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Heavy Higgs and Beyond Standard Model subgroup

Goal of the group

The main scope of the group is to provide theoretical guidelines, in common between ATLAS and CMS, to

- characterize properly the heavy Higgs in the SM case (line shape and S/B interference in gg fusion and VBF)
 - define general benchmarks to reinterpret SM searches/signatures in BSM scenarios
- We started to look into the most basic/general BSM scenarios from a general point of view:
- ◆ EW-singlet mixed with SM-like Higgs at ~ 126 GeV
 - ◆ 2HDM

We have in the plan to look into Higgs Triple Models and study the case of two degenerate resonances at ~ 126 GeV from a model-independent point of view.

Also help in defining search for specific signatures (eg $H \rightarrow$ invisible, $H \rightarrow hh$) can be provided in case of interest

On the long term (for the next LHC run) a proper strategy for general EWSB studies (eg VV scattering analysis) should be prepared

Group Contacts

Experimental contacts:

- ATLAS: Sara Diglio (Melbourne) Krisztian Peters (CERN)
- CMS: Mario Pelliccioni (Torino/CERN) Mario Kadastik (NICPB Estonia)

Theory contacts: Margarete Muehlleitner (Karlsruhe) Heather Logan (Carleton)

Results (links and references)

Complex Pole Lineshape

[Link](#) to CPS lineshape with EWK uncertainties (arXiv:1112.5517)

gg->VV S/B interference

Preliminary set of results for interference reweighing in SM case

- gg->4l [Link](#) to interference tables with QCD uncertainties (arXiv:1206.3824)
- gg->2l2n for $H \rightarrow ZZ \rightarrow 2l2n$ with gg2VV-3.1.3
zz2l2n_interfwgts.root: Inteference weights in format of **1+Interf/Signal**, as a function of $M(ZZ)$.
Following selections are used when computing these weights:
 $p_{T1} > 20, |\eta_{e1}| < 2.5, 76.2 < M_{ll} < 106.2, MET > 50.$
- gg->lv2j for $H \rightarrow WW \rightarrow lvjj$ with MCFM-V6.3 (example input.DAT)
wwlvjj_interfwgts.root: Inteference weights in format of **Interf/Signal** (Upper, Central, Down), as a

function of $M(WW)$, without cuts.

Preliminary set of results for interference reweighing in BSM case (EW singlet)

- $gg \rightarrow 2l2n$ for $H \rightarrow ZZ \rightarrow 2l2n$ with $gg2VV$ -3.1.3
- $gg \rightarrow lv2j$ for $H \rightarrow WW \rightarrow lvjj$ with MCFM-V6.3
wvlvjjBSM_interfwgts.root: Interference weights in format of Interf/Signal ($C2=1,0.1,\dots,0.9$, Upper, Central, Down), as a function of $M(WW)$, without cuts
- $gg \rightarrow lvlv$ for $H \rightarrow WW \rightarrow lvlv$ with MCFM 6.3 (fixed width BW lineshape): WW $lvlv$ Interference Weights: Interference weights in the form of Interference/Signal, for additive, central and multiplicative schemes, as a function of $M(WW)$. Covers widths from 0.1 - 2.0 * SM. Updated on 20/5/14.

2HDM

Meetings and Minutes

- CERN InDico Agenda [↗](#) , Minutes

-- ReiTanaka - 20-Apr-2012

- WWlvlv_interfwgts.tar.gz: Interference Weights for HWWlvlv

This topic: LHCPHysics > LHCHXSWG BSM

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