

Higgs (N)NLO MC&Tools Workshop for LHC RUN-2

Close Out

Daniela Rebutti (Pavia Univ.), Markus Schumacher (Freiburg Univ.),
Junichi Tanaka (Univ. of Tokyo), Reisaburo Tanaka (LAL, Orsay)

December 19, 2014, CERN

(N)NLO MC&Tools WS Close Out

- Goal of this workshop: **prepare for initial MCs for RUN-2** (L=100 fb⁻¹ data at 13/14TeV)
 - More exclusive analyses in different Higgs production processes, ggF, VBF, VH, ...
 - Use of all kinematical information with Higgs production and decay ($p_T, Y, \Omega_{\text{decay}}$).
 - Unified approach with HEFT in coupling (on/off-shell) and CP.
 - Direct searches for hint for BSM Higgs (be prepared for early discovery !)
- **Very nice talks (33 TH, 7 ATLAS) and a lot of discussions !**
 - Saw many progresses and even new results presented at this workshop !
 - Discussed Higgs signal and related SM backgrounds (WW/ZZ, ttbb, etc.) MCs.
- **Wrap-up**
 - Please check round-table-discussion slides to follow up (timeout, talk K-factor \approx 1.2).
 - Encourages to continue the discussions among TH+EXP experts.
 - Plots shown at this WS are summarized in ATLAS PUB note ([ATL-PHYS-PUB-2014-022](#)).
- **Higgs (N)NLO MC&Tools Jamboree in 2015 ?**
 - To prepare for Moriond 2016 (with L=10 fb⁻¹ data at 13TeV)
- **Dream NNLO QCD + NLO EW Monte Carlo for all Higgs processes.**

Tools for Higgs Analysis

ggF

- [HIGLU](#) (NNLO QCD+NLO-EW)
- [iHixs](#) (NNLO QCD+NLO-EW)
- [FeHiPro](#) (NNLO QCD+NLO-EW)
- [HNNLO](#), [HRes](#) (NNLO+NNLL QCD)
- [SusHi](#) (NNLO QCD)
- [RGHiggs](#) (NNLO+NNLL QCD)
- [ggHiggs](#) (approx. NNNLO QCD)

VBF

- [VV2H](#) (NLO QCD)
- [VBFNLO](#) (NLO QCD)
- [HAWK](#) (NLO QCD+EW)
- [VBF@NNLO](#) (NNLO QCD)

WH/ZH

- [V2HV](#) (NLO QCD)
- [HAWK](#) (NLO QCD+EW)
- [VH@NNLO](#) (NNLO)

ttH

- [HQQ](#) (LO QCD)
- [POWHEL](#) (NLO QCD)
- [MG5_aMC@NLO](#) (NLO QCD)

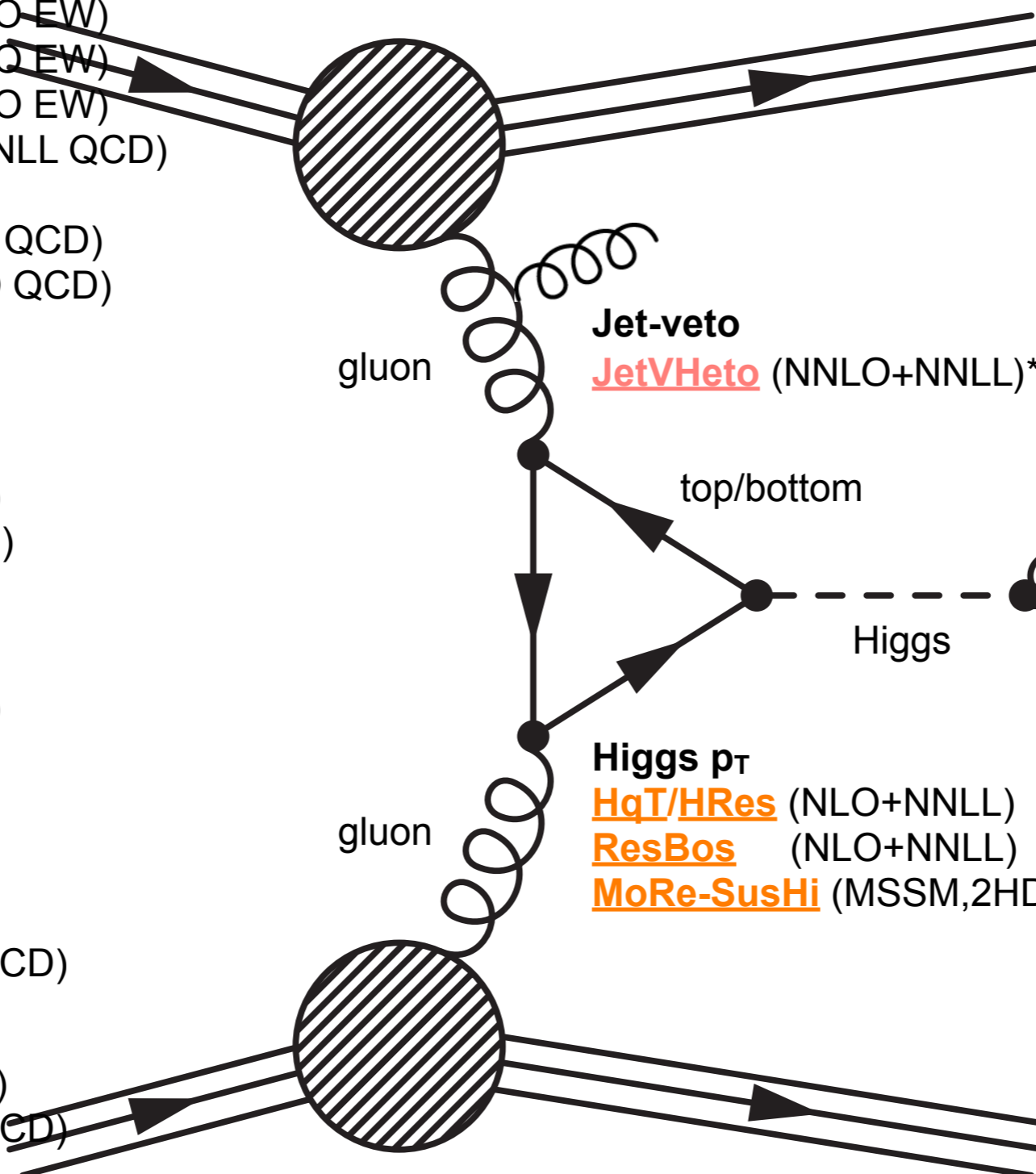
bbH

- [bbh@NNLO](#) (NNLO QCD)
- [MG5_aMC@NLO](#) (NLO QCD)

HH

- [HPAIR](#) (NLO QCD)
- [MG5_aMC@NLO](#) (NLO QCD)

+ private codes.



PDF: [MSTW/MMHT](#), [CTEQ](#), [NNPDF](#), etc.
[LHAPDF](#), [HOPPET](#), [APFEL](#)

NLO MC

- [POWHEG](#) [MiNLO](#)
- [MadGrapn5_aMC@NLO](#)
- [SHERPA](#) [MEPS@NLO](#)
- [PYTHIA8](#) [UNLOPS](#)
- [HERWIG++](#) [Matchbox](#)

LO MC

- [gg2VV](#)

NLO ME

- [MCFM](#), [MG5_aMC@NLO](#)

W/Z

Higgs Decay

- [HDECAY](#) (NLO++)
- [Prophecy4f](#) (NLO)

W/Z

Higgs Properties

- [MELA/JHU](#), [MEKD](#)

HEFT

- [MG5_aMC@NLO](#) (SILH,HC)
- [eHDECAY](#)

MSSM/2HDM

- [FeynHiggs](#), [CPSuperH](#)
- [SusHi+2HDMC](#)
- [HIGLU+HDECAY](#)

* NLO+NNLL in differential

Thank you very much for coming!

● *Wish you safe trip back to your home.*

● *Merry Christmas and A Happy New Year for 2015*

2015: Year of Sheep (oriental zodiac)



© <http://shaunthesheep.com>



© http://www.wanpagu.com/top_illustration.html