

# HH Subgroup Meeting

Sally Dawson (TH), Christoph Englert (TH), Maxime Goutzevitch (CMS),  
Roberto Salerno (CMS), Magdalena Slawska (ATLAS)

# Contacts

---

**Indico agenda:**

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

**HH Twiki page:**

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

# Charges

---

- I. Accurate **predictions** for the differential signal cross sections in the SM in gluon-gluon fusion especially as a function of the Higgs trilinear coupling. Get theoretical uncertainties on the cross section prediction.
- II. Accurate **predictions** for the differential signal cross sections in other SM production processes (VBF, VHH, ttHH,...).
- III. Accurate **predictions** for rates and distributions in EFT approaches (inclusion of higher dimensional operators) and in full BSM (SUSY, 2HDM, ...). **Determination** of relevant benchmark scenarios to be tested by the experiments.
- IV. Systematic **study** of the possible final state signatures at the LHC with a special attention to having also accurate predictions for the corresponding backgrounds. **Evaluation** the needs that new sophisticated techniques for signal/background discrimination will demand on theory predictions for signal/backgrounds.

# Timeline

---

Series of meetings to review the existing work and evaluate the progresses in view of the HXSWG general assembly meeting

## **Today - HH subgroup meeting**

Review of the existing work on I.

Discussion of the next steps

## **mid Nov. - HH subgroup meeting**

Review of the existing work on II./III.

Discussion of the next steps

## **mid Dec. - HH subgroup meeting**

Progresses on I.: distributions/interface with showering

## **Jan. 22-Jan. 24 - HXSWG General assembly meeting**

Summarise the progress made

Set concrete goals and a timeline for physics recommendations

# Today agenda

---

## Monday, 20 October 2014

- 14:30 - 14:50      **Introduction 20'**  
Speakers: Sally Dawson (BNL), Christoph Englert (Heidelberg University), Maxime Gouzevitch (Universite Claude Bernard-Lyon I (FR)), Magdalena Slawinska (NIKHEF (NL)), Dr. Roberto Salerno (Ecole Polytechnique (FR))
- 14:50 - 15:10      **Theoretical Aspects of Higgs Pair Production at LHC 20'**  
Speaker: Michael Spira (Paul Scherrer Institut (CH))
- 15:10 - 15:30      **HH production : NLO+PS and top-quark mass effects in gg fusion 20'**  
Speakers: Fabio Maltoni (Universite Catholique de Louvain (UCL) (BE)), Marco Zaro (LP THE Jussieu, Paris), et al.
- 15:30 - 15:50      **Top quark mass effects (NLO) and matching coefficient (NNLO) for Higgs boson pair production 20'**  
Speakers: Jonathan Grigo, Kirill Melnikov, Matthias Steinhauser (KIT)
- 15:50 - 16:10      **HH production at NNLO in the EFT 20'**  
Speakers: Javier Mazzitelli, Daniel De Florian
- 16:10 - 16:30      **Higgs boson pair production: The road ahead 20'**  
Speakers: Andreas Papaefstathiou (U), Philipp Maierhöfer
- 16:30 - 16:50      **Discussion 20'**  
Speaker: ALL