



HIGGS CROSS SECTION UPDATES IN YR5

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YELLOW REPORT 5 - YR5

▶ **Yellow Report (YR) 5:**

Concerted effort of the community to update and improve on community documents. Opportunity to prepare for the future wealth of data in Run 3 and beyond.

- ▶ **Contrast to YR4:** Not one single document but rather individual contributions with smaller sets of authors.



TIMELINE

★ **June 2024 - WG1 Kick-Off Meeting** (<https://indico.cern.ch/event/1420243/>)

★ **Oct. 2024 - Meeting on Current Status** (<https://indico.cern.ch/event/1460528/>)

★ **Dec. 2024 - LHCHWG annual meeting** (<https://indico.cern.ch/event/1389221/>)

★ **June 2025 - First deadline for SciPost Submission.**
Priority Projects for Run 3!
We will organize additional meetings before that.

★ **... further submission deadlines - TBD**

YELLOW REPORT 5 - YR5



★ Who proposes WG1 contributions to YR5?

- ▶ We do! The conveners and sub-group conveners should propose, solicitate and organize the contributions for YR5.

★ Who approves these projects to become YR5 projects?

- ▶ The steering committee of the LHC HWG. The first deadline for projects that should be finished by June 25 is **October 22nd 2024!**
- ▶ We (WG1 conveners) have collected your proposals and will send out our current list of projects in the course of the next week for your approval. We will then inform the Steering committee by Oct. 22nd.

YELLOW REPORT 5 - YR5



★ How does the publication process work?

1. Conveners / sub-group conveners are responsible for the organization of projects.
2. Anyone is welcome to contribute and have authorship in resulting manuscripts!
3. Once an article is complete it will be submitted for review by the entire HWG. Typically in the form of a CDS document. Feedback gets incorporated.
4. Request for green light from the steering committee and submission of the article to SciPost .

★ General Guidelines for Community Reports by the HWG:

<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/ModeOfOperation>

★ SciPost Physics Community Reports: Designed for this kind of publication!

<https://scipost.org/SciPostPhysCommRep/about>

UPDATE OF HIGGS BOSON PRODUCTION CROSS SECTIONS

★ A contribution by WG1 to YR5



▶ Goal:

Produce reference predictions based on the current state-of-the art for all Higgs boson production mechanisms and document how these predictions are obtained. The final manuscript should reflect concisely the current state-of-the art of the literature.

▶ This is **not the** YR5 but merely one contribution to it. We (the conveners of WG1) think it is a valuable addition to YR5 to have this documented for **all production mechanisms in a single coherent document.**

▶ It is paramount that this document references all relevant literature that enables the prediction of Higgs boson production cross sections!

UPDATE OF HIGGS BOSON PRODUCTION CROSS SECTIONS

★ Progress and Current Status



▶ A patch while we work on this - Ad-Interim note for 13.6 TeV based on interpolations from YR4. <https://arxiv.org/pdf/2402.09955>

▶ Instructions for update with input values etc.:

<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCHWG136TeVxsec>

▶ Create numbers and put into spreadsheet

Deadline!!! Annual LHCHWG Meeting Dec. 2024

Will be made available on Twiki soon after that.

<https://cernbox.cern.ch/s/EoixsvAAeLYyGdP> PWD: LHCHWG13.6TeV

▶ **Write / publish SciPost article by June 2025**

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

UPDATE OF HIGGS BOSON PRODUCTION CROSS SECTIONS



★ Public Note:

▶ Write public note by June 2025

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

▶ In spirit similar to (but a bit more detailed than) Ad-Interim 13.6 TeV note.

▶ Complete update to state-of-the-art of 7, 8, 13, 13.6 & 14 TeV XS.

▶ Content:

1. Reference Cross Section Tables.

2. Mini Review reflecting the state of the field.

3. Ensuring that all relevant literature is properly referenced and documented.

★ **Any other contribution deriving new contributions, including comparative studies, etc. should be published separately - no matter if by external groups or within the HWG. This cross section update note needs to clearly referenced these other articles. In our opinion, this is in accordance with the SciPost publication standard even if tables with numbers are included in two SciPost publications.**