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Jets subgroup

Goal of the group

Group Contacts

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Available Tools

Settings for comparison studies

H+2-jet NLO+shower comparison study

Process/Inputs:

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```
* pure gg -> H + 2j NLO+shower at parton level

* m_H = 125 GeV
* \sqrt{s} = 8 TeV
* strict mtop -> \infty limit (no mtop rescaling or bottom interference)
* on-shell stable Higgs
* MSTW2008 NLO PDFs (68CL) (always also at LO)
  with its alphas(mZ) = 0.12018, nf = 5, 2-loop running
* \mu_r = \mu_f = \mu = m_H in (N)LO hard matrix element corrections
```

Jet cuts:

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(\eta is pseudorapidity, y is rapidity)

a) Jet selection:

```
* anti-kT with R = 0.4
* at least two jets with pTj > 25 GeV and |\eta_j| < 5
```

b) VBF cuts:

```
* \delta y_jj = |y_j1 - y_j2| > 2.8
* m_jj > 400 GeV
```

Distributions:

=====

All distributions with

```
* only cuts a) and cuts a)+b)
* at LO and NLO each with \mu = {2 m_H, m_H, m_H/2}
```

```
1) pTj1 [0, 300] in steps of 5 GeV
2) pTj2 [0, 300] in steps of 5 GeV
3) yj1 [-5, 5] in steps of 0.5
```

- 4) y_{j2} [-5, 5] in steps of 0.5
- 5) $|\Delta y_{jj}|$ [0,10] in steps of 0.5
- 6) m_{jj} [0, 1000] in steps of 40 GeV

- 7) $\Delta\phi_{jj}$ [0, π] in steps of $\pi/20$
- 8) p_{Tj3} [0, 300] in steps of 5 GeV
- 9) y_{j3} [-5, 5] in steps of 0.5

- 10) $|\eta_H - 0.5(\eta_{j1} + \eta_{j2})|$ [0,10] in steps of 0.5
- 11) $p_{T\{Hjj\}} = |\vec{p}_{TH} + \vec{p}_{Tj1} + \vec{p}_{Tj2}|$ [0, 300] in steps of 5 GeV
- 12) $\pi - \Delta\phi_{\{H,jj\}}$ [0, 1.5] in steps of 0.05

Results

First comparisons can be found here [↗](#).

Guidelines for UE related uncertainties

The following are guidelines for the estimation of UE related uncertainties in ggF and VBF processes:

- 1) Turn UE on/off for the nominal default tune (expect ~10-20% variations depending on selection cuts and tune)
- 2) Cross check on/off effect for alternative tunes (that are also deemed "reasonable")
- 3) Cross checks can include the use of tunes performed within a common framework but using different PDFs (eg. NLO v. LO, as is the case with AU2-CT10 and AU2-CTEQ6L1)

First studies can be found here [↗](#) and these studies will continue past the Moriond conferences. Until these guidelines can be implemented, the following temporary uncertainties are suggested:

- 1) For ggF+2j use 30% uncertainty
- 2) For VBF use 7% uncertainty

These uncertainties pertain to the normalization of both samples in the loose and tight VBF categories.

References

Meetings

- [18/05/12 ↗](#)
- [12/10/12 ↗](#)
- [29/11/12 ↗](#)
- [20/12/12 ↗](#)
- [08/02/13 ↗](#)
- [25/01/13 ↗](#)

Links

-- ReiTanaka - 02-May-2012

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