

WG1: introduction

LHCHWG general meeting, 29th November 2022

Bernhard Mistlberger, Alexander Karlberg (TH),
Roberto Di Nardo (ATLAS), Julie Malclès (CMS)

WG1 overview

- WG1 focuses on:
 - SM Higgs cross-sections and branching ratios,
 - Modelling of main backgrounds for SM cross-section measurements.
- One subgroup per main four production modes,
- A subgroup dedicated to off-shell cross-section and interference with continuum background
- Additional point-of-contact to update Higgs branching fractions, generally less active due to sufficiently high-precision. Ongoing activity on BRs within MSSM WG3 with WG1 BR tools.
- Cross-talk with other WGs: STXS, (SM)EFT, BSM Higgs, ...
- Twiki: <https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCHWG1>
- Indico: <https://indico.cern.ch/event/1071695/>

WG1 meetings in 2022

WG1: Higgs Cross Sections and Branching Ratios subgroup meetings in 2022

<https://indico.cern.ch/category/5847/>

- 09 Dec [Joint session of LHC Top and Higgs working groups: ttW modeling in light of ttH measurements](#)
- 22 Nov [WG1 - VH subgroup](#)
- 19 Oct - 21 Oct [Past, present, and future of VBF](#)
- 17 Oct [WG1 Offshell Subgroup Joint Meeting](#)
- 10 Oct [WG1 - VH subgroup](#)
- 05 Jul [Modelling of the ttbb process at the LHC in light of ttH measurements](#)
- 12 May [WG1 - VH subgroup](#)
- 28 Apr [HXSWG Offshell Interpretations 5th Joint Meeting](#)
- 22 Feb [WG1 - VBF subgroup](#)
- 03 Feb [WG1 Updated Higgs Cross Sections](#)

WG1 notes

- **Off-shell group:**

<https://cds.cern.ch/record/2801789>

Discussion on the potential impact of off-shell Higgs measurements on searches for BSM physics carried out in the EFT framework or as benchmark model studies. Off-shell potential to resolve flat directions in parameter space for on-shell measurements.

- **ttH group:**

<https://cds.cern.ch/record/2812088>

MC generator comparisons at particle level to compare the modelling of important backgrounds and associated uncertainties in ATLAS and CMS.

Few comments still to be addressed

Off-shell Higgs Interpretations Task Force^b

Models and Effective Field Theories Subgroup Report

Aleksandr Azatov^{1,2,c}, Jorge de Blas^{3,d}, Adam Falkowski^{4,e}, Andrei V. Gritsan^{5,f},
Christophe Grojean^{6,7,g}, Lucas Kang^{5,h}, Nikolas Kauer^{8,i} (ed.), Ennio Salvioni^{9,10,j},
Ulascan Sarica^{11,k}, Marion Thomas^{12,l} and Eleni Vryonidou^{12,m}

Study of $t\bar{t}b\bar{b}$ and $t\bar{t}W$ background modelling for $t\bar{t}H$ analyses

Lars Ferencz^{1,b}, Kirill Grevtsov^{1,c}, Judith Katzy^{1,d}, Andrea Knue^{2,e},
Jan van der Linden^{3,f}, Josh McFayden^{4,g}, Gianna Moenig^{4,h}, Emanuel Pfeffer^{3,i},
Andrej Saibel^{5,j}, Matthias Schröder^{6,k}, Joshuha Thomas-Wilsker^{7,l}

WG1 contributions at this general meeting

WG1 parallel sessions Monday

Higgs-boson production in top-quark fragmentation *Colomba Brancaccio et al.* [🔗](#)
503/1-001 - Council Chamber, CERN 09:00 - 09:15

ttH production in NNLO QCD *Chiara Savoini et al.* [🔗](#)
503/1-001 - Council Chamber, CERN 09:22 - 09:37

Top Mass Effects in the Higgs p_T distribution *Vittorio Del Duca*
503/1-001 - Council Chamber, CERN 09:45 - 10:05

Morning coffee
10:30 - 11:00

Exact top-quark mass dependence in hadronic Higgs production *Mr Marco Niggetiedt*
503/1-001 - Council Chamber, CERN 11:00 - 11:20

V+jets background modeling in CMS *Aliya Nigamova*
503/1-001 - Council Chamber, CERN 11:30 - 11:40

V+jets background modeling in ATLAS *Maria Mironova*
503/1-001 - Council Chamber, CERN 11:50 - 12:00

ggZH 0+1J studies in ATLAS *Philipp Windischhofer*
503/1-001 - Council Chamber, CERN 12:15 - 12:25

WG1 plenary sessions Tuesday

VBf group report *Stephane Brunet Cooperstein*
500/1-001 - Main Auditorium, CERN 09:10 - 09:35

ttH/tH update *Marco Zaro*
30/7-018 - Kjell Johnsen Auditorium, CERN 15:30 - 15:50

Afternoon coffee
16:00 - 16:30

VH update *Hannah Arnold*
30/7-018 - Kjell Johnsen Auditorium, CERN 16:30 - 16:50

Offshell *Raoul Horst Rontsch*
30/7-018 - Kjell Johnsen Auditorium, CERN 17:00 - 17:20

ggF update *Stephen Philip Jones*
30/7-018 - Kjell Johnsen Auditorium, CERN 17:30 - 17:50

+ cross topics sessions: EFT, HH, snowmass, ECFA, top mass renormalization scheme uncertainties

Thanks and welcome!

Some personnel changes in the ranks over the past months.

We're very grateful for the dedication of the **outgoing conveners** and welcome the **newcomers**, who have been already active over the past months.

- WG1 convener: thanks **John Campbell** and welcome to **Bernhard Mistlberger**
- ggF: welcome **Alexander Huss**
- VBF: welcome **Gaetano Barone** and **Silvia Ferrario Ravasio**, thanks to **Antonio De Maria** and early thanks to **Simon Plätzer** stepping down at the end of the month
- ttH: welcome to **Malgorzata Worek** and **Marco Zaro** and thanks to **Laura Reina** and **Stefano Pozzorini**
- Offshell: thanks **Lailin Xu** and **Nikolas Kauer**, welcome **Rafael Coelho Lopes de Sa** and **Ennio Salvioni**

Thanks for your work over the last years!