VBF update on cross section at 13.6 TeV

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13.6 TeV update

- NLO EW corrections **ready**. Provided by **Alexander Mück**
  - using *Hawk* [Denner, Dittmaier, Kallweit, Lang, Mück]
- N3LO QCD corrections **almost ready**. Provided by **Alexander Karlberg**
  - using *proVBFH* [Cacciari, Dreyer, Karlberg, Salam, Zanderighi]
  - still one bug to be fixed. Probably negligible effect but need careful check.
- Once bug fixed, straightforward combination for inclusive prediction
  - expected timeline: few weeks

Follow up, systematic study at differential level

1. Provide state-of-the-art predictions at the differential level at fixed order
   - NNLO QCD + NLO EW
   - double/triple differential and STSX binning
   - physical understanding of various approximations (*kill several birds with one stone*)
2. First step toward systematic estimate of PS uncertainty in VBF
   - same set-up as for fixed order
   - use Powheg with different parton showers

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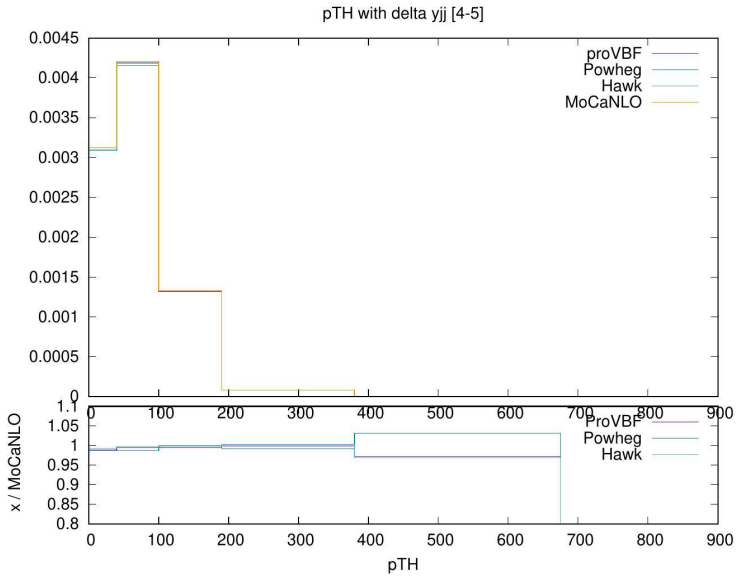
Codes: Hawk, proVBFH, MoCaNLO, Powheg

Follow up, systematic study at differential level

1. Tuned comparison of various fixed-order codes (**with different approximations**)
   - data produced at LO and NLO QCD
   - currently comparing (looks fine so far)

2. Interpretation of physical result
   - provided refined estimate of uncertainties (EW corrections, VBF approximation, …)
   - understand differences and make recommendations



Follow up, systematic study at differential level

1. Comparison of different parton shower
   - alline with set-up of fixed-order study
   - comparison with different parton shower (different physics)
2. Make some statements about parton shower uncertainty

→ Write up an article and published it

<u>timeline:</u> a couple of months if nothing unexpected happen