

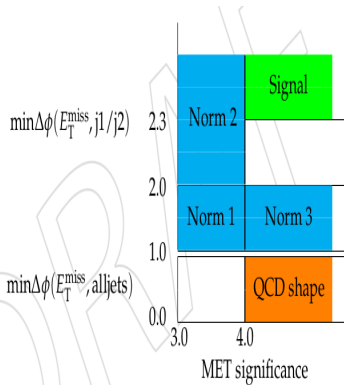
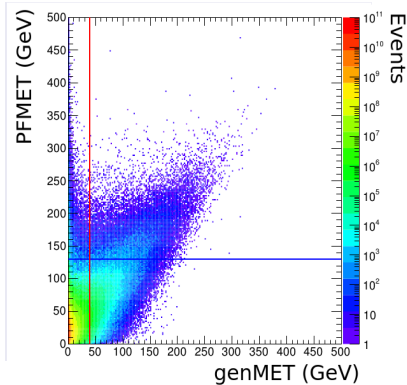
VBF Higgs to Invisible Update

HIG-14-038, AN-14-243

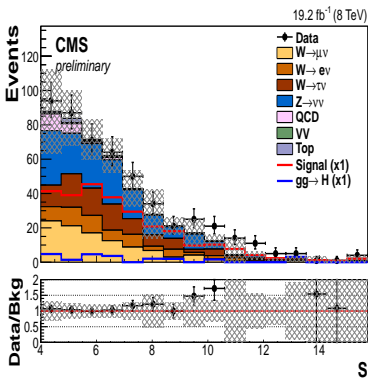
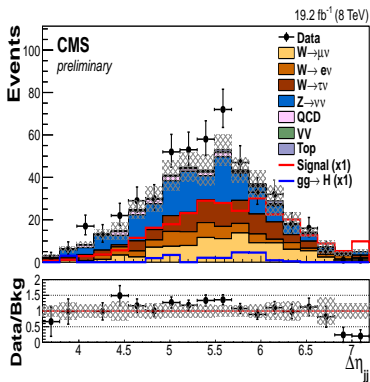
Yields

Process	Event yields
$Z \rightarrow \nu\nu$	$158.1 \pm 37.3 \pm 21.2$
$W \rightarrow \mu\nu$	$102.5 \pm 6.2 \pm 11.7$
$W \rightarrow e\nu$	$57.9 \pm 7.4 \pm 7.7$
$W \rightarrow \tau\nu$	$94.6 \pm 13.1 \pm 23.8$
top	5.5 ± 1.8
VV	3.9 ± 0.7
QCD multijet	17 ± 14
Total Background	$439.4 \pm 40.7 \pm 43.5$
Signal(VBF)	273.1 ± 31.2
Signal(ggH)	23.1 ± 15.9
Observed data	508

QCD



QCD



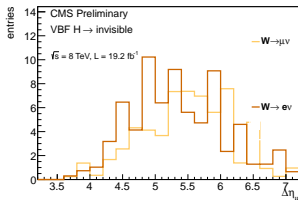
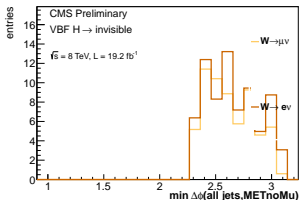
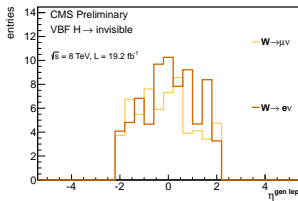
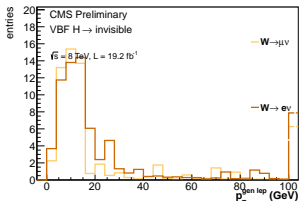
Inside/outside acceptance check

- ▶ Check MC yield in signal region from $W \rightarrow e/\mu\nu$
 - i.e. we veto any reconstructed leptons
- ▶ Split into events with gen lepton inside acceptance ($|\eta| < 2.1$) and outside acceptance ($|\eta| > 2.4$)

Process	Inside acceptance	Outside acceptance
$W \rightarrow e\nu$	73.7 ± 6.8	30.2 ± 4.9
$W \rightarrow \mu\nu$	61.5 ± 6.8	74.4 ± 7.3

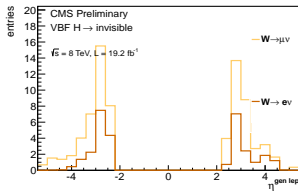
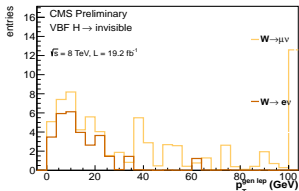
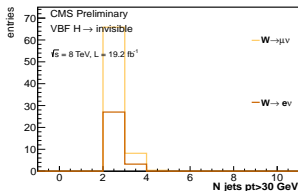
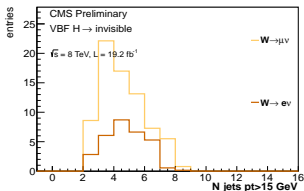
- ▶ Inside acceptance:
 - Slightly more $e\nu$ events
 - Might be from efficiency
- ▶ Outside acceptance results odd

Shape checks inside acceptance



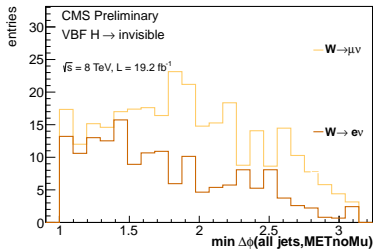
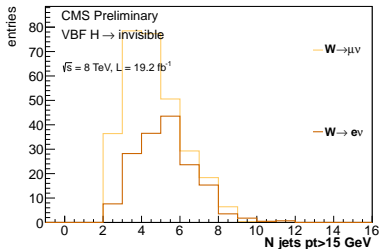
Outside acceptance

- Outside acceptance $e\nu$ events have a lot more jets
- No $e\nu$ events with high pt gen leptons



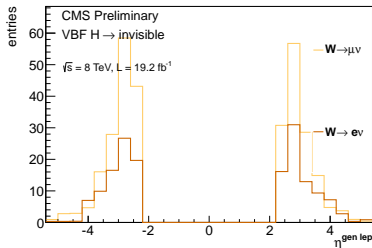
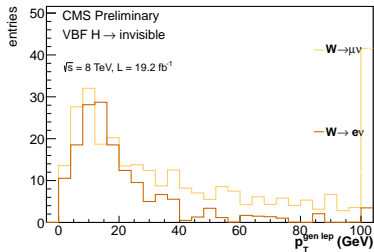
Outside acceptance

- Seems outside acceptance electrons are more likely to be reconstructed as jets than muons
- Loosen jetmetdphi cut to 1



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Backup