Signal efficiency with recoil cut

recoil>110GeV

decay mode	counts	ZZ cut	WW cut	both cut	recoil cut	(%)
qqH all eLpR	46,339	41,127 88.8%	42,508 91.7%	38,269 82.6%	31,005	66.9% ±0.2%
qqH all eRpL	31,312	27,898 89.1%	28,707 91.7%	25,858 82.6%	20,942	66.9% ±0.3%
H -> bb eLpR	25,713	22,815 88.7%	23,739 92.3%	21,255 82.7%	17,408	67.7% ±0.3%
H -> bb eRpL	17,271	15,314 88.7%	15,917 92.2%	14,249 82.5%	11,672	67.6% ±0.4%
H -> WW eLpR	10,627	9,444 88.9%	9,659 91.0%	8,705 81.9%	7,262	68.3% ±0.5%
H -> WW eRpL	7,220	6,430 89.0%	6,562 90.9%	5,923 82.0%	4,937	68.4% ±0.5%
H -> ZZ eLpR	1,376	1,214 88.2%	1,264 91.9%	1,131 82.2%	939	68.2% ±1.3%
H -> ZZ eRpL	938	824 87.8%	867 92.4%	774 82.5%	643	68.6% ±1.5%
H -> $\tau\tau$ eLpR	172	161 93.6%	161 93.6%	152 88.4%	104	60.5% ±3.7%
H -> $\tau\tau$ eRpL	123	113 91.9%	113 91.9%	106 86.2%	74	60.2% ±4.4%

more detail

recoil>110GeV

decay mode	counts	ZZ cut	WW cut	both cut	recoil cut	(%)
H -> WW eLpR	10,627	9,444 88.9%	9,659 91.0%	8,705 81.9%	7,262	68.3% ±0.5%
H -> WW eRpL	7,220	6,430 89.0%	6,562 90.9%	5,923 82.0%	4,937	68.4% ±0.5%
H->WW->hadronic L	4,888 45.9%	4,304 88.0%	4,568 93.5%	4,054 82.9%	3,243	66.3% ±0.7%
H->WW->hadronic R	3,305 45.8%	2,911 88.1%	3,090 93.5%	2,745 83.1%	2,198	66.5% ±0.8%
H->WW->leptonic L	1,068 10.1%	1,068 100%	1,059 99.2%	1,059 99.2%	980	91.8% ±0.8%
H->WW->leptonic R	750 10.4%	749 99.9%	744 99.2%	744 99.2%	686	91.5% ±1.0%
H->WW->semileptonic	4,671 44.0%	4,073 87.2%	4,032 86.3%	3,592 76.9%	3,040	65.0% ±0.7%
H->WW->semileptonic	3,166 43.8%	2,769 87.5%	2,728 86.2%	2,434 76.9%	2,053	64.8% ±0.8%

Outlook

- look H->ZZ decay as well.
- leptonic mode is not affected by cut at all.
- bb/WW are not consistent within efficiency uncertainty.
  -> should be investigated.
- analyze 2-jets and 3-jets clustering to decide cut box for semi-leptonic ZZ/WW.