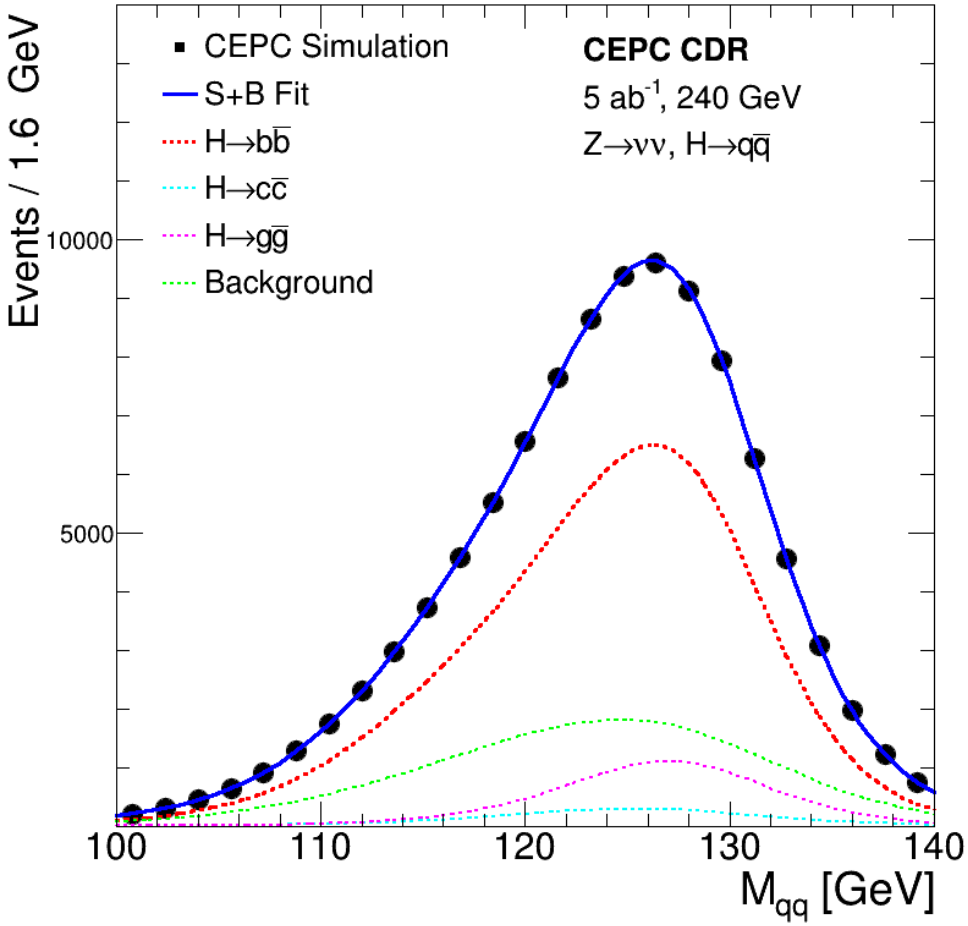
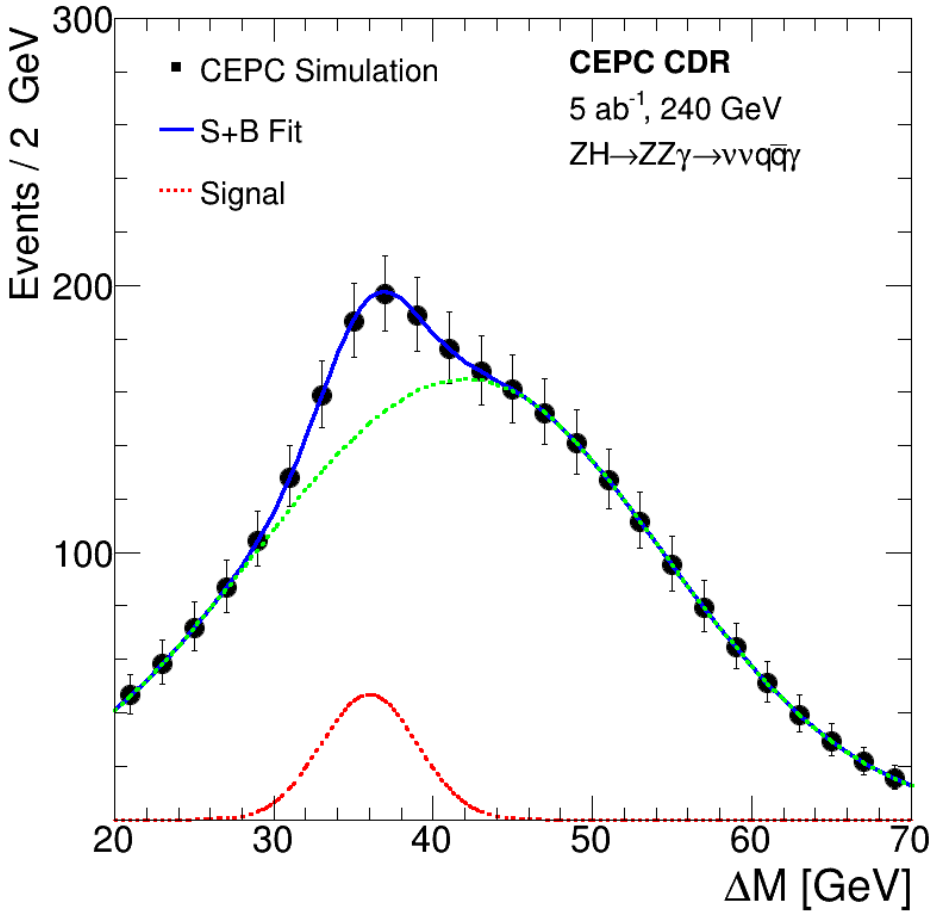
Weekly

Kaili

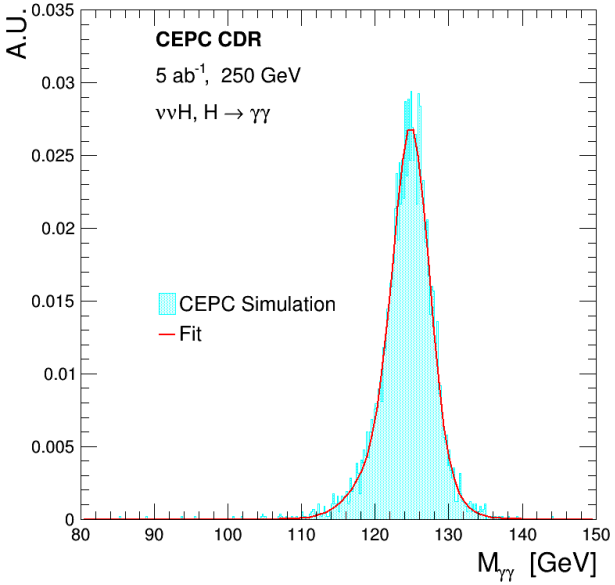
2018.08.02

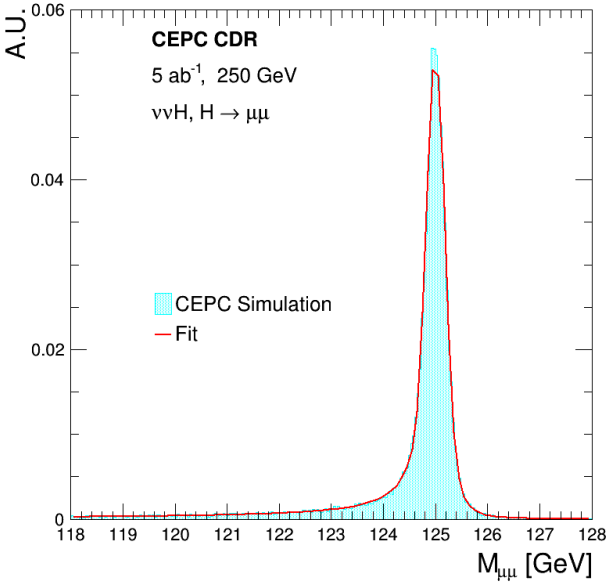
X axis legend

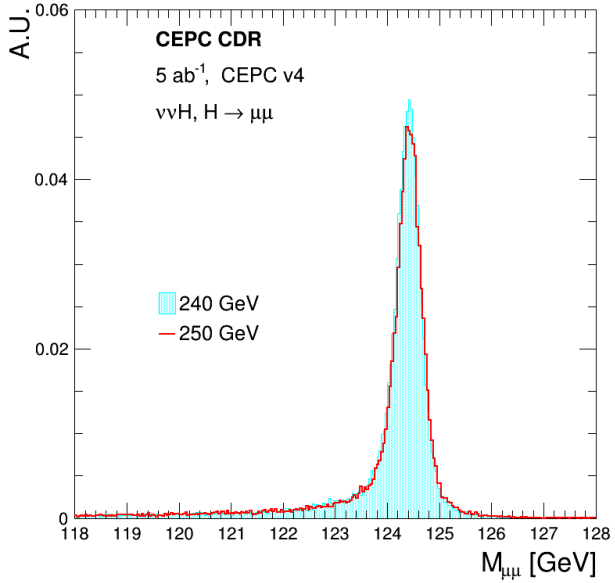


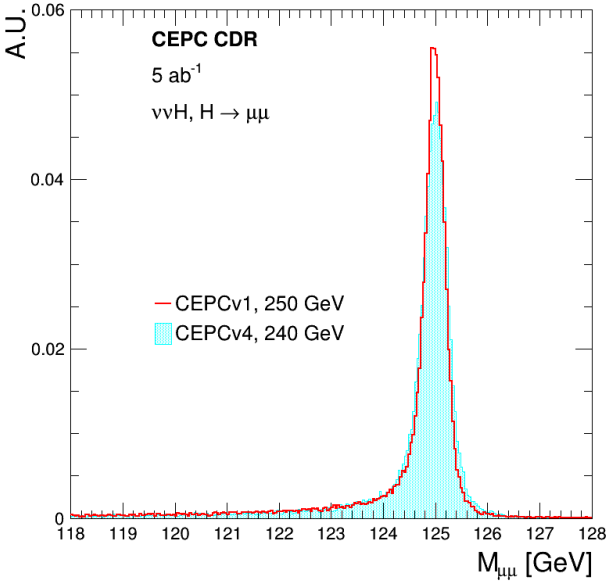


Zhaohang's plot



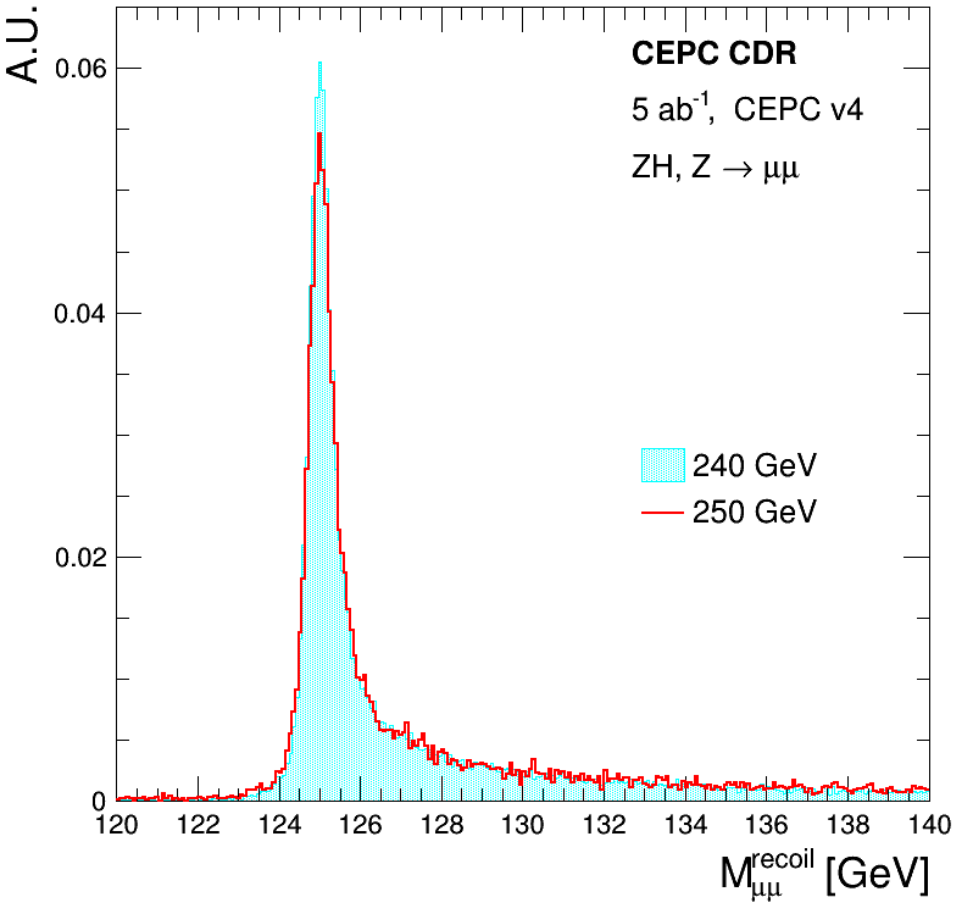


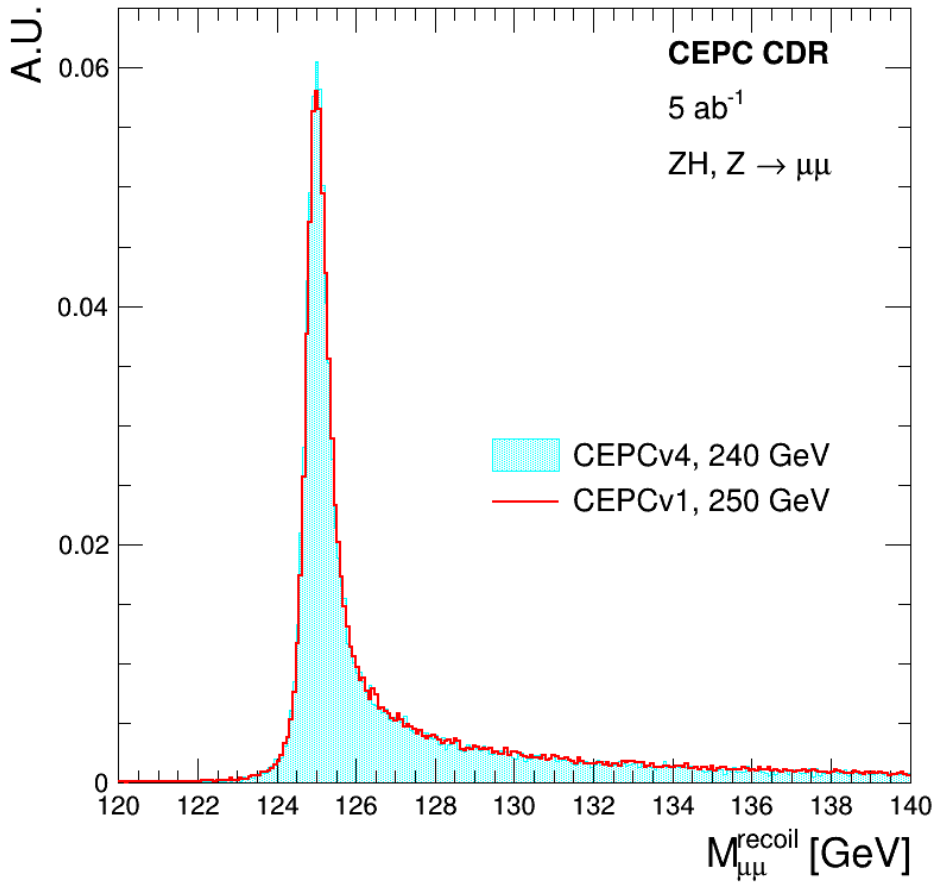




Zhaohang's plot

Fig 4,7 already updated in white paper.
5,6 wait for the origin source code;



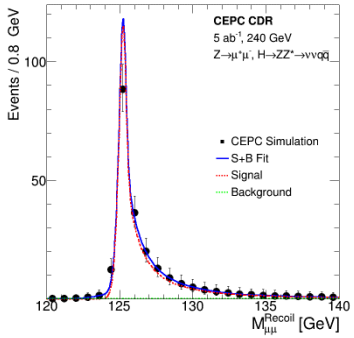


Xsec for 240GeV

Background processes, cross section in pb		
$e^+e^- \to e^+e^-$ (Bhabha)	25.1	1.3×10^8
$e^+e^- \to q\bar{q}\,(\gamma)$	50.2	2.5×10^8
$e^+e^- \to \mu^+\mu^-\,(\gamma)$ [or $\tau^+\tau^-\,(\gamma)$]	4.40	2.2×10^7
$e^+e^- \to WW$	15.4	7.7×10^7
$e^+e^- \to ZZ$	1.03	5.2×10^6
$e^+e^- \to e^+e^-Z$	4.73	2.4×10^7
$e^+e^- \to e^+\nu W^-/e^-\bar{\nu}W^+$	5.14	2.6×10^7

- Xsec calculation for single Z, W with problem
  - Previous result was summed by individual channels (incomplete)
  - Gang suggests to remove these 2 columns temporally
  - Would bring back further;

Issues



- H->ZZ
  - Shi Xin and Shih-Chieh may want to replace the old result
  - Under further checking;
  - Would have much worse result for H->ZZ. 5%->6, 7%?

- Br result
  - in hand: Xsec*Br and Xsec; to get Br;
  - currently no good way to make clear the correlation
  - So use $\sqrt{0.29^2 + 0.5^2}$? bb is the most affected channel;

- Plots update
  - I would update those plots to both white paper and CDR git.

Fit Result (2018.07.23)

	250GeV	240GeV
$\sigma(ZH)$	0.50%	0.50%
$\sigma(ZH) * Br(H \to bb)$	0.28%	0.29%
$\sigma(ZH) * Br(H \to cc)$	3.27%	3.42%
$\sigma(ZH) * Br(H \to gg)$	1.28%	1.34%
$\sigma(ZH) * Br(\mathrm{H} \to WW)$	1.00%	1.04%
$\sigma(ZH) * Br(H \to ZZ)$	5.12%	5.21%
$\sigma(ZH) * Br(H \to \tau\tau)$	0.83%	0.87%
$\sigma(ZH) * Br(H \to \gamma\gamma)$	6.62%	7.25%
$\sigma(ZH) * Br(H \to \mu\mu)$	15.9%	16.8%
$\sigma(\mathrm{vv}H) * Br(H \to \mathrm{bb})$	3.01%	3.16%
$Br_{\mathrm{upper}}(H \to inv.)$	0.42%	0.44%
$\sigma(ZH) * Br(H \to Z\gamma)$	19.41%	21.71%

10κ	**240GeV**	Pre_CDR
κ_b	**1.6%**	1.3%
κ_c	**2.3%**	1.7%
κ_g	**1.7%**	1.5%
κ_γ	**4.0%**	4.7%
κ_τ	**1.6%**	1.4%
κ_Z	**0.25%**	0.26%
κ_W	**1.5%**	1.2%
κ_μ	**8.6%**	8.6%
Br_{inv}	**0.33%**	0.28%
Γ_H	**3.3%**	2.8%

7κ	**240GeV**	Pre_CDR
κ_b	**1.6%**	1.3%
κ_c	**2.3%**	1.7%
κ_g	**1.7%**	1.5%
κ_γ	**3.9%**	4.7%
κ_l	**1.5%**	1.4%
κ_Z	**0.16%**	0.26%
κ_W	**1.4%**	1.2%

backup

b/c/g

Signal		250	240
Z	H		
H->qq			
ee	bb	1.30%	1.35%
	cc	11.78%	12.35%
	gg	6.17%	6.51%
μμ	bb	1.00%	1.03%
	cc	9.44%	9.77%
	gg	4.90%	5.08%
qq	bb	0.47%	0.49%
	cc	11.19%	12.45%
	gg	3.65%	3.94%
vv	bb	0.40%	0.41%
	cc	3.84%	4.10%
	gg	1.49%	1.61%
vvH(WW fusion)			
vvH	bb	3.01%	3.16%
zh	bb	0.32%	0.32%
ZH			
Z	bb	0.28%	0.29%
	cc	3.27%	3.45%
	gg	1.28%	1.37%

WW/ZZ

Signal		250	240
Z	H		
H->WW			
ee	lvlv	9.36%	9.79%
	evqq	4.57%	4.77%
	μvqq	3.95%	4.10%
μμ	lvlv	7.35%	7.54%
	evqq	4.01%	4.07%
	μvqq	3.97%	4.07%
vv	qqqq	1.98%	2.09%
	evqq	4.68%	4.88%
	μvqq	4.18%	4.35%
	lvlv	11.30%	11.60%
qq	qqqq	1.84%	1.93%
H->ZZ			
vv	μμqq	7.96%	8.21%
vv	eeqq	39.50%	42.19%
μμ	vvqq	7.38%	7.56%
ZH			
Z	WW	1.00%	1.04%
	ZZ	5.12%	5.21%

Others

Signal		250	240
Z	H		
H->Invisible			
qq	ZZ(vvvv)	220.00%	245.00%
ee		325.00%	388.00%
μμ		229.00%	257.00%
Tot		150.24%	161.61%
H→γγ			
μμ+ττ	γγ	37.79%	41.13%
vv		9.86%	10.47%
qq		9.30%	10.39%
Tot		6.66%	7.38%
H→μμ			
qq	μμ	17.75%	18.70%
ee		61.38%	64.71%
μμ		86.10%	90.74%
vv		53.32%	56.93%
Tot		15.90%	16.84%
H→ττ			
ee	ττ	2.73%	2.86%
μμ		2.67%	2.74%
qq		0.98%	1.02%
vv		2.65%	2.81%
Tot		0.83%	0.87%