



LHC HWG1 plenary session – Introduction

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2024 LHC Higgs Working group workshop

- ➡ **June 2024: kick-off meeting: WGI agenda**
- ➡ **October 2024: update and priority definition: WGI agenda**
- ➡ **October 2024: YR5 cross-section update summary: WGI meeting**
 - ▶ cross-section update as one of the YR5 contributions proposed by WGI (all production mechanisms in a single document). Ad-interim note: arXiv . Updated numbers created and being collected in spreadsheet
- ➡ **December 2024: LHCHWG general assembly (today)**
- ➡ **June 2025: first deadline for priority projects for SciPost submission**
 - ▶ additional WGI/sub-group meetings will be organised to review development of the projects before the June deadline
 - ▶ general guideline for community reports: twiki
 - ▶ SciPost Physics Community report: <https://scipost.org/SciPostPhysCommRep/about>
- ➡ **Further submission deadlines after June 2025**

➡ Identified priority projects for YR5 intended to be finalised by June 2025

- ▶ **WGI**: updated cross-section predictions for all Higgs boson production modes
- ▶ **gluon fusion**: the impact of N3LO PDF's on the ggF cross-section
- ▶ **VBF**: differential and parton shower studies of VBF signal / harmonising fiducial definitions
- ▶ **VBF**: ggF contribution in VBF phase-space
- ▶ **VH**: differential NLO for ggZH, inclusion of differential k-factor in Powheg
- ▶ **ttH**: NNLO cross-section update and comparisons among resummation schemes at NNLL
- ▶ **Off-shell**: parton shower and jet merging benchmarking studies
- ▶ **BR**: include Dalitz decay in Hdecay

➡ **Larger set of projects is in planning stage by WGI and could result in further contributions to YR5 at a later time**

➡ **These projects will be discussed in detail in WGI plenary sessions and also during YR5 lightning talk session on Friday**

➡ Several ongoing activities beyond YR5 discussed in WG1 group and sub-group meetings since the last LHC Higgs workshop

- ▶ theoretical and experimental developments for each WG1 sub-group will be covered during WG1 plenary sessions
- ▶ dedicated highlights on experimental results with focus on modelling choice along with theory lightning contributions discussed during WG1 parallel session tomorrow

November 2024

19 Nov [WG1 - Offshell meeting](#)

October 2024

29 Oct - 31 Oct [VBF Workshop: Collaborative Advances in Theory and Experiment](#)

24 Oct [VH subgroup meeting: Plans for YR5](#)

11 Oct [WG1 - XSec update summary for YR5](#)

01 Oct [WG1 meeting](#)

September 2024

30 Sept [ttH/tH WG meeting -- Recent measurements and theoretical developments for ttH \(H → bb\) and ttbb](#)

03 Sept [WG1 meeting](#)

June 2024

26 Jun [ggF: aN3LO PDFs for Run3 & YR5](#)

11 Jun [WG1 - kick-off meeting on YR5 activities](#)

April 2024

30 Apr [State of the art predictions for ttH ttH](#)

15 Apr [WG1 - Offshell meeting](#)

04 Apr [WG1 - boosted Higgs discussion](#)

March 2024

01 Mar [YR5 and 13.6 TeV discussions](#)

February 2024

16 Feb [Discussion BR\(H→ss\)](#)

- ➡ **Two TH WGI sub-group conveners are stepping down - please send us (WGI conveners) nominations**
 - ▶ TH off-shell convener replacing Eleni Vryonidou and joining Raoul Roentsch
 - ▶ TH VH convener replacing Giancarlo Ferrera and joining Matthew Lim
- ➡ **Many thanks Eleni and Giancarlo for your contributions and coordination of the off-shell and VH groups!**

WG1 contributions at LHC Higgs WG workshop

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14:00 → 15:30

Plenary (WG1)

Conveners: Alessandro Calandri (ETH Zuerich), Alexander Karlberg (CERN)

31/3-004 - IT Amphitheatre (C...

Dec 4 (now)

14:00	Introduction	Speakers: Alessandro Calandri (ETH Zuerich), Alexander Karlberg (CERN), Bernhard Mistlberger (SLAC), Hannah Arnold (Stony Brook University)	10m
14:10	ggF status report (17'+5')	Speakers: Alessandra Cappati (Université Catholique de Louvain), Robin Hayes (Nikhef)	22m
14:32	VBF status report (17'+5')	Speaker: Jiayi Chen (Simon Fraser University)	22m
14:54	VH status report (15'+7')	Speaker: Matthew Lim (University of Sussex)	22m

14:00 → 15:30

Plenary (WG1) + Future colliders

Conveners: Alessandro Calandri (ETH Zuerich), Alexander Karlberg (CERN)

31/3-004 - IT Amphitheatre (C...

Dec 5

14:00	ttH/tH status report (17'+5')	Speaker: Judith Katzy (DESY)	22m
14:22	Off-shell status report (17'+5')	Speaker: Raoul Horst Roentsch (Università degli Studi and INFN Milano)	22m
14:44	BR status report (10'+5')	Speaker: Michael Spira (Paul Scherrer Institute)	15m
15:00	Higgs physics at future colliders (20'+10')	Speaker: Matthew Philip McCullough (CERN)	30m

WG1 contributions at LHC Higgs WG workshop

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09:00 → 12:02

WG1 parallel session

📍 40/S2-A01 - Salle Anderson (C...



Conveners: Alessandro Calandri (ETH Zuerich), Alexander Karlberg (CERN)

09:00

Higgs+charm ATLAS (10'+10')

Speaker: Elliot Reynolds (University of Kansas)

🕒 20m



Dec 5

09:20

Higgs+charm CMS (10'+10')

Speaker: Tiziano Bevilacqua (University of Zuerich)

🕒 20m



09:40

yt-induced Hbb as a background for HH searches (17'+5')

Speaker: Marco Zaro (Università degli Studi and INFN Milano)

🕒 22m



10:02

ttHbb highlights/summary of the WG1 - ttH/tH workshop (10'+10')WG1 ttH/tH workshop: <https://indico.cern.ch/event/1440845/>

Speaker: Matthias Schroeder (University of Hamburg)

🕒 20m



10:22

Updated ttHbb results ATLAS (10'+10')

Speaker: Alexander Froch (Université de Genève)

🕒 20m



10:42

VHcc ATLAS+CMS focusing on modelling uncertainties (20'+10')

Speaker: Zhuoran Feng (Nikhef)

🕒 30m



11:12

VHbb ATLAS+CMS focusing on modelling uncertainties (20'+10')

Speaker: Christina Reissel (MIT)

🕒 30m



11:42

PDF uncertainties on predictions for Higgs production in gluon-gluon fusion (15'+5')

Lightning talk

Speaker: Maria Vittoria Garzelli (University of Hamburg)

🕒 20m



WG1 contributions at LHC Higgs WG workshop

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14:00 → 15:30

Lightning session for LHCHWG Report 5

4/3-006 - TH Conference Roo...



14:00

WG3: Rare and Exclusive Higgs boson decays (7'+3')

Speakers: David d'Enterria (CERN), Van Dung Le (Ho Chi Minh City University)

⌚ 10m



Dec 6 (plenary)

14:10

WG3: NMSSM MasterCode, Benchmarks for NMSSM (7'+3')

Speaker: Felix Egle (DESY)

⌚ 10m



14:20

WG1: Parton shower aspects of Vector Boson Fusion Higgs production (7'+3')

Speaker: Jiayi Chen (Simon Fraser University)

⌚ 10m



14:30

WG1: Resummed predictions for VH (7'+3')

Speaker: Kajal Samanta (IPPP Durham)

⌚ 10m



14:40

WG1: NLO ggZH differential prediction (7'+3') [remote]

Speaker: Marco Vitti (KIT)

⌚ 10m



14:50

WG2: Recommendation for ATLAS + CMS full-likelihood publications (7'+3') [remote]

Speaker: Nicholas Wardle (Imperial College)

⌚ 10m



15:00

WG2: CPV STXS, CPV benchmark call in BSM models and dictionary note on different CPV parametrizations (7'+3') [remote]

Speaker: Henning Bahl (Heidelberg University)

⌚ 10m



15:10

WG4: HH physics at 14 TeV (15'+5') [remote]

Speaker: Javier Mazzitelli (Paul Scherrer Institute)

⌚ 20m

