

# VBF Higgs to Invisible - Update

HIG-14-038, AN-14-243

P. Dunne

## Overview

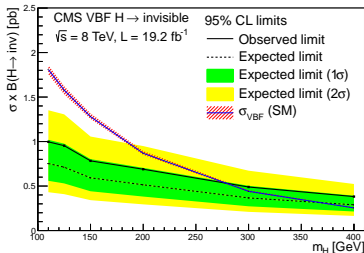
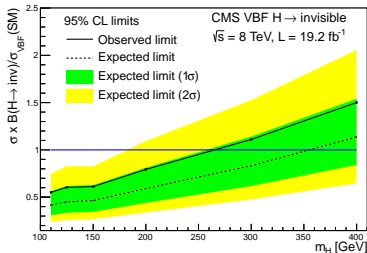
- ▶ Preapproval conditions answered before Christmas
- ▶ Further study of single mu data suggested
  - Completed last week
- ▶ Unblinded results have been obtained and will be shown below

## Unblinded yields

Background	$N_{est} \pm (stat) \pm (syst)$
$Z \rightarrow \nu\nu$	$157.3 \pm 37.1 \pm 38.3$
$W \rightarrow \mu\nu$	$101.8 \pm 6.1 \pm 11.9$
$W \rightarrow e\nu$	$57.4 \pm 7.3 \pm 7.0$
$W \rightarrow \tau\nu$	$98.0 \pm 13.2 \pm 25.4$
top	$4.4 \pm 1.0 \pm 1.4$
VV	$3.8 \pm 0.0 \pm 0.7$
QCD multijet	$17 \pm 0 \pm 14$
Total Background	$439.7 \pm 40.5 \pm 55.8$
Signal(VBF 125)	$273.4 \pm 0.0 \pm 31.2$
Signal(ggH 125)	$22.6 \pm 0.0 \pm 15.6$
Observed	<b>508</b>

## Limits

- ▶ Prefit expected limit on  $B(H \rightarrow \text{inv})$  42% for  $m_H = 125$  GeV from Asymptotic
  - 39% with full toys, difference is due to a known feature of combines handling of pre-fit gmN when using Asymptotic
- ▶ Postfit observed (expected) limit on  $B(H \rightarrow \text{inv})$  60 (45)% for  $m_H = 125$  GeV
  - This corresponds to a  $1\sigma$  upwards fluctuation



- ▶ Single bin counting experiment so limit 100% correlated across all mass points

## Conclusion

- ▶ Unblinded results shown
- ▶ We observe a  $1\sigma$  upwards fluctuation
- ▶ This gives us a postfit observed (expected) limit on  $B(H \rightarrow \text{inv.})$  of 60 (45)% for  $m_H = 125$  GeV
  - This limit includes a 20% uncertainty on the  $Z/\gamma^* \rightarrow \mu\mu$  to  $Z \rightarrow \nu\nu$  extrapolation factor which is under investigation
- ▶ Documentation has been updated

## Backup