Update for Combination Measurement of CEPC

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Outline

- Sorry for the terrible report last week

- Current data update
- Peskin's Package

- To do

Data from each subchannel

Signal		abbr.	Who takes charge	Update date
Z	H			
ee	bb	eebb	ZhenXing	2016.4
	cc	eecc		
	gg	eegg		
μμ	bb	mmbb		
	cc	mmcc		
	gg	mmgg		
qq	bb	qqbb	Bai Yu	2016.7
	cc	qqcc		
	gg	qqgg		
ll	γγ	llaa	Wang Feng	2015.11
vv		nnaa		
qq		qqaa		
vv	ZZ	vvzz	Yuqian	2016.7
μμ	ττ	mmtt	Yu Dan	2016.7
vv	WW	vvWW	Libo	2016.7

Data from each subchannel

- Got source code from Dan and Yuqian to create histogram myself

- After discussion they agree to directly create for me
  - Need signal & bkg ntuple, after cut, scaled.
  - Currently need H_InvMass
  - For CrossX, need recoil Mass in channels like mmtt, vvzz.
  - Further: Br in each channel for coupling

- Currently, NP not considering.

Coupling constants fits

- Got package from Nikolaos, sorry for misrecognition;

- To fit 7,8, or 10 Higgs coupling parameters, need input:
  - Initial value by theory
  - Br、errors、limits for each channel/subchannel
    - addsigma(ZZ,1.0, 0.026)
    - addsigmaBR(ZZ,bb,1.0,0.012);
    - addsigmaBR(ZZ,invis,0.0, errorest(Zhinvis3002,Zhtheory/2.0));
    - addlimit(ZZ,invis, 0.009);
  - Other Constraits
    - Like: ratios of BR, like $\frac{Br_{h\to\gamma\gamma}}{Br_{h\to ZZ}}$ can largely improve κ_γ;
    - addBRratio(gamgam,ZZ, 1.0, 0.036);

Coupling constants fits

Results Like:

```
1 sigma conf. interval for
   g(h->WW)          ( -0.0369 , 0.0541 )   mean = 0.00872398
   g(h->ZZ)          ( -0.006 , 0.0094 )    mean = 0.00174603
   g(h->b bbar)      ( -0.0284 , 0.0615 )   mean = 0.0162411
   g(h->gg)          ( -0.0449 , 0.0741 )   mean = 0.0140886
   g(h->gam gam)     ( -0.0161 , 0.023 )    mean = 0.00326983
   g(h->tau tau)     ( -0.034 , 0.0664 )    mean = 0.0157645
   g(h->c cbar)      ( -0.0484 , 0.0767 )   mean = 0.01366
   g(h->t tbar)      ( -0.4449 , 1.9447 )   mean = 0.749837
   BR(h->invis)      ( 0 , 0.0054 )
   BR(h->other)      ( 0 , 0.0053 )
sigmas from confidence intervals:
  W     :  0.0455
  Z     :  0.0077
  b     :  0.04495
  g     :  0.0595
  gam   :  0.01955
  tau   :  0.0502
  c     :  0.06255
  t     :  1.1948
  invis :  0.0054
  other :  0.0053
Mean and SD of all deviations
g(h-> WW)     0.00872398 pm 0.0453094
g(h-> ZZ)     0.00174603 pm 0.00765412
g(h-> bb)     0.0162411 pm 0.0448736
g(h-> gg)     0.0140886 pm 0.0595057
g(h-> gam gam) 0.00326983 pm 0.0195681
g(h-> tau tau) 0.0157645 pm 0.0500164
g(h-> cc)     0.01366 pm 0.0624593
g(h-> tt)     0.749837 pm 1.01036
g(h-> mu mu)  0 pm 0
g(h-> Z gam )  0 pm 0
BR(h-> invis)  0.0042263 pm 0.00318456
BR(h-> other)  0.00422218 pm 0.00318248
Gamma_T     1.03868 pm 0.0869639
```

Current Plan

- Manqi suggests me to study a minimal case in ZZ, ττ channel
  - Get κ_Z、 κ_τ、 Γ
- For other br needed, discuss later;
- Continue study corrlated physics concepts