



# Introduction

Arnaud Ferrari  
Uppsala University, Sweden  
(on behalf of the conveners)

LHC-HH meeting, 29/01/2020

# LHC-HH = HH sub-group of the LHC Higgs Cross-Section Working Group

- ▶ *Conveners:* Ramona Gröber, Javier Mazzitelli, Maggie Mühlleitner (theory), Luca Cadamuro (CMS) and Arnaud Ferrari (ATLAS).
- ▶ *Twiki page:*  
<https://twiki.cern.ch/twiki/bin/view/LHCPhysics/LHCHXSWGHH>
- ▶ *ATLAS-CMS-Theory meetings every 3 months:* next one on April 27th!

## *General news:*

- ▶ HH white-paper: the latest version is on [arxiv:1910.00012](https://arxiv.org/abs/1910.00012), as well as [LHCHXSWG-2019-005](#) in CDS, under review by the LHC Higgs XSWG group.
- ▶ We are starting to think about a future LHC-HH workshop to review the Run-2 results and prepare for Run-3.  
→ When would be a good date? Spring 2021?

# Tentative milestones for 2020

1. Two HH-related items in Les Houches proceedings:
  - (i) Advanced computations of ggF  $HH$  cross-sections towards NNLO FTapprox vs  $\kappa_\lambda$  (including scale uncertainties).
  - (ii) Top-quark mass scheme uncertainties are large and their reduction is still unclear. A task-force on such uncertainties was set-up in Les Houches:  
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4. Collect inputs for resonant  $HH/SH/SS$  benchmarks:
  - (i) Call for  $X \rightarrow HH$  benchmarks in 2019: one contribution received, to be reviewed today.
  - (ii) Once the input format is deemed useful, a call for  $X \rightarrow SS/SH$  benchmarks (i.e. with two mass parameters) will follow.

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6. Preparation of a full Run-2 ATLAS+CMS non-resonant  $HH$  combination.

# Today's meeting

## Morning session (4-S-030):

<b>09:30</b>	→ 09:45	<b>Introduction</b>	🕒 15m 📍 4/S-030 
<b>Speakers:</b> Arnaud Ferrari (Uppsala University (SE)), Javier Mazzitelli, Luca Cadamuro (University of Florida (US)), Margarete Mühlleitner (KIT), Ramona Groeber (Università di Padova and INFN, Sezione di Padova)			
<b>09:45</b>	→ 10:15	<b>Light Yukawa couplings in HH production (20+10)</b>	🕒 30m 📍 4/S-030 
<b>Speaker:</b> Lina Alasfar (HU-Berlin)			
<b>10:15</b>	→ 10:45	<b>HH in composite Higgs models (20+10)</b>	🕒 30m 📍 4/S-030 
<b>Speaker:</b> Prof. Margarete Muehleitner (KIT)			
<b>10:45</b>	→ 11:15	<b>HH MC update (20+10)</b>	🕒 30m 📍 4/S-030 
<b>Speaker:</b> Alexandra Carvalho Antunes De Oliveira (Instituto de Fisica Teorica (IFT)-UNESP - Universidade Estadual)			
<b>11:15</b>	→ 11:45	<b>Looking back at the HL-LHC HH combination (20+10)</b>	🕒 30m 📍 4/S-030 
<b>Speaker:</b> Elisabeth Petit (CPPM-Marseille (FR))			

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## Afternoon session (160-R-009):

<b>14:00</b>	→ 14:30	<b>Single Higgs EFT fits and possible implications for di-Higgs (20+10)</b> Speaker: Anke Blöcker (Uni Heidelberg)	🕒 30m	📍 160/R-009	📄
<b>14:30</b>	→ 15:00	<b>HH in EFTs at NLO (20+10)</b> Speaker: Gudrun Heinrich (Max Planck Institute for Physics)	🕒 30m	📍 160/R-009	📄
<b>15:00</b>	→ 15:30	<b>Uncertainties in HH production related to the scheme and scale of the top quark mass (20+10)</b> Speaker: Stephen Phillip Jones (CERN)	🕒 30m	📍 160/R-009	📄
<b>15:30</b>	→ 16:00	<b>Uncertainties at NNLO FTapprox vs lambda (20+10)</b> Speaker: Javier Mazzitelli	🕒 30m	📍 160/R-009	📄
<b>16:00</b>	→ 16:30	<b>Input for X to HH benchmarks in models with an extra singlet (20+10)</b> Speaker: Tania Natalie Robens (Rudjer Boskovic Institute (HR))	🕒 30m	📍 160/R-009	📄