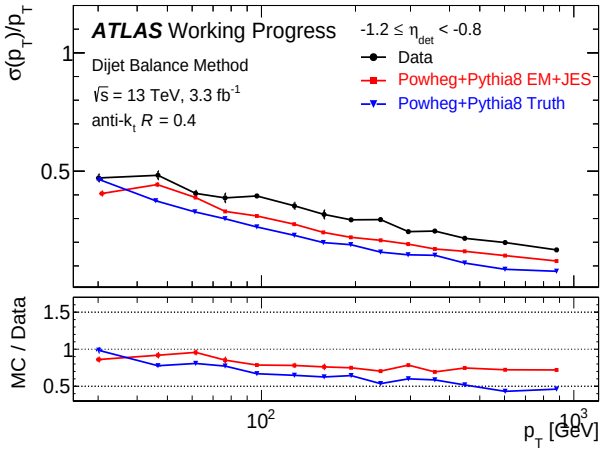

ATLAS Working Progress
-2.8 ≤ η_det < -2.4
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
-2.1≤ η_det < -1.8
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

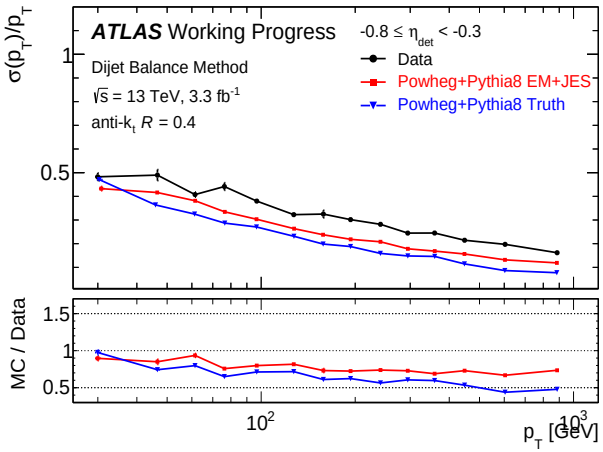

ATLAS Working Progress
-1.5 ≤ η_det < -1.2
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

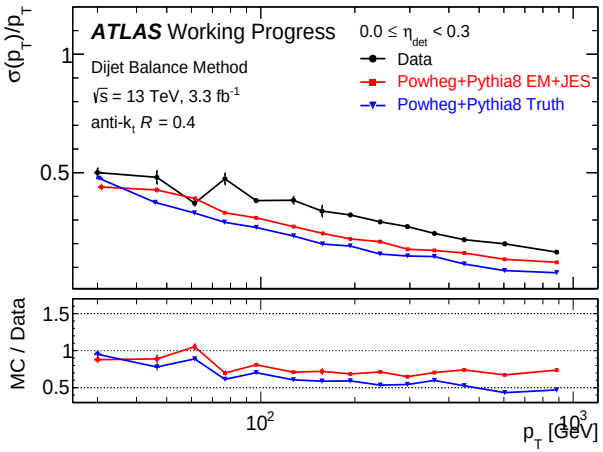

ATLAS Working Progress
-2.4 ≤ η_det < -2.1
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

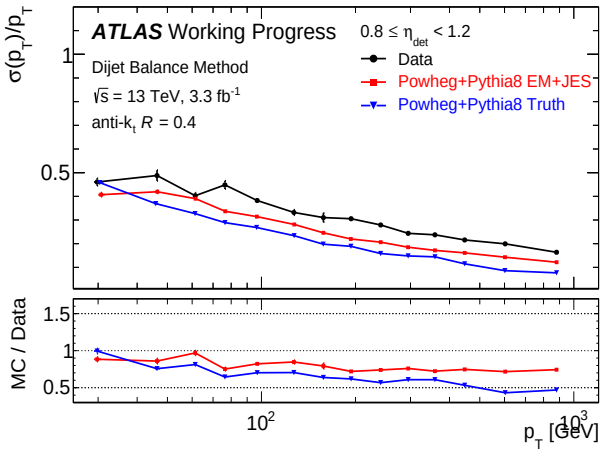

ATLAS Working Progress
-1.8 ≤ η_det < -1.5
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

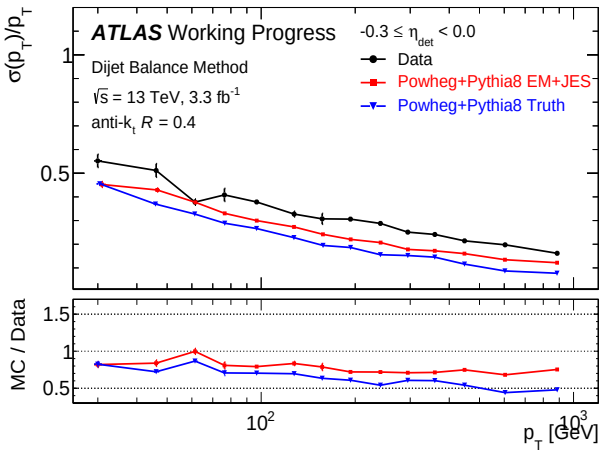

ATLAS Working Progress
-1.2 ≤ η_det < -0.8
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

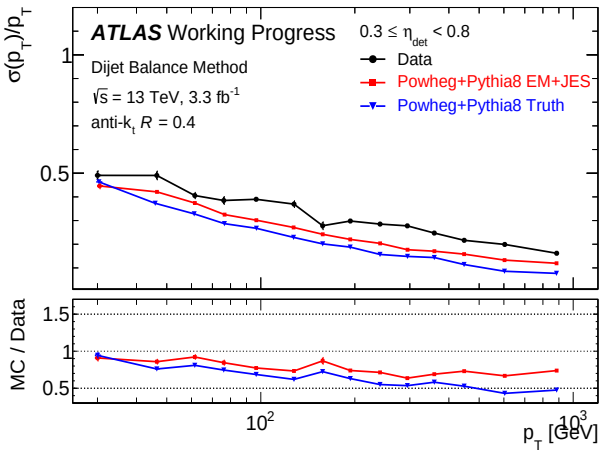
JER vs pT

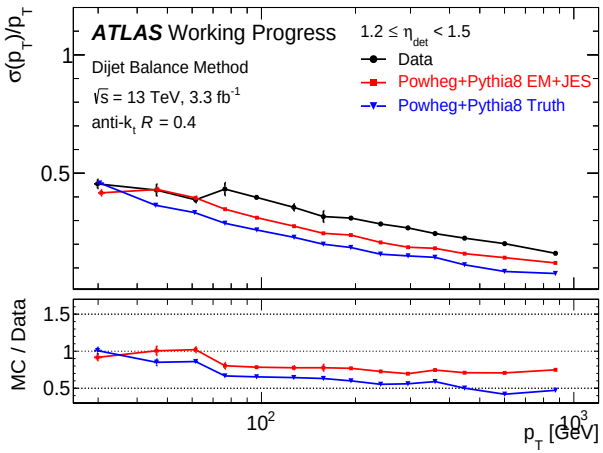

ATLAS Working Progress
-0.8 ≤ η_det < -0.3
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
0.0 ≤ η_det < 0.3
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
0.8 ≤ η_det < 1.2
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
-0.3 ≤ η_det < 0.0
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
0.3 ≤ η_det < 0.8
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]


ATLAS Working Progress
1.2 ≤ η_det < 1.5
Dijet Balance Method
√s = 13 TeV, 3.3 fb^-1
anti-k_t R = 0.4
Data
Powheg+Pythia8 EM+JES
Powheg+Pythia8 Truth
σ(p_T)/p_T
MC / Data
p_T [GeV]

Next Steps:

- Subtract the true (physics) resolution from the reco
- Study systematically varied MC subtractions
- Extract a mean resolution and compare with the MC simulated resolution and other systematic studies
- Any suggestions for other studies?