

Revised systematic uncertainty of MC derived TES

Adding non-closure term in quadrature

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Barrel region ($0 \leq |\eta| \leq 1.3$):

1-prong:

15-20 GeV, uncertainty 4% (previously 4.5%)

20-30 GeV, uncertainty 3% (previously 3.5%)

>30 GeV, uncertainty 2.5% (previously 2.5%)

3-prong:

15-20 GeV, uncertainty 10% (previously 14%)

20-30 GeV, uncertainty 8% (previously 10%)

>30 GeV, uncertainty 6% (previously 8%)

Transition region: ($1.3 < |\eta| \leq 1.6$):

All taus, uncertainty 6% (previously 7%)

Endcap region: ($1.6 < |\eta| \leq 2.5$):

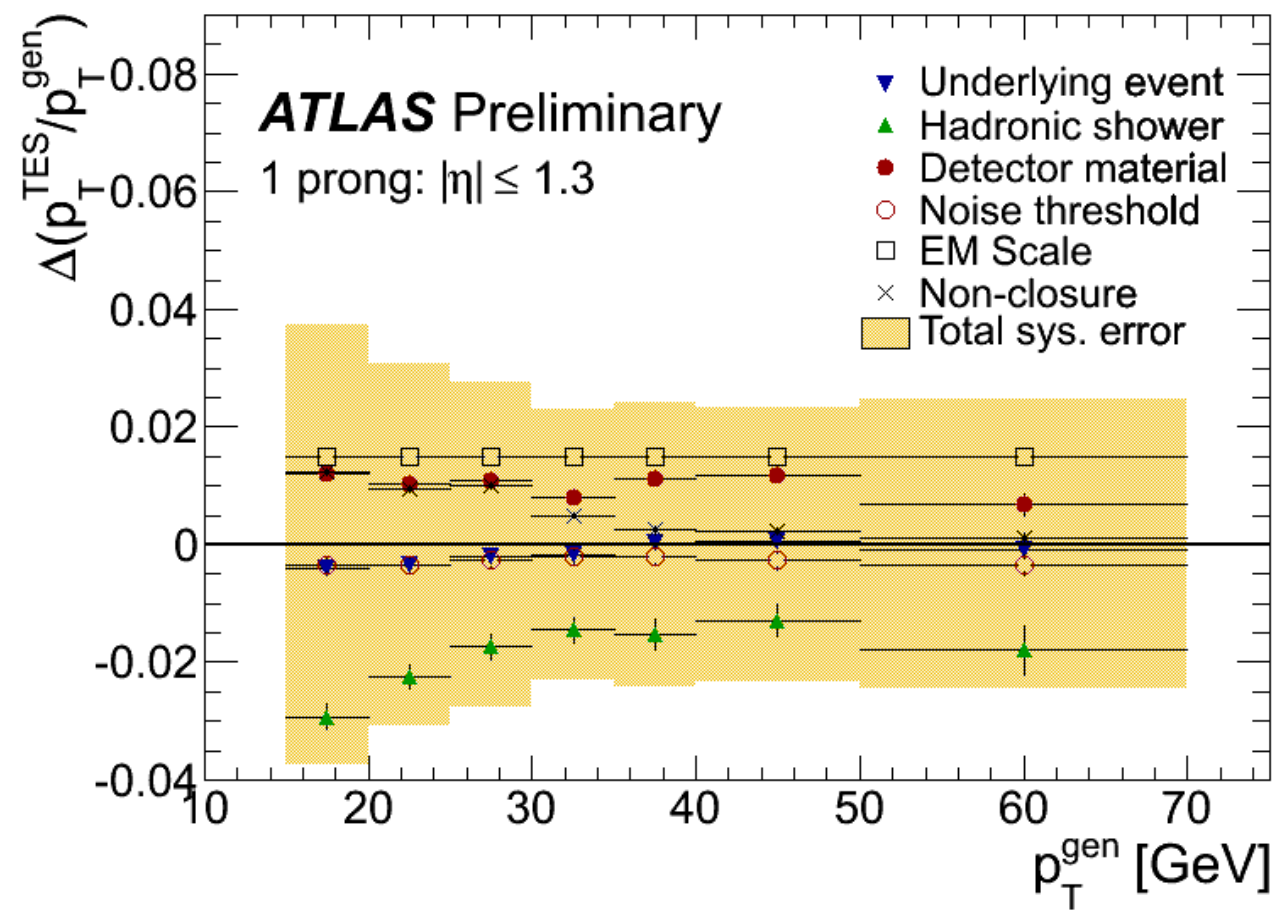
1-prong, uncertainty 4% (previously 4.5%)

3-prong, uncertainty 5.5% (previously 6.5%)

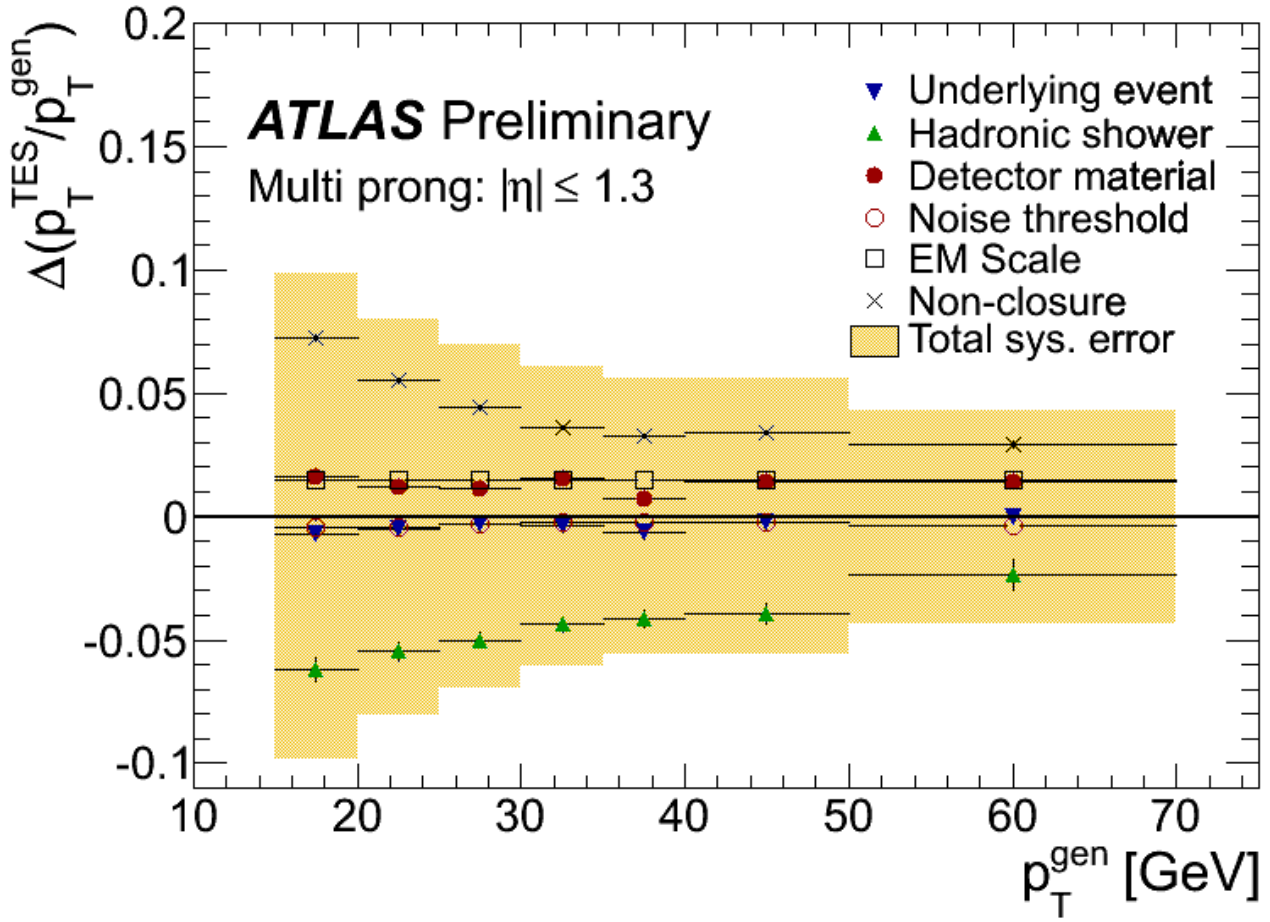
- ▶ Previously non-closure term was deemed completely anti-correlated to other systematics
- ▶ Non-closure systematic term was being added linearly to other systematics

- ▶ Through the ed. board process for the note, realized this wasn't the case (should have taken non-closure to be uncorrelated to other systematics).
- ▶ Currently non-closure term is combined in quadrature with other systematics

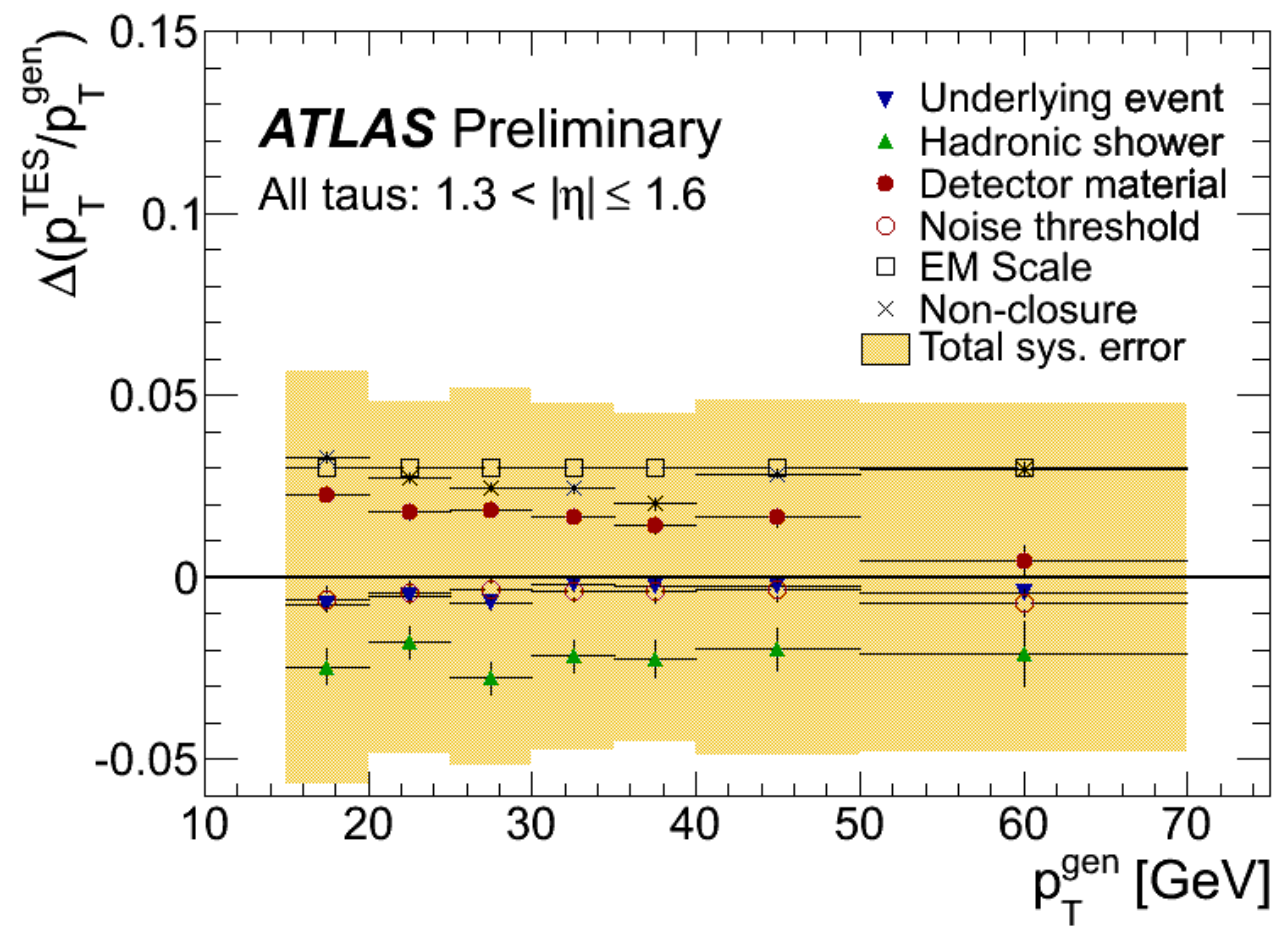
- ▶ Following slides show break down of systematic uncertainty terms per bin



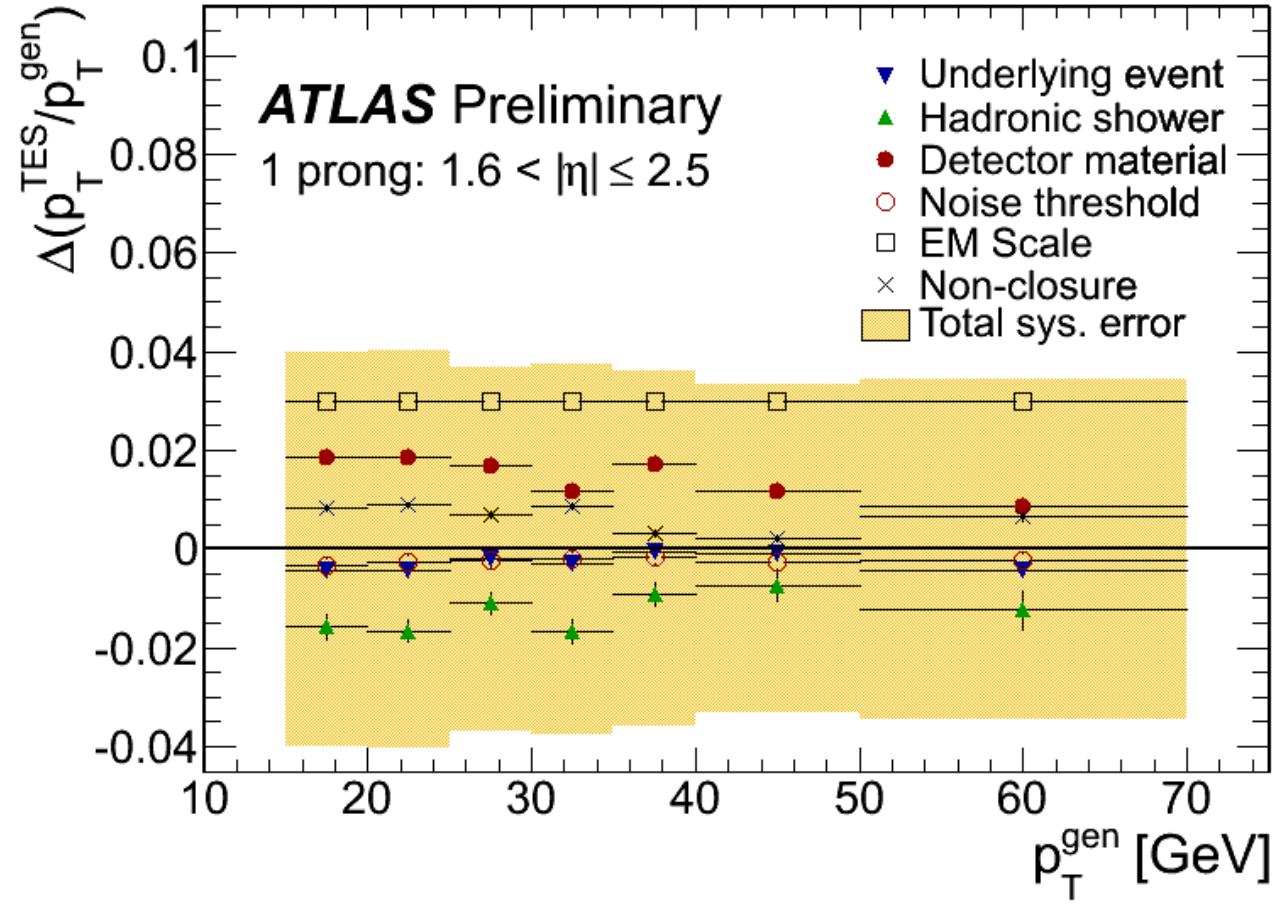
| p_T range | UE | Had SM | AltDetGeo | Noise Uncert | Abs EMScale | NonClos | Sys Uncert |
|------------------------------|---------|---------|-----------|--------------|-------------|---------|------------|
| p_T^{Gen} 15 GeV to 20 GeV | -0.396% | -2.929% | 1.193% | -0.342% | 0.015% | 1.226% | 3.746% |
| p_T^{Gen} 20 GeV to 25 GeV | -0.353% | -2.245% | 1.025% | -0.338% | 0.015% | 0.954% | 3.080% |
| p_T^{Gen} 25 GeV to 30 GeV | -0.201% | -1.739% | 1.086% | -0.250% | 0.015% | 1.007% | 2.751% |
| p_T^{Gen} 30 GeV to 35 GeV | -0.182% | -1.448% | 0.794% | -0.214% | 0.015% | 0.501% | 2.304% |
| p_T^{Gen} 35 GeV to 40 GeV | 0.015% | -1.519% | 1.115% | -0.192% | 0.015% | 0.244% | 2.429% |
| p_T^{Gen} 40 GeV to 50 GeV | 0.065% | -1.288% | 1.165% | -0.268% | 0.015% | 0.225% | 2.322% |
| p_T^{Gen} 50 GeV to 70 GeV | -0.082% | -1.792% | 0.677% | -0.343% | 0.015% | 0.115% | 2.461% |



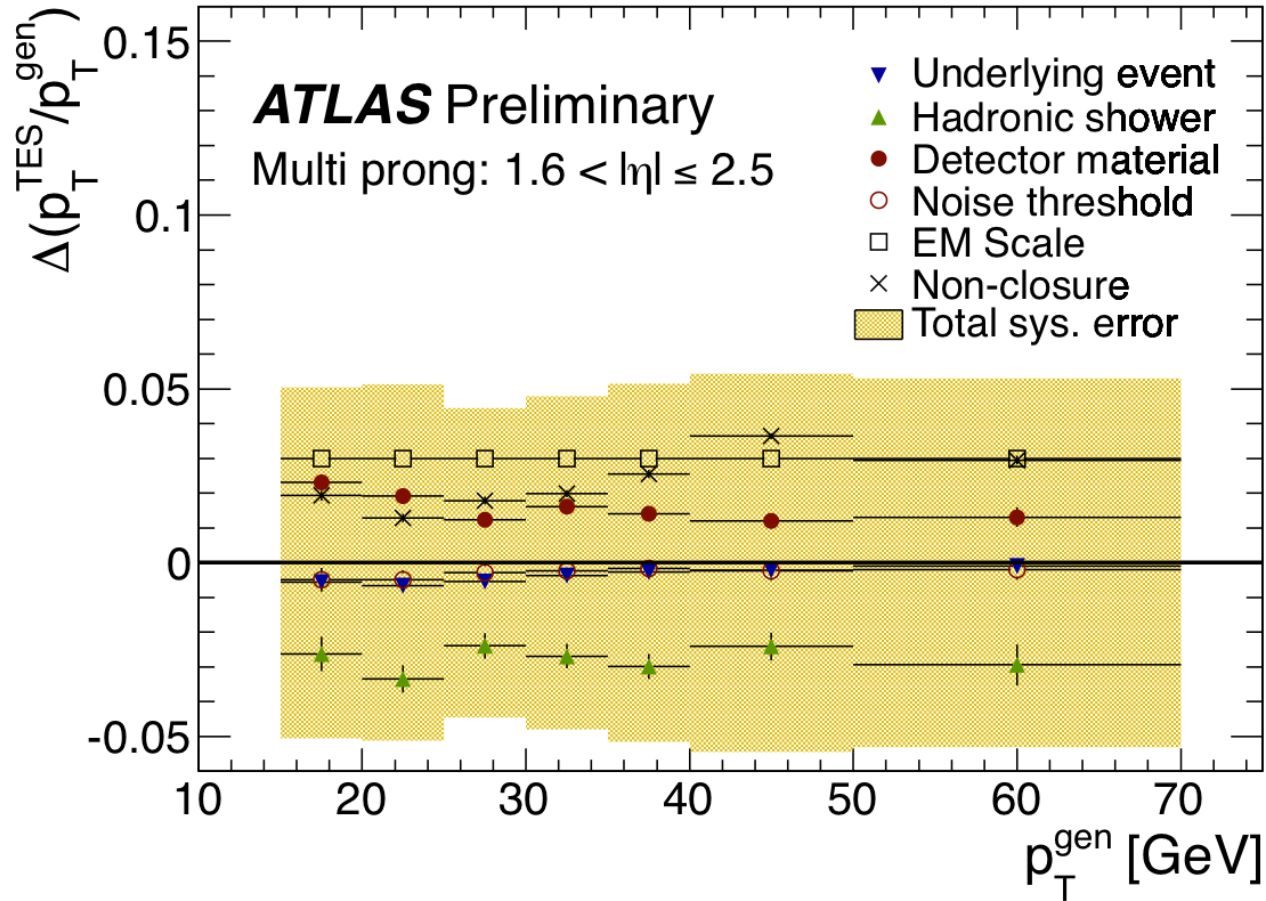
| p_T range | UE | Had SM | AltDetGeo | Noise Uncert | Abs EMScale | NonClos | Sys Uncert |
|------------------------------|---------|---------|-----------|--------------|-------------|---------|------------|
| p_T^{Gen} 15 GeV to 20 GeV | -0.700% | -6.216% | 1.612% | -0.466% | 0.015% | 7.257% | 9.842% |
| p_T^{Gen} 20 GeV to 25 GeV | -0.503% | -5.475% | 1.200% | -0.443% | 0.015% | 5.502% | 8.024% |
| p_T^{Gen} 25 GeV to 30 GeV | -0.291% | -5.028% | 1.109% | -0.270% | 0.015% | 4.409% | 6.954% |
| p_T^{Gen} 30 GeV to 35 GeV | -0.351% | -4.364% | 1.519% | -0.252% | 0.015% | 3.614% | 6.071% |
| p_T^{Gen} 35 GeV to 40 GeV | -0.630% | -4.137% | 0.715% | -0.214% | 0.015% | 3.268% | 5.568% |
| p_T^{Gen} 40 GeV to 50 GeV | -0.245% | -3.914% | 1.412% | -0.203% | 0.015% | 3.404% | 5.590% |
| p_T^{Gen} 50 GeV to 70 GeV | -0.046% | -2.357% | 1.433% | -0.355% | 0.015% | 2.940% | 4.316% |



| p_T range | UE | Had SM | AltDetGeo | Noise Uncert | Abs EMScale | NonClos | Sys Uncert |
|------------------------------|---------|---------|-----------|--------------|-------------|---------|------------|
| p_T^{Gen} 15 GeV to 20 GeV | -0.744% | -2.459% | 2.292% | -0.594% | 0.03% | 3.293% | 5.661% |
| p_T^{Gen} 20 GeV to 25 GeV | -0.507% | -1.787% | 1.791% | -0.408% | 0.03% | 2.737% | 4.829% |
| p_T^{Gen} 25 GeV to 30 GeV | -0.717% | -2.769% | 1.865% | -0.332% | 0.03% | 2.461% | 5.179% |
| p_T^{Gen} 30 GeV to 35 GeV | -0.179% | -2.162% | 1.682% | -0.370% | 0.03% | 2.442% | 4.758% |
| p_T^{Gen} 35 GeV to 40 GeV | -0.219% | -2.238% | 1.416% | -0.363% | 0.03% | 2.021% | 4.503% |
| p_T^{Gen} 40 GeV to 50 GeV | -0.258% | -1.961% | 1.649% | -0.342% | 0.03% | 2.841% | 4.881% |
| p_T^{Gen} 50 GeV to 70 GeV | -0.402% | -2.093% | 0.439% | -0.714% | 0.03% | 2.954% | 4.792% |



| p_T range | UE | Had SM | AltDetGeo | Noise Uncert | Abs EMScale | NonClos | Sys Uncert |
|------------------------------|---------|---------|-----------|--------------|-------------|---------|------------|
| p_T^{Gen} 15 GeV to 20 GeV | -0.442% | -1.578% | 1.870% | -0.325% | 0.03% | 0.825% | 3.996% |
| p_T^{Gen} 20 GeV to 25 GeV | -0.429% | -1.660% | 1.861% | -0.282% | 0.03% | 0.892% | 4.035% |
| p_T^{Gen} 25 GeV to 30 GeV | -0.200% | -1.098% | 1.674% | -0.231% | 0.03% | 0.691% | 3.685% |
| p_T^{Gen} 30 GeV to 35 GeV | -0.308% | -1.672% | 1.182% | -0.190% | 0.03% | 0.861% | 3.750% |
| p_T^{Gen} 35 GeV to 40 GeV | -0.072% | -0.917% | 1.739% | -0.157% | 0.03% | 0.308% | 3.604% |
| p_T^{Gen} 40 GeV to 50 GeV | -0.110% | -0.756% | 1.178% | -0.256% | 0.03% | 0.212% | 3.329% |
| p_T^{Gen} 50 GeV to 70 GeV | -0.433% | -1.235% | 0.855% | -0.242% | 0.03% | 0.645% | 3.452% |



| p_T range | UE | Had SM | AltDetGeo | Noise Uncert | Abs EMScale | NonClos | Sys Uncert |
|------------------------------|---------|---------|-----------|--------------|-------------|---------|------------|
| p_T^{Gen} 15 GeV to 20 GeV | -0.557% | -2.626% | 2.307% | -0.498% | 0.03% | 1.932% | 5.051% |
| p_T^{Gen} 20 GeV to 25 GeV | -0.672% | -3.346% | 1.922% | -0.494% | 0.03% | 1.281% | 5.121% |
| p_T^{Gen} 25 GeV to 30 GeV | -0.551% | -2.394% | 1.228% | -0.290% | 0.03% | 1.786% | 4.452% |
| p_T^{Gen} 30 GeV to 35 GeV | -0.378% | -2.695% | 1.610% | -0.234% | 0.03% | 1.983% | 4.794% |
| p_T^{Gen} 35 GeV to 40 GeV | -0.272% | -2.986% | 1.411% | -0.176% | 0.03% | 2.553% | 5.151% |
| p_T^{Gen} 40 GeV to 50 GeV | -0.221% | -2.412% | 1.199% | -0.244% | 0.03% | 3.638% | 5.441% |
| p_T^{Gen} 50 GeV to 70 GeV | -0.093% | -2.945% | 1.308% | -0.205% | 0.03% | 2.949% | 5.303% |