

VBF Higgs to Invisible - Update

HIG-14-038, AN-14-243

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Overview

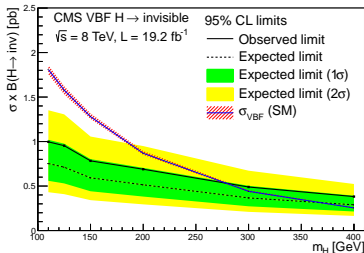
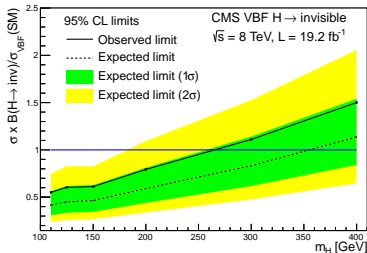
- ▶ Preapproval conditions answered before Christmas
- ▶ Further study of single mu data suggested
 - Completed last week
- ▶ Unblinded results have been obtained and will be shown below

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	508

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 1σ upwards fluctuation



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

Conclusion

- ▶ Unblinded results shown
- ▶ We observe a 1σ 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
- ▶ Control plots and updated documentation will follow shortly

Backup