

WG1 Yellow Report 5

October meeting

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Timeline (update)

- June 2024: Kick-off meeting (<https://indico.cern.ch/event/1420243/>)
- October 2024: Update and decide on priorities
- December 2024: LHCHWG annual meeting (<https://indico.cern.ch/event/1389221/>)
 - 13.6 TeV spreadsheet **MUST BE FINAL** (from SC)
- June 2025: First deadline for SciPost submission. Priority projects!
 - Urgent projects for run-3 should be given priority
 - 13.6 TeV updates in dedicated short report (<https://github.com/bmistlbe/InclusiveHXSUpdate>)
- Summer 2026: Second deadline (?)
 - All projects done and submitted to SciPost...

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

- Fall 2024 (today), Spring 2025, Fall 2025, Winter 2025..?

Spreadsheet

- Here: <https://cernbox.cern.ch/s/EoixsvAAeLYyGdP> (pwd: LHCHWG13.6TeV)
- Numbers need to be final by the annual meeting. That's a **hard deadline** from the SC.
- Will be put on TWiki as soon as it is ready so it can be used
- As you fill these tables think of filling the tables in the report as well...



Xsec updates

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

- Please start filling in the tables and writing your sections!
- Idea is to collect all numbers in one report. Details of combinations/calculations/uncertainty estimates should go in dedicated reports (if needed)
- The sub-group sections are not meant to be extensive reviews, but should make sure to cite all relevant literature (1-2 pages per group).
- Think of them as **mini-reviews** taking a snapshot of the state-of-the-art of the predictions.
- Please make sure to include anyone who has contributed in the author list and ask them to contribute as well.
- Report **must be done by June 2025**.

Ideas so far...

- From individual meetings earlier this year we have collected a few [ideas](#)
- List needs to be split into:
 - Priority projects (June 2025)
 - Active projects (beyond June 2025)
 - Inactive
- 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.

Today's meeting

- Hear inputs from sub-groups on ongoing/proposed projects for Report 5
- Decide which projects to prioritise for June 2025 -> need to report back to SC this week
- If time allows, we will also quickly discuss the annual meeting organisation

Annual meeting organisation

- Workshop agenda: <https://indico.cern.ch/event/1389221/timetable/>
- Each WG1 subgroup will present the status of the activities in the WG1 plenary session
- Requested inputs for talks on parallel sessions on dedicated WG1 topics
 - please feel free to reach out (by mid-October) if you have contributions in mind
- So far we received 4 proposals for EXP contributions from VH and ttH groups:
 - Run 2 ttHbb results in CMS and summary of recent WG1 ttH workshop
 - Updated Run 2 ttHbb results in ATLAS
 - Full Run 2 VH (bb/cc) results in ATLAS and CMS
 - Run 2 updated VHcc results in ATLAS