



# LHC-HH introduction

The 18th Workshop of the LHC Higgs Working Group

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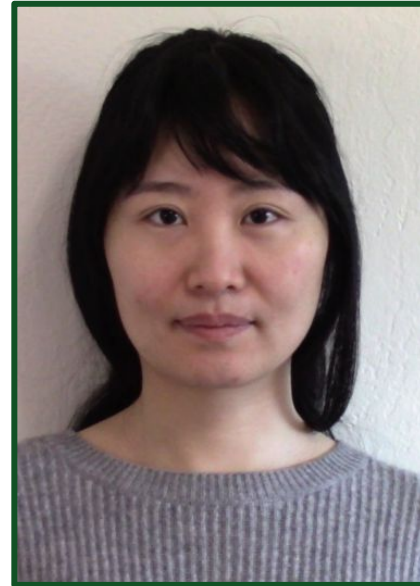
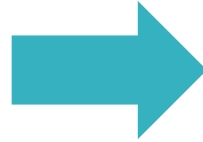
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December 2nd, 2021



# LHC-HH leadership news

Nan Lu will take over from Luca Cadamuro as LHC-HH convener from CMS



**Welcome, Nan, and thank you Luca for all your work!**

# Ongoing work in the HH cross group

task	status
<b>ggF:</b> top-quark mass renormalization scheme uncertainty	Phys. Rev. D 103, 056002 (2021)
<b>ggF:</b> NLO EFT frameworks and new shape benchmarks, HEFT vs SMEFT	In progress
<b>ggF:</b> combination of H and HH (in connection with WG2 activities)	In progress
<b>ggF:</b> cross section / MC for $gg \rightarrow H + bb$	To be started
<b>ggF/VBF:</b> cross section and MC prediction for various $m_H$ values	To be started
<b>VBF:</b> fiducial cross-sections vs. coupling modifiers	Started
<b>VBF:</b> cross-sections for $ggF\ HH+2j$ at hard matrix-element	Ongoing. <a href="#">MC studies @ LHC-HH</a>
<b>Resonant:</b> benchmarks for spin-0 HH, SH and SS to be probed with 100-300/fb, including interference with non-resonant HH	Paper in preparation ( <a href="#">report today!</a> )
<b>Compositeness models:</b> covered by EFT?	To be started

# HH cross group meetings in 2021

- February 25th
  - EFT Modelling at NLO (Lina Alasfar)
  - Multi-Higgs Production Probes Higgs Flavour (Daniel Egana-Ugrinovic)
  - Benchmarks for resonant HH production (Margarete Mühlleitner)
  - Triple Higgs Boson Production at the Large Hadron Collider with Two Real Singlet Scalars (Tania Robens)
- September 29-30th
  - Higgs Pairs mini-workshop, preparation for the Higgs Pairs 2022 workshop in Croatia
  - Two half-day sessions with reports on current work and planning/discussions to prepare for the workshop next year
  - All sessions recorded for future reference

# HH cross group meetings in 2021

- December 2nd (today!)
  - Experimental Overview (ATLAS+CMS) (Alessandra Betti)
  - Resonant Benchmarks for Spin-0 HH, SH and SS (Duarte Azevedo)
  - Effective Field Theory for Higgs Pair Production (Ramona Gröber)
  - Lightning talks\*
    - Higgs Boson Pair Production at NNLO in the Large-Mt Expansion (Florian Herren)
    - Higgs Pair Production at Approximate NNLO QCD with Anomalous Couplings (Ludovic Scyboz)
    - Machine Learning Augmented Probes of Light Yukawa Couplings from Higgs Pair Production (Ayan Paul)
    - Multiscalar Final States in the TRSM (Gilberto Tetlalmatzi-Xolocotzi)

**\*We're trying out contributed lightning talks for the first time in an LHC-HH meeting - let us know what you think and if you'd like to see more of this in the future!**

# Reminder: Higgs Pairs 2022 workshop

Postponed to May 30th - June 3rd, 2022 in Dubrovnik, Croatia

- We hope to be able to see you all there, in person!





**BACKUP**

