| syst. source / bin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Jet energy scale | $\begin{aligned} & +4.3 \\ & { }_{-1.7}^{+} \end{aligned}$ | $\begin{aligned} & -0.3 \\ & -1.3 \\ & -1.3 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.3 \end{aligned}$ | $\begin{aligned} & +6.4 \\ & +0.9 \end{aligned}$ | $\begin{aligned} & -0.6 \\ & -0.4 \end{aligned}$ | $\begin{aligned} & -2.3 \\ & +2.2 \end{aligned}$ | $\begin{aligned} & -2.5 \\ & +3.1 \end{aligned}$ | $\begin{aligned} & \hline-4.5 \\ & +0.4 \end{aligned}$ | $\begin{aligned} & -0.3 \\ & -0.8 \end{aligned}$ | $\begin{aligned} & +1.5 \\ & +0.9 \end{aligned}$ | $\begin{aligned} & -1.5 \\ & +3.4 \end{aligned}$ | $\begin{aligned} & -0.5 \\ & +3.5 \end{aligned}$ | $\begin{aligned} & \hline+2.4 \\ & -1.8 \end{aligned}$ | ${ }_{4.5}^{+0.4}$ | $\begin{aligned} & -1.2 \\ & -0.6 \end{aligned}$ | $\begin{aligned} & +0.5 \\ & -0.7 \end{aligned}$ |
| Jet energy resolution | $\begin{array}{\|} +1.1 .1 \\ +0.1 \end{array}$ | $\begin{aligned} & -0.7 \\ & -0.7 \end{aligned}$ | $\begin{aligned} & -1.0 \\ & +0.5 \end{aligned}$ | ${ }_{-0 .}^{2.0}$ | $\begin{gathered} -0.7 \\ -1.7 \end{gathered}$ | $\begin{aligned} & -0.2 \\ & +1.0 \\ & \hline 1.2 \end{aligned}$ | ${ }_{+1.9}^{+1.6}$ | $\begin{aligned} & -1.7 \\ & -2.2 \end{aligned}$ | $\begin{aligned} & -0.2 \\ & -1.6 \end{aligned}$ | $\begin{array}{r} +0.4 \\ +4.0 \end{array}$ | $\begin{aligned} & +0.1 \\ & +0.4 \end{aligned}$ | $\begin{aligned} & +2.5 \\ & +2.9 \end{aligned}$ | $\begin{array}{r} +0.1 \\ +0.4 \end{array}$ | $\begin{aligned} & -1.3 \\ & { }_{1.5} \end{aligned}$ | $\begin{gathered} -0.2 \\ -1.4 \end{gathered}$ | $\begin{aligned} & -1.4 \\ & +1.9 \end{aligned}$ |
| Kin. reconstruction | -0.0 +0.0 | ${ }_{-0.0}^{+0.0}$ | $\begin{aligned} & -0.0 \\ & +0.0 \end{aligned}$ | $\begin{aligned} & -0.0 \\ & +0.0 \end{aligned}$ | ${ }_{-0.0}^{+0.0}$ | $\begin{array}{r} -0.0 \\ +0.0 \\ \hline 0 \end{array}$ | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0.0}^{+0.0}$ | $\begin{aligned} & -0.0 \\ & +0.0 \end{aligned}$ | $\begin{aligned} & -0.0 \\ & +0.0 \\ & \hline 0 \end{aligned}$ | $\begin{gathered} -0.0 \\ +0.0 \\ +0.0 \end{gathered}$ | $\begin{aligned} & -0.0 \\ & +0.0 \end{aligned}$ | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0.0}^{+0.0}$ | -0.0 +0.0 |
| Pileup | ${ }_{-0.6}^{+0.5}$ | $\begin{array}{r} -0.5 \\ +0.5 \end{array}$ | ${ }_{-0.4}^{+0.5}$ | $\begin{aligned} & -0.8 \\ & -0.4 \end{aligned}$ | ${ }_{-0.3}^{+0.4}$ | $\begin{aligned} & -0.3 \\ & +0.4 \\ & \hline \end{aligned}$ | $\begin{array}{r} +0.0 \\ +0.1 \end{array}$ | $\begin{aligned} & -0.5 \\ & +0.7 \end{aligned}$ | ${ }_{-0.4}^{+0.5}$ | $\begin{array}{r} -0.6 \\ +0.5 \end{array}$ | $\begin{aligned} & -0.6 \\ & +0.6 \\ & +0.6 \end{aligned}$ | $\begin{aligned} & -0.7 \\ & +0.9 \end{aligned}$ | ${ }_{-0.7}^{+0.8}$ | $\begin{array}{r} -0.9 \\ +0.6 \end{array}$ | ${ }_{-0.4}^{+0.1}$ | $\begin{aligned} & -0.7 \\ & +0.7 \end{aligned}$ |
| Trigger | $\begin{array}{r} -0.0 \\ +0.0 \end{array}$ | $\begin{array}{r} -0.0 \\ +0.0 \\ +0.0 \end{array}$ | ${ }_{-0.0}^{+0.0}$ | $\begin{aligned} & -0.2 \\ & +0.2 \end{aligned}$ | ${ }_{-0 .}^{0.1}$ | $\begin{array}{r} -0.0 \\ +0.0 \end{array}$ | ${ }_{-0.1}^{+0.1}$ | ${ }_{-0.2}^{+0.2}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0 .}^{0.1}$ | ${ }_{-0.0}^{-0.0}$ | $\begin{aligned} & -0.0 \\ & +0.1 \end{aligned}$ |
| Background Z/ $\gamma^{*}$ | $\begin{aligned} & -0.8 \\ & +0.8 \end{aligned}$ | $\begin{aligned} & -0.2 \\ & +0.2 \end{aligned}$ | ${ }_{-0.6}^{+0.6}$ | $\begin{aligned} & -2.1 \\ & +2.4 \end{aligned}$ | ${ }_{-0.1}^{+0.1}$ | ${ }_{0.2}^{0.1}$ | ${ }_{-0.1}^{+0.1}$ | ${ }_{-0.2}^{+0.1}$ | ${ }_{-0.3}^{+0.3}$ | $\begin{aligned} & -1 \\ & +0 . \\ & +0 . \end{aligned}$ | $\begin{gathered} -0.1 \\ +0.0 \\ +0.0 \end{gathered}$ | ${ }_{-0.6}^{+0.5}$ | ${ }_{-0.3}^{+0.2}$ | ${ }_{-0.3}^{+0.3}$ | ${ }_{-0.4}^{+0.4}$ | ${ }_{-0.3}^{+0.3}$ |
| Background other | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0.5}^{+0.5}$ | ${ }_{-0.8}^{+0.8}$ | $\begin{aligned} & -0.6 \\ & +0.7 \end{aligned}$ | $\begin{aligned} & -0.2 \\ & +0.2 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.2 \end{aligned}$ | ${ }_{-0.1}^{+0.1}$ | $\begin{aligned} & -0.5 \\ & +0.4 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.0 \end{aligned}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | $\begin{aligned} & -0.4 \\ & +0.4 \end{aligned}$ | $\begin{array}{r} -1.1 \\ +1.1 \end{array}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ | ${ }_{-1}^{+1.0}$ | ${ }_{-0 .}^{+0.1}$ | $\begin{aligned} & -1.4 \\ & +1.4 \end{aligned}$ |
| b tagging | ${ }_{-0.5}^{+0.5}$ | ${ }_{-0.6}^{+0.4}$ | ${ }_{-1.9}^{+0.8}$ | ${ }_{-2.4}^{+2.6}$ | ${ }_{-0.3}^{+0.8}$ | ${ }_{-0.5}^{+0.1}$ | ${ }_{-0.8}^{+0.6}$ | ${ }_{-0 .}^{+1.1}$ | ${ }_{-0.3}^{+1.4}$ | ${ }_{-0.8}^{+0.3}$ | ${ }_{-0.7}^{+0.9}$ | ${ }_{-2.3}^{+1.1}$ | ${ }_{-0.0}^{+0.5}$ | ${ }_{-1.4}^{+0.4}$ | ${ }_{-1.6}^{+0.9}$ | ${ }_{-0.6}^{+0.1}$ |
| Int. luminosity | $\begin{gathered} -0.0 \\ +0.0 \\ \hline 0 \end{gathered}$ | $\begin{array}{r} -0.1 \\ +0.1 \end{array}$ | ${ }_{-0.1}^{+0.1}$ | $\begin{aligned} & -0.4 \\ & +0.4 \end{aligned}$ | ${ }_{-0.2}^{+0.2}$ | ${ }_{-0.0}^{+0.0}$ | ${ }_{-0 .}^{+0.1}$ | ${ }_{-0.1}^{+0.1}$ | $\begin{aligned} & -0.2 \\ & +0.2 \end{aligned}$ | $\begin{aligned} & -0.0 \\ & +0.3 \end{aligned}$ | $\begin{aligned} & -0.2 \\ & +0.2 \end{aligned}$ | $\begin{aligned} & -1 \\ & +0 \\ & +0 \end{aligned}$ | ${ }_{-0 .}^{+0.2}$ | ${ }_{-0 .}^{+0.3}$ | ${ }_{-0 .}^{+0.1}$ | $\begin{aligned} & -0.1 \\ & +0.1 \end{aligned}$ |
| $m_{\text {t }}$ | -2.9 +2.3 | -2.6 +1.5 | $\begin{aligned} & -1.2 \\ & +2.5 \end{aligned}$ | $\begin{gathered} -6.6 \\ +3.6 \end{gathered}$ | ${ }_{-0.4}^{+0.7}$ | ${ }_{-0.2}^{+0.3}$ | $\begin{aligned} & -1.0 \\ & +1.8 \end{aligned}$ | $\begin{aligned} & -1.6 \\ & +0.4 \end{aligned}$ | ${ }_{-1.4}^{+1.6}$ | ${ }_{-0.9}^{+0.6}$ | ${ }_{-2.2}^{+1.5}$ | ${ }_{-0.5}^{+1.9}$ | ${ }_{-3.3}^{+3.2}$ | ${ }_{-2.7}^{+3.3}$ | ${ }_{-1.6}^{+1.5}$ | ${ }_{-0.8}^{+1.8}$ |
| $\mu_{\mathrm{f}}, \mu_{\mathrm{r}}$ | $\begin{gathered} -1.2 \\ +3.8 \end{gathered}$ | $\begin{aligned} & -0.0 \\ & -3.8 \end{aligned}$ | ${ }_{-2.1}^{+7.0}$ | $\begin{aligned} & -10.4 \\ & -1.9 \end{aligned}$ | $\begin{aligned} & -2.8 \\ & +4.4 \end{aligned}$ | ${ }_{-2.3}$ | ${ }_{-8.1}^{+11.6}$ | $\begin{aligned} & -1.4 \\ & -0.8 \end{aligned}$ | $\begin{aligned} & -8.3 \\ & +5.1 \end{aligned}$ | ${ }_{-5.0}^{3.8}$ | $\begin{aligned} & -0.4 \\ & -6.4 \\ & -0.4 \end{aligned}$ | $\begin{aligned} & +4.4 \\ & +3.1 \end{aligned}$ | $\begin{gathered} -4.2 \\ +7.3 \end{gathered}$ | ${ }_{-5.2}^{1.0}$ | $\begin{aligned} & +2.6 \\ & +1.3 \end{aligned}$ | $\begin{aligned} & +0.4 \\ & +5.4 \end{aligned}$ |
| Matching threshold | $\begin{array}{r} -1.3 \\ +1.9 \end{array}$ | ${ }_{-0.3}^{+0.3}$ | $\begin{aligned} & +1.7 \\ & +1.6 \end{aligned}$ | $\begin{aligned} & -12.7 \\ & { }_{-0.3} \end{aligned}$ | $\begin{aligned} & +0.1 \\ & +0.3 \end{aligned}$ | ${ }_{-1.5}^{-0.4}$ | $\begin{aligned} & +2.4 \\ & +0.2 \end{aligned}$ | $\begin{aligned} & +4.4 \\ & +1.7 \end{aligned}$ | $\begin{aligned} & +1.4 \\ & +1.8 \end{aligned}$ | $\begin{array}{r} -2.1 \\ +1.1 \end{array}$ | $\begin{aligned} & -5.1 \\ & -6.2 \end{aligned}$ | $\begin{aligned} & +1.2 \\ & +1.2 \end{aligned}$ | $\begin{aligned} & -0.6 \\ & +1.4 \end{aligned}$ | $\begin{gathered} -1.4 \\ -5.8 \end{gathered}$ | ${ }_{-3.3}^{7.2}$ | $\begin{array}{r} +5.1 \\ +3.5 \end{array}$ |
| PDFs | ${ }_{-0.3}^{+0.2}$ | ${ }_{-0.2}^{+0.2}$ | ${ }_{-0.2}^{+0.1}$ | ${ }_{-0.2}^{+0.2}$ | ${ }_{-0.3}^{+0.2}$ | ${ }_{-0 .}^{0.1}$ | ${ }_{-0.2}^{+0.2}$ | ${ }_{-0.4}^{+0.4}$ | ${ }_{-0 .}^{0.1}$ | ${ }_{-0.3}^{+0.3}$ | ${ }_{-0.5}^{+0.5}$ | ${ }_{-0.4}^{+0.4}$ | ${ }_{-0.3}^{+0.4}$ | ${ }_{-0.4}^{+0.5}$ | ${ }_{-0.2}^{+0.2}$ | ${ }_{-0.6}^{+0.6}$ |
| Hadronization | +0.2 | -5.0 | +10.1 | -3.0 | +4.8 | -2.5 | $-5.4$ | +2.7 | +6.7 | -3.3 | -13.1 | +0.8 | -4.6 | +10.1 | $-5.2$ | -10.4 |
| Hard scattering | -0.3 | -2.7 | -2.1 | -1.5 | -1.4 | -3.2 | +4.1 | -4.2 | +2.1 | +3.5 | +4.2 | -0.3 | +2.5 | -1.1 | +4.4 | +12.8 |

