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# Extended Higgs Sector Subgroup of LHC HWG

The Extended Higgs Sector subgroup is responsible for providing support and recommendations for issues related to the (work in progress).

# Organization

Group conveners:

<b>ATLAS</b>	<b>CMS</b>	<b>THEORY</b>
Lidija Zivkovic (Belgrade)	Mariarosaria d'Alfonso (MIT)	Shufang Su (Arizona)
Nikolaos Rompotis (Liverpool)	Santeri Laurila (CERN)	Rui Santos (Lisbon)
		Tania Robens (Zagreb)

To reach all conveners, [click here](#).

# Meetings

November 5 [↗](#)

July 6-7 [↗](#)

Indico page of the WG3 contains relevant meetings [↗](#)

# TWIKI with additional information

- Twiki containing BRs numbers for  $H^{\pm} \rightarrow cb$  in the 3HDM: Hplus3HDM.
- Twiki containing cross section and BRs numbers for 2HDM: LHCHWG2HDM ("2HDM Ntuple")
- Twiki containing cross section and BRs numbers for flavorful 2HDM: LHCHWG3Flavorful2HDM.
- Twiki for LFV Higgs decay in BGL.
- Twiki for 2HDM benchmarks.
- Twiki for the Georgi-Machacek model.
- Twiki for benchmarks other than 2HDM
- Twiki for the width and interference treatment recommended for a common treatment for ATLAS and CMS analyses.
- Twiki for MSSM charged Higgs (heavy, light, intermediate masses).

# Ongoing work

- Check physics case for 3HDM, LRS, CPV, SM+Triplet models, in case provide cross sections and BRs: Santos to write short summary of which code is good for which
- Interface theory constraints for an additional singlet into ScannerS: done. The latest version of ScannerS that include a large number of models with extended scalar sectors is now available, see <https://arxiv.org/pdf/2007.02985.pdf>. The code includes the usual theoretical constraints: stability and perturbativity and electroweak precision together with interfaces with several other codes. A description on how to check if a given point is allowed by the constraints can be done for the CxSM and is described in detail in the following presentation [https://indico.cern.ch/event/640710/contributions/2599076/attachments/1463561/2261560/MSampaioWG3\\_20](https://indico.cern.ch/event/640710/contributions/2599076/attachments/1463561/2261560/MSampaioWG3_20).
- Cross sections and BRs for 2HDM+singlet models (real & complex): Nikos Rompotis.
- Inclusion of 2HDM electroweak baryogenesis information in electroweak phase transition properties by using the BSMPT code by Maggie: Maggie, Nikos Rompotis.
- Theoretical predictions for interference effects for large width charged Higgs decays: done. Santos to write a short description of regions of parameter space that have large interference effects.
- Expand 2HDM/MSSM  $H^+$  cross sections from 2 to 3 TeV: contact.
- Provide benchmark scenarios for searches for  $H_5$  states in GM for masses below 200GeV: Heather Logan
- Provide simulation tool for loop-induced  $H^+ \rightarrow W^+ \gamma$  with fermiophobic  $H^+$  in GM: Heather Logan

# Experimental results

- ATLAS
- CMS [↗](#)

# Twiki revisions

-- LidijaZivkovic - 2021-03-10

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This topic: LHCPhysics > LHCHWG3EX

Topic revision: r7 - 2021-10-25 - LidijaZivkovic



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