# HH total XS at NNLO+NNLL

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- All the results correspond to $\mu_0 = M_{hh}/2$

- Consistency with Eleni's results at NLO checked

NLO+top mass effects    vs    NNLO+NNLL

-10%    +20%    +10% &rarr; 45% difference

For Ecm=8TeV and $\mu_0 = M_{hh}$

- Smaller differences for $\mu_0 = M_{hh}/2$

Total cross section with Higgs mass variation:

| $m_h = 124.5$ GeV | NNLL (fb) | scale unc. (%) | PDF unc. (%) | PDF+$\alpha_S$ unc. (%) |
|---|---|---|---|---|
| 7 TeV | 7.77 | $+4.0 - 5.7$ | $\pm 3.4$ | $\pm 4.4$ |
| 8 TeV | 11.3 | $+4.1 - 5.7$ | $\pm 3.0$ | $\pm 4.0$ |
| 13 TeV | 38.2 | $+4.3 - 6.0$ | $\pm 2.1$ | $\pm 3.1$ |
| 14 TeV | 45.3 | $+4.4 - 6.0$ | $\pm 2.1$ | $\pm 3.0$ |
| 100 TeV | 1760 | $+5.0 - 6.7$ | $\pm 1.7$ | $\pm 2.7$ |
| $m_h = 125$ GeV | NNLL (fb) | scale unc. (%) | PDF unc. (%) | PDF+$\alpha_S$ unc. (%) |
| 7 TeV | 7.72 | $+4.0 - 5.7$ | $\pm 3.4$ | $\pm 4.4$ |
| 8 TeV | 11.2 | $+4.1 - 5.7$ | $\pm 3.1$ | $\pm 4.0$ |
| 13 TeV | 38.0 | $+4.3 - 6.0$ | $\pm 2.1$ | $\pm 3.1$ |
| 14 TeV | 45.1 | $+4.4 - 6.0$ | $\pm 2.1$ | $\pm 3.0$ |
| 100 TeV | 1749 | $+5.1 - 6.6$ | $\pm 1.7$ | $\pm 2.7$ |
| $m_h = 125.09$ GeV | NNLL (fb) | scale unc. (%) | PDF unc. (%) | PDF+$\alpha_S$ unc. (%) |
| 7 TeV | 7.71 | $+4.0 - 5.7$ | $\pm 3.4$ | $\pm 4.4$ |
| 8 TeV | 11.2 | $+4.1 - 5.7$ | $\pm 3.1$ | $\pm 4.0$ |
| 13 TeV | 37.9 | $+4.3 - 6.0$ | $\pm 2.1$ | $\pm 3.1$ |
| 14 TeV | 45.0 | $+4.4 - 6.0$ | $\pm 2.1$ | $\pm 3.0$ |
| 100 TeV | 1748 | $+5.0 - 6.5$ | $\pm 1.7$ | $\pm 2.6$ |
| $m_h = 125.5$ GeV | NNLL (fb) | scale unc. (%) | PDF unc. (%) | PDF+$\alpha_S$ unc. (%) |
| 7 TeV | 7.66 | $+4.0 - 5.7$ | $\pm 3.4$ | $\pm 4.4$ |
| 8 TeV | 11.1 | $+4.1 - 5.7$ | $\pm 3.1$ | $\pm 4.0$ |
| 13 TeV | 37.7 | $+4.3 - 6.0$ | $\pm 2.1$ | $\pm 3.1$ |
| 14 TeV | 44.8 | $+4.4 - 5.9$ | $\pm 2.1$ | $\pm 3.1$ |
| 100 TeV | 1738 | $+5.2 - 6.4$ | $\pm 1.7$ | $\pm 2.7$ |

Invariant mass distributions: