

# WG1 Yellow Report 5 kick-off meeting

Hannah Arnold, Alessandro Calandri,  
Alexander Karlberg, Bernhard Mistlberger



# Today's meeting

- Brainstorm ideas and identify/assign interested parties
- Focus of YR5 is HL-LHC but results should be provided for run-3 as well whenever possible
- Not meant to fall on the shoulders of the sub-group conveners only
- Ideally projects **coordinated** by conveners with **active participation** from experts in the community
- All contributions expected to be of **high enough quality** to be published in *SciPost Physics Community Reports*
- Important to be mindful of typical slow progress in the WG and timeline...

## Ideas so far...

- From individual meetings earlier this year we have collected a few ideas
- List definitely not definitive (and until somebody commits to work on something the list is really just indicative of potential topics)
- Better calculations of all Higgs XS.
  - Inclusive numbers 13, 13.6, 14 TeV (and legacy 7 and 8 TeV)
  - Some dedicated studies for special fiducial regions, e.g. boosted Higgs, VBF.
  - STXS update?
- Parton Shower uncertainties - input from experiments?
- Comparison of recent ttH approximate NNLO and resummations.
- Monte Carlo uncertainties in ttW/ttH (update of previous study)
- Study of top Yukawa and interplay between tWH and interferences
- Update boosted Higgs study - EW corrections, top mass scheme uncertainty, 13.6 TeV, larger pt range, PDFs.
- NLO for ggZH and NNLO MC for qqZH
- N3LO PDF impact on Higgs cross sections
- Model uncertainties in off-shell generators
- Review of the state-of-the-art for SMEFT operators in the context of off-shell measurements
- $H \rightarrow c\bar{c}$
- Higgs decays to mesons ( $J/\Psi + \gamma$ ,  $J/\Psi + J/\Psi$ , ...)?
- Reproducible predictions, provide runcards where applicable
- NNLOPS
- ttX and role as backgrounds for Higgs
- V + HF
- Single Higgs + HF as backgrounds for HH.

# Timeline

- June 2024: Kick-off meeting
  - First brainstorm
- December 2024: LHCHWG annual meeting
  - All activities should have been assigned and ideally also started at this point
- November/December 2025: LHCHWG annual meeting
  - All projects done and submitted to SciPost...

Far in the future, but things are slow. We suggest having some intermediate meetings

- Fall 2024, Spring 2025, Fall 2025..?



## Xsec updates

github repo: <https://github.com/bmistlbe/InclusiveHXUpdate>

- Please start filling in the tables and writing your sections.
- The sub-group sections are not meant to be extensive reviews, but should make sure to cite all relevant literature.
- Think of them as **mini-reviews** taking a snapshot of the state-of-the-art in the predictions.
- Please make sure to include anyone who has contributed in the author list and ask them to contribute as well
- Report meant to be done by **the of the summer**, so far nobody worked on it...