Report for H->ll

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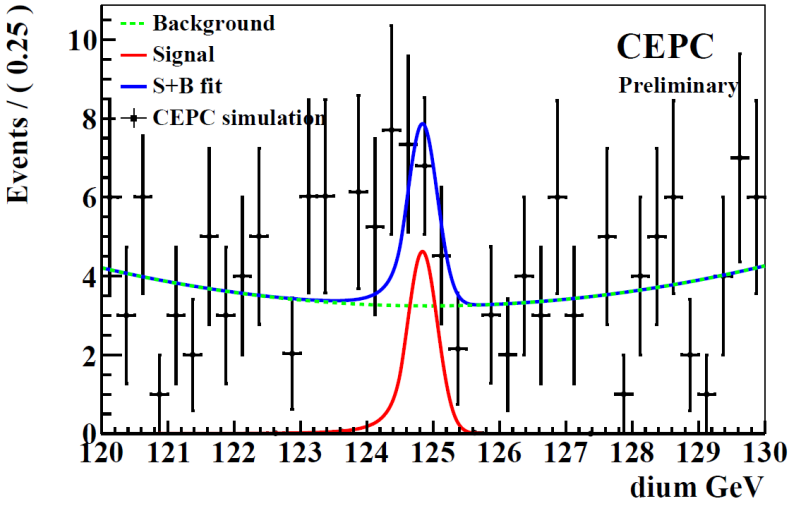
ZvvHuu

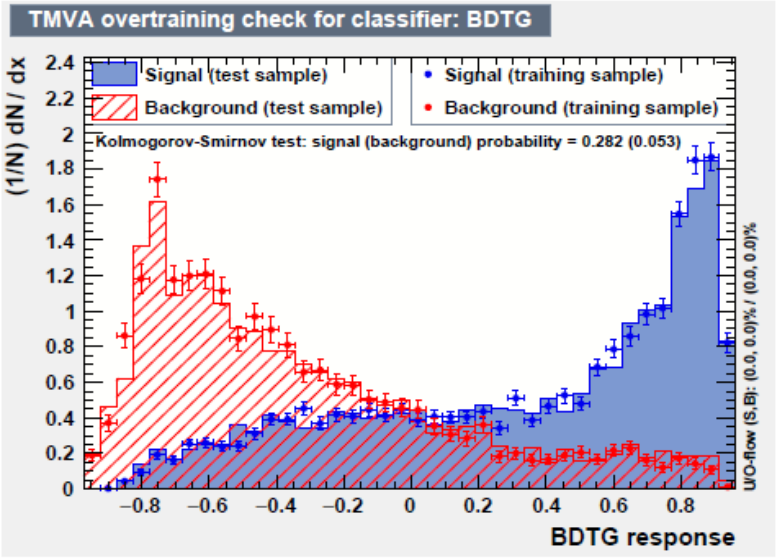
Category	signal	ZZ	WW(SW)	ZZorWW	SingleZ	2f
Preselection	41.7	34901	121952	489686	25619	1635887
$120<M_{\mu^+\mu^-}<130$	38.4	382	16677	56029	315	49490
MET>8.5	37.9	291	16264	53740	305	8600
$90.8<M_{recoil_\mu}<93.4$	24.0	96	834	2034	79	184
$\cos\theta_{Z\mu^+}<0.999$	24.0	96	833	2034	79	126
$\cos\theta_{Z\mu^-}<0.999$	24.0	96	833	2034	79	57
$cos\theta_{\mu^+}>0$	12.0	33	28	108	25	10
$cos\theta_{\mu^-}<0$	9.1	22	11	86	17	9
efficiency	21.8%					

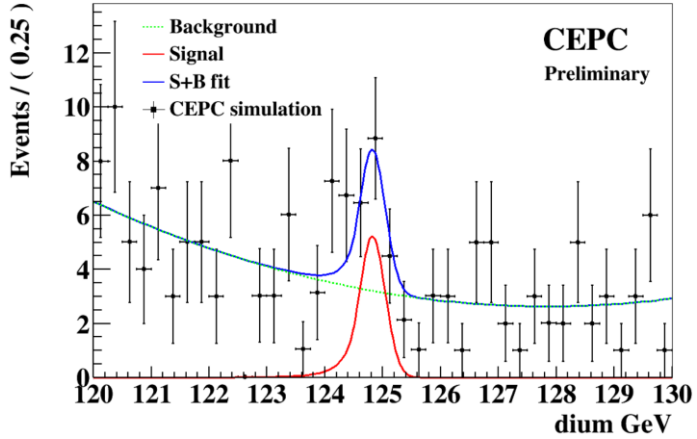
e3e3



Significance =2.56

$\cos\theta_{Z\mu^+}$,$\cos\theta_{Z\mu^-}$, $cos\theta_{\mu^+}$, $cos\theta_{\mu^-}$,MET,MEZ

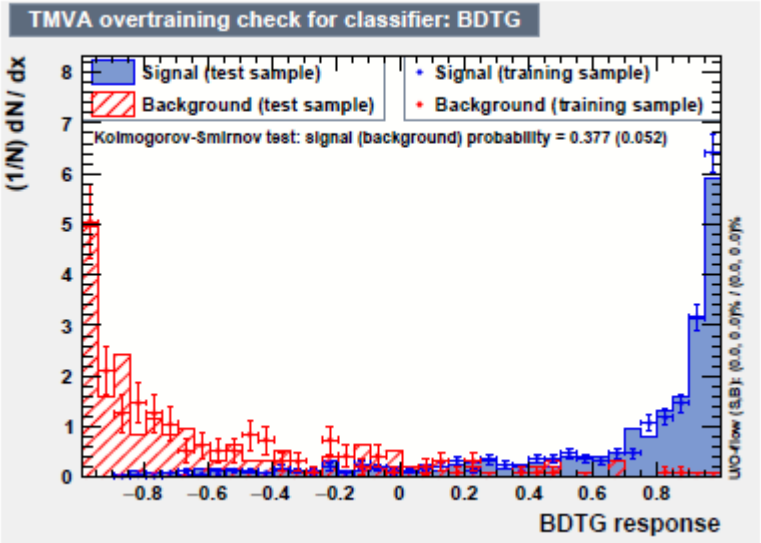




Significance = 2.91

ZeeHuu

After the requirement $M_{\mu^+\mu^-}$ within [120-130] GeV, $M_{\mu^+\mu^-}$, M_{recoil_μ}, $E_{\mu^+\mu^-}$, M_{recoil_e}, $M_{e^+e^-}$, $cos_{\mu^+\mu^-}$, $P_{T_{\mu^+\mu^-}}$, $P_{Z_{\mu^+\mu^-}}$, cos_{μ^-} and cos_{μ^+} are used by BDTG



We can get the kinematic limit of signal by analyzing Z-u-u system （Conservation of energy）

Cos_u_u<-0.603
Pt<62.5
E_u_u<140

Because the kinematic limit is the unique characteristics of signal, the cut-count should add the limit.

M_recoil_e<150 M_recoil_all>137

Category	signal	ZZ	WW(SW)	ZZorWW	SingleZ	2f
Preselection	4.7	18	0	9	22672	8.0
$120<M_{\mu^+\mu^-}<130$	4.3	0	0	0	747	0.0
$90.5<M_{recoil_\mu}<92.5$	2.5	0	0	0	34	0.0
$cos_{\mu^+\mu^-}<-0.603$	2.5	0	0	0	33	0.0
$P_{T_{\mu^+\mu^-}}<62.5$	2.5	0	0	0	31	0.0
$138.5<E_{\mu^+\mu^-}<139.7$	2.2	0	0	0	8	0.0
efficiency	46.8%		Significance=0.74			

Response>0.5

Significance=1.5

ZuuHuu

$$\delta = (\frac{pair1.M}{\Delta Z})^2 + (\frac{pair2.M}{\Delta H})^2$$

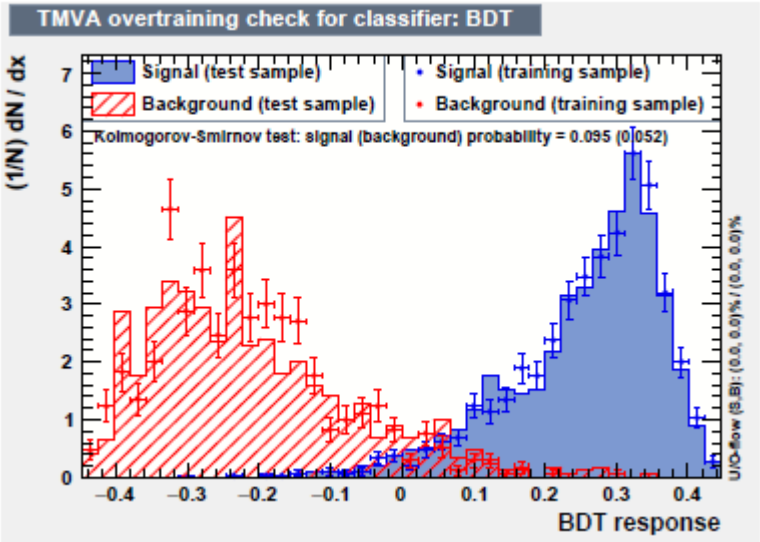
ΔH \ ΔZ	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
0.5	12	10	7	6	6	5	5	5	5	6	6	8	9	8	8
0.6	13	12	11	9	7	5	5	5	5	5	5	5	6	6	8
0.7	13	12	12	11	10	7	6	5	5	5	5	5	5	5	6
0.8	13	13	12	12	11	10	8	7	5	6	5	5	5	5	5
0.9	14	13	13	12	12	12	10	9	7	6	5	6	5	5	5
1	14	14	13	13	12	12	12	10	10	7	7	6	5	6	5
1.1	15	14	13	13	13	12	12	12	11	10	8	7	6	5	6
1.2	17	14	14	13	13	13	12	12	12	11	10	9	7	7	6
1.3	17	15	14	14	13	13	12	12	12	12	11	10	9	7	7
1.4	17	16	14	14	13	13	13	12	12	12	12	11	10	10	8

Delta_Z=1.5 , Delta_H =0.75

Category	signal	ZZ	WW(SW)	ZZorWW	SingleZ	2f
Preselection	6.6	17631.0	0	0	0	0.0
120<$E_{\mu^+\mu^-}$<130	6.0	1685.2	0	0	0	0.0
90.6< M_{recoil_μ} <93.4	3.9	128.8	0	0	0	0.0
90.2<$M_{\mu^+\mu^-}$(Z)<92.8	3.2	58.1	0	0	0	0.0
$cos_{\mu^+\mu^-}$(H)<-0.603	3.2	50.0	0	0	0	0.0
$cos_{\mu^+\mu^-}$(Z)<-0.364	3.2	47.0	0	0	0	0.0
138.0<$E_{\mu^+\mu^-}$(H)<139.8	3.0	15.5	0	0	0	0.0
$P_{T_{\mu^+\mu^-}}$(H)<62.5	3.0	14.7	0	0	0	0.0
efficiency	45.5%					

Significance=1.2

After the requirement $M_{\mu^+\mu^-}$ within [120-130] GeV, $M_{\mu^+\mu^-}(H)$, $M_{recoil_\mu}(H)$,$M_{\mu^+\mu^-}(Z)$, $M_{recoil_\mu}(Z)$, $E_{\mu^+\mu^-}(H)$, $cos_{\mu^+\mu^-}$ are used by BDT method. The significance is 1.5σ



Cos_u_u<-0.603
Pt<62.5
138<E_u_u<140

Response>0.2

Significance=1.5