

Update for Combination Measurement of CEPC

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IHEP

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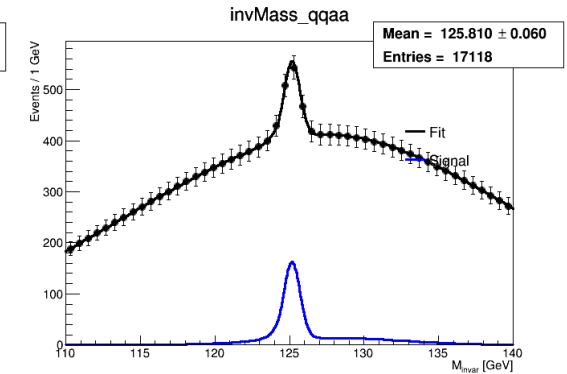
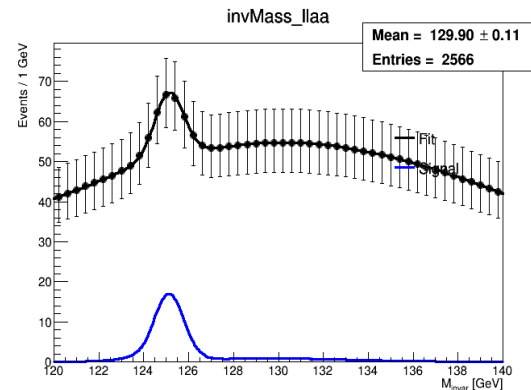
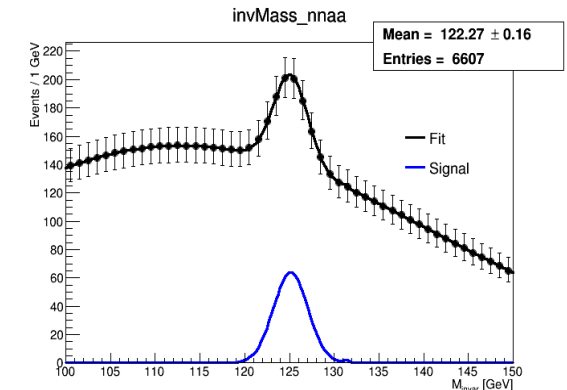
Subchannels Table

Signal		abbr.	Who takes charge	Status	Signal		abbr.	Who takes charge	Update date
Z	H				Z	H			
ee	bb	eebb	ZhenXing	With data in March; Considering Algorithm method.	vv	ZZ(llyj)	vvzz	Yuqian	Data in June, need rescale
	cc	eecc			$\mu\mu$	ZZ(vvj)	$\mu\mu$ ZZ		
	gg	eegg			ee	ZZ(vvj)	eeZZ		
$\mu\mu$	bb	mmbb			$\mu\mu$	WW($\mu\nu\mu\nu$)		Libo	Data in July, need rescale
	cc	mmcc				WW(evev)			
	gg	mmgg				WW(e $\nu\mu\nu$)			
qq	bb	qqbb	Bai Yu		ee	WW($\mu\nu\mu\nu$)		Libo	Undergoing
	cc	qqcc				WW(evev)			
	gg	qqgg				WW(e $\nu\mu\nu$)			
ll	yy	llaa	Feng	New man takes in charge now;	vv	WW(lvqq)		Xianke	\
vv		nnaa			$\mu\mu$	$\tau\tau$	$\mu\mu\tau\tau$	Dan	Need bkg
qq		qqaa				Dilepton		Lei, Cui	Undergoing

Signal events check

For lumi 5000fb, 10^6 ZH total

H	Z	Ntuple	CDR estimates	Theory estimates (before cut)	H br	Z br
$\gamma\gamma$	$\ell\ell$	90	98	164.0774	0.23%	6.73%
	$\nu\nu$	328	339	487.6	0.23%	20%
	qq	630	582	1706.6	0.23%	70%



entries are S+B

Signal events check

H	Z	Ntuple	Theory (before cut)
bb	ee	10853	20586
cc		319	961
gg		1176	3062
bb	$\mu\mu$	10773	20586
cc		283	961
gg		1815	3062
bb	qq	148749	428876
cc		3887	20034
gg		25564	63812
$\gamma\gamma$	ll	90	164.0774
	$\nu\nu$	328	487.6
	qq	630	1706.6
ZZ(lljj)	$\nu\nu$	1408	742
WW($\mu\nu\mu\nu$)	$\mu\mu$	52	76.8
WW(e ν e ν)		36	76.8
WW(e $\nu\mu\nu$)		105	153.6
$\tau\tau$	$\mu\mu$	1397	2257

Theoretic number
calculated by
 $1.06e5(5000\text{fb}) \cdot \text{Br}$
Which recorded in
PDG or Pre_CDR.

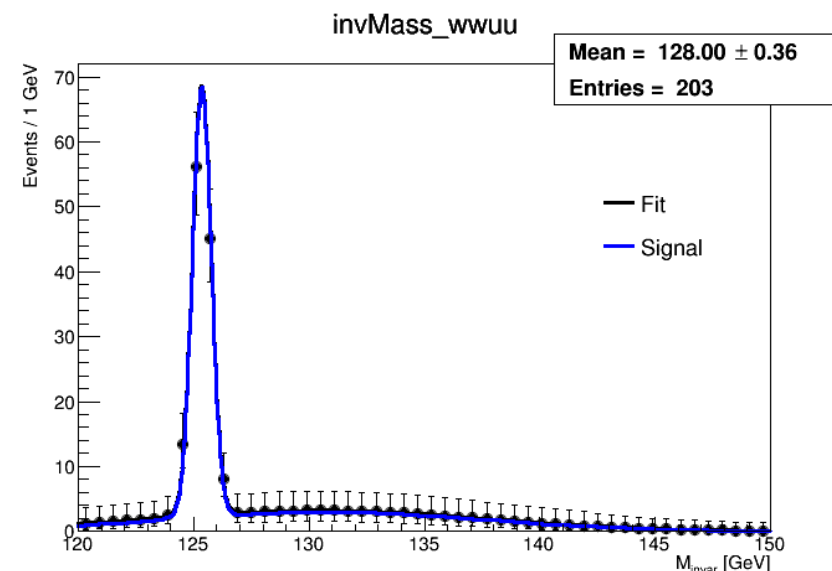
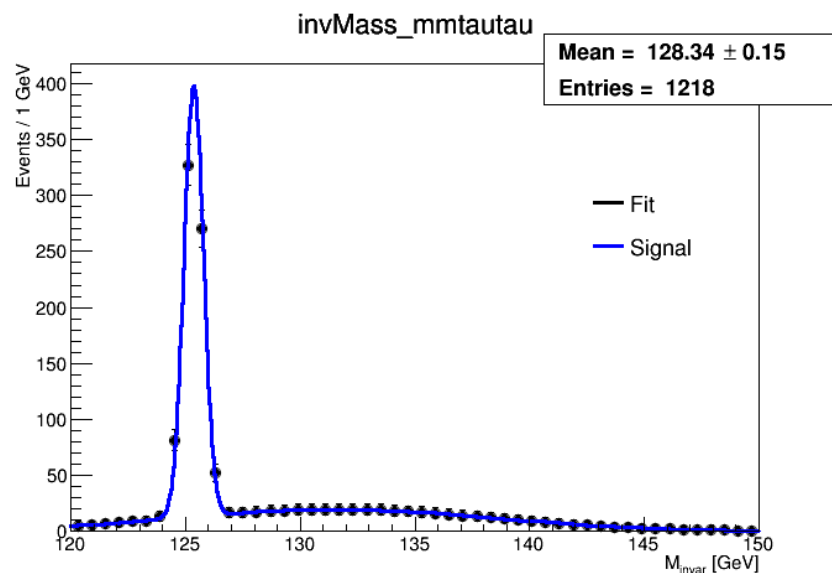
My calculation could be
0.07%, Pre_CDR says
0.05%.
still lower than real value.
According to Yuqian, this
channel is 2.5 times
(12500fb)
So could be 563.2 – 742.

New data plot (Unfinished)

Z- $\rightarrow \mu\mu$, H- $\rightarrow \tau\tau$

Currently no bkg;

Z- $\rightarrow \mu\mu$, H- $\rightarrow WW(\text{even}, \mu\nu\mu\nu)$



Stats low so combined WW channel;
Bkg low, 52+6, 36+4, 105+0
Need more toys to rebuild

Current Fit result

Sys uncertainty set to 0;
For 5000ifb;

Now:

Fit type	μ	μ_{bb}	μ_{cc}	μ_{gg}	μ_{zz}	μ_{aa}	μ_{tt}	μ_{ww}
Global	0.241%							
Sub channel		0.248%	3.042%	1.242%	6.452%	7.458%	2.865%	1.115%

Unfinished.....

Jin's:

Fit type	μ	μ_{bb}	μ_{cc}	μ_{gg}	μ_{zz}	μ_{aa}	μ_{tt}	μ_{ww}
Global	0.242%							
Sub channel		0.248%	3.041%	1.242%	6.450%	7.459%	\	\

Pre_CDR expected: (Calculated by simple counting)

Fit type	μ	μ_{bb}	μ_{cc}	μ_{gg}	μ_{zz}	μ_{aa}	μ_{tt}	μ_{ww}	invisible
Global	0.28%								
Sub channel		0.28%	2.2%	1.6%	6.9%	9.0%	17%	4.9% (lvlv+lvqq)	0.28%

Discussion

- Currently some channels unfinished, we got $\frac{0.28-0.241}{0.28} = 14\%$ better result, only by changing counting to fitting.
- Future can do better, with sys uncertainties or flavor tagging.
- Maybe wait to August to scale MC;
- For flavor tagging, under discussion;
 - Difficult to directly get correlation matrix;
 - Viewing their code, trying to solve

Coupling constant

- Yuqian unavialable