

$H \rightarrow WW$ Trileptons: Compare $m_{ll} \in [81.0, 101.1]$ to $m_{ll} \in [76.0, 106.1]$

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- 1 Jason's Trilepton limits, comparing use of a $m_Z \pm 10.0$ GeV window to a $m_Z \pm 15.0$ GeV window.
- 2 Combine Jason's WH (NoZPeak) and ZH -NJet1 analyses with Geumbong's ZH -NJet2orMore analysis.
- 3 The best choice appears to be the combination of Jason's WH (NoZPeak) and ZH -NJet1 analyses with Geumbong's ZH -NJet2orMore analysis, using the $m_Z \pm 15.0$ GeV window.
- 4 Full limits using the best choice

Jason's Trileptons Only: Compare $m_{ll} \in [81.0, 101.1]$ to $m_{ll} \in [76.0, 106.1]$

Exp. Median Limits	110	115	120	125	130	135	140	145	150	155
NoZPeak ($Z \pm 10$)	82.1	47.5	31.3	21.0	16.1	13.2	11.5	10.1	9.52	8.81
InZPeakNJet1 ($Z \pm 10$)	218	133	88.0	63.7	50.4	43.2	38.7	35.9	34.9	34.5
InZPeakNJet2orMore ($Z \pm 10$)	186	100	58.5	38.9	28.5	22.0	18.5	15.9	14.2	13.1
Trilep-($Z \pm 10$)	61.8	36.5	23.4	15.7	12.1	9.59	8.24	7.23	6.76	6.19
Exp. Median Limits	160	165	170	175	180	185	190	195	200	
NoZPeak ($Z \pm 10$)	7.93	7.99	8.98	9.92	11.7	14.7	17.7	20.3	22.9	
InZPeakNJet1 ($Z \pm 10$)	34.6	36.9	40.6	44.7	48.4	61.1	69.9	77.8	85.9	
InZPeakNJet2orMore ($Z \pm 10$)	11.8	11.7	12.9	13.7	15.0	18.2	21.2	23.4	25.6	
Trilep-($Z \pm 10$)	5.51	5.52	6.08	6.86	7.81	9.53	11.4	12.7	14.4	
Exp. Median Limits	160	165	170	175	180	185	190	195	200	
NoZPeak ($Z \pm 15$)	7.99	8.18	9.17	10.4	12.2	15.3	18.7	21.3	24.1	
InZPeakNJet1 ($Z \pm 15$)	32.5	34.7	37.9	41.0	44.6	55.5	63.7	70.5	78.9	
InZPeakNJet2orMore ($Z \pm 15$)	11.5	11.2	12.3	13.4	14.5	17.4	20.4	22.2	24.8	
Trilep-($Z \pm 15$)	5.57	5.61	6.21	6.77	7.65	9.70	11.5	13.0	14.4	

Jason's & Geumbong's Combined: Compare

$m_{ll} \in [81.0, 101.1]$ to $m_{ll} \in [76.0, 106.1]$

Exp. Median Limits	110	115	120	125	130	135	140	145	150	155
NoZPeak ($Z \pm 10$)	82.1	47.5	31.3	21.0	16.1	13.2	11.5	10.1	9.52	8.81
InZPeakNJet1 ($Z \pm 10$)	218	133	88.0	63.7	50.4	43.2	38.7	35.9	34.9	34.5
InZPeakNJet2orMore ($Z \pm 10$)	196	107	63.1	42.0	29.9	23.0	18.6	15.7	14.1	12.6
Trilep- ($Z \pm 10$)	64.9	37.1	24.0	16.3	12.3	9.86	8.41	7.22	6.59	6.12
NoZPeak ($Z \pm 15$)	81.3	48.1	31.4	21.2	16.4	13.3	11.7	10.3	9.75	8.97
InZPeakNJet1 ($Z \pm 15$)	213	131	86.4	61.9	48.6	42.1	37.7	34.8	33.5	32.6
InZPeakNJet2orMore ($Z \pm 15$)	191	103	61.1	40.2	29.2	22.0	17.8	15.2	13.4	12.0
Trilep- ($Z \pm 15$)	63.4	37.2	23.9	16.1	12.2	9.57	8.31	7.13	6.58	5.95
Exp. Median Limits	160	165	170	175	180	185	190	195	200	
NoZPeak ($Z \pm 10$)	7.93	7.99	8.98	9.92	11.7	14.7	17.7	20.3	22.9	
InZPeakNJet1 ($Z \pm 10$)	34.6	36.9	40.6	44.7	48.4	61.1	69.9	77.8	85.9	
InZPeakNJet2orMore ($Z \pm 10$)	11.1	10.9	12.1	13.1	14.7	17.6	20.8	22.5	24.6	
Trilep- ($Z \pm 10$)	5.29	5.30	5.94	6.56	7.51	9.34	11.1	12.6	13.9	
NoZPeak ($Z \pm 15$)	7.99	8.18	9.17	10.4	12.2	15.3	18.7	21.3	24.1	
InZPeakNJet1 ($Z \pm 15$)	32.5	34.7	37.9	41.0	44.6	55.5	63.7	70.5	78.9	
InZPeakNJet2orMore ($Z \pm 15$)	10.5	10.3	11.4	12.5	13.8	16.7	19.6	21.4	23.5	
Trilep- ($Z \pm 15$)	5.25	5.17	5.88	6.53	7.39	9.16	10.9	12.2	13.7	

Full Trilepton Limits for Jason's & Geumbong's Combined ($m_Z \pm 15.0$, Unblinded)

Limits	110	115	120	125	130	135	140	145	150	155
$+2\sigma/\sigma_{SM}$	127	73.6	47.9	32.4	24.2	19.2	16.3	14.2	13.0	11.8
$+1\sigma/\sigma_{SM}$	89.9	52.9	33.6	23.1	17.3	13.5	11.8	10.1	9.24	8.43
Median/σ_{SM}	63.4	37.2	23.9	16.1	12.2	9.57	8.31	7.13	6.58	5.95
$-1\sigma/\sigma_{SM}$	46.1	27.0	17.3	11.7	8.74	7.00	6.07	5.21	4.81	4.40
$-2\sigma/\sigma_{SM}$	35.8	21.0	13.3	9.09	6.82	5.48	4.71	4.08	3.76	3.50
Observed/σ_{SM}	49.3	31.6	20.3	17.3	12.6	9.42	8.82	7.60	6.46	5.86
Limits	160	165	170	175	180	185	190	195	200	
$+2\sigma/\sigma_{SM}$	10.3	10.0	11.6	12.9	14.8	18.1	21.9	24.1	27.2	
$+1\sigma/\sigma_{SM}$	7.35	7.24	8.25	9.13	10.4	12.9	15.4	17.1	19.2	
Median/σ_{SM}	5.25	5.17	5.88	6.53	7.39	9.16	10.9	12.2	13.7	
$-1\sigma/\sigma_{SM}$	3.91	3.92	4.42	4.89	5.53	6.84	8.09	9.05	10.2	
$-2\sigma/\sigma_{SM}$	3.17	3.23	3.60	3.95	4.46	5.49	6.54	7.31	8.23	
Observed/σ_{SM}	5.47	4.80	5.37	6.45	8.90	9.91	11.6	13.7	18.4	

Table: Combined trilepton analysis limits for 5.3fb^{-1} for distinct *NoZPeak*, *InZPeak_NJet1*, and *InZPeak_NJet2orMore* regions. The Z-Peak region is defined by a window $m_Z \pm 15.0\text{GeV}$.

Full Trilepton Limits for Jason's & Geumbong's Combined ($m_Z \pm 15.0$, Unblinded)

