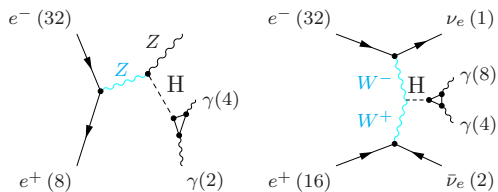


qqH ($H \rightarrow \gamma\gamma$) @250 Gev

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August 1, 2014

$$H \rightarrow \gamma\gamma$$



external Z in the left hand plot decaying to: $Z \rightarrow l^+l^-$, $Z \rightarrow \nu\bar{\nu}$, $Z \rightarrow q\bar{q}$

Expected # events ($Br = 0.00228$)

● $MH=125, \sqrt{s} = 250$: 182 (18 + 44 + 120(*)) (($L=250 \text{ fb}^{-1}$))

(*) Decay Branch being discussed today.

- Got the SM backgrounds (last week just signal and main back).
- Current selection needs to be optimized.
 - Last two cuts do not show impact in the significance.
- Even without optimization it seems integrated lumi. > 250 is necessary.

Preselection

Cut2 : cut2 nPfos > 20

Cut3 : cut3 pt1 + pt2 > 55

Cut4 : cut4 costheta1 < 0.95 & costheta2 < 0.95

Cut5 : cut5 e1 + e2 > 125

Cut6 : cut6 $40 < e1 < 100$ & $40 < e2 < 100$

Cut7 : cut7 $-0.95 < \cos(1,2) < -0.58$

Cut8 : cut8 missE < 30

Cut9 : cut9 missEt < 20

Cut10 : cut10 pt(H) > 30

- Old cut table was wrong in the SM backgrounds.
- Signal and main background was not affected by such bug.
- Cuts are the same but i have modified the preselection.

Old VS NEW Cut table

Process:	signal	qqaa
Cross Section:	0.47	266.16
Expected:	118.65	6.65e+04
Generated:	7.95e+04	6.13e+06
Presel.:	107.08	3.37e+04
Cut2:	107.08	3.37e+04
Cut3:	107.08	3.37e+04
Cut4:	98.01	1.27e+04
Cut5:	96.04	1.10e+04
Cut6:	89.47	7034.55
Cut7:	83.37	4289.65
Cut8:	79.24	4102.62
Cut9:	77.18	4033.10
Cut10:	66.07	3150.90

Process:	signal	qqaa	2f	4f	aa_2f	1f_3f	Signf
Cross Section:	0.47	266.17	1.19e+05	4.09e+04	6.61e+05	1.22e+06	-
Expected:	118.65	6.65e+04	2.96e+07	1.02e+07	1.65e+08	3.04e+08	-
Generated:	7.95e+04	6.14e+06	9.45e+06	1.09e+07	1.65e+07	3.40e+07	-
Presel.:	108.23	4.65e+04	9.52e+05	4.45e+04	1.14e+04	4.35e+05	0.09
Cut2:	108.19	4.64e+04	2.33e+05	3.13e+04	2047.67	3.62e+04	0.18
Cut3:	104.35	1.86e+04	1.10e+05	2.18e+04	1.00	444.23	0.27
Cut4:	97.87	1.18e+04	8.58e+04	1.94e+04	1.00	260.46	0.29
Cut5:	95.95	1.04e+04	7.66e+04	1.25e+04	1.00	221.56	0.30
Cut6:	89.02	6815.49	3.11e+04	1.09e+04	1.00	174.26	0.40
Cut7:	82.96	4133.44	1.30e+04	7350.22	0	39.10	0.53
Cut8:	79.86	3953.33	1.09e+04	3909.29	0	10.31	0.58
Cut9:	77.56	3856.39	1.08e+04	3583.12	0	10.31	0.57
Cut10:	66.52	2989.11	7860.12	2159.28	0	6.75	0.58