

# LHCHSWG: BR subgroup: 2014 status, plans for the near future

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## 1 Branching Ratios in the SM

### Status:

- Predictions for standard decay channels based on Hdecay and Prophecy4f [1]
- Update of Hdecay: full EW corrections now available

### Plans:

- Update of predictions
  - using the latest version of Hdecay
  - with possibly improved quark mass uncertainties

#### To-do list:

- estimate reduced theoretical uncertainties of improved Hdecay predictions
- clarify quark mass uncertainties
- redo runs
- Proper inclusion of Dalitz decays

#### To-do list:

- agree on definition with ATLAS/CMS
- evaluate Dalitz decays (implementation in Hdecay in progress)

- Predictions for rare decays

#### To-do list:

- get input from ATLAS/CMS/theory which rare decays are interesting
- ask theorists to provide predictions
- example already under discussion:  $H \rightarrow J/\Psi \gamma$

## 2 Branching Ratios in the MSSM

### Status:

- Predictions for standard decay channels based on `FeynHiggs` and `Hdecay`
- Evaluation done in
  - Conventional benchmark scenarios [2]
  - New: “low-tb-high” scenario (work in progress)

### Plans:

- Include Higgs decays to SUSY particles (sclar fermions, charginos, neutralinos)
- Include  $\text{BR}(t \rightarrow H^\pm b)$

To-do list:

- agree which codes to be used for which decay
  - redo runs
- Evaluation of uncertainties to SM particles
- To-do list:
- evaluate theory uncertainties in the MSSM
  - take over parametric uncertainties from the SM
  - redo runs

## 3 Branching Ratios in other BSM models

### Status:

so far nothing done by BR group

### Plans:

- define interesting models and benchmark scenarios  $\rightarrow$  WG3  
example: 2HDM
- organize responsibility with WG3
- possibly take care on production of numbers for specific benchmark scenarios  
example: 2HDM

## References

- [1] A. Denner, S. Heinemeyer, I. Puljak, D. Rebuszi and M. Spira, *Eur. Phys. J. C* **71** (2011) 1753 [arXiv:1107.5909 [hep-ph]].
- [2] M. Carena, S. Heinemeyer, O. Stål, C. Wagner and G. Weiglein, *Eur. Phys. J. C* **73** (2013) 9, 2552 [arXiv:1302.7033 [hep-ph]].