LHT status report

7.16 physics meeting

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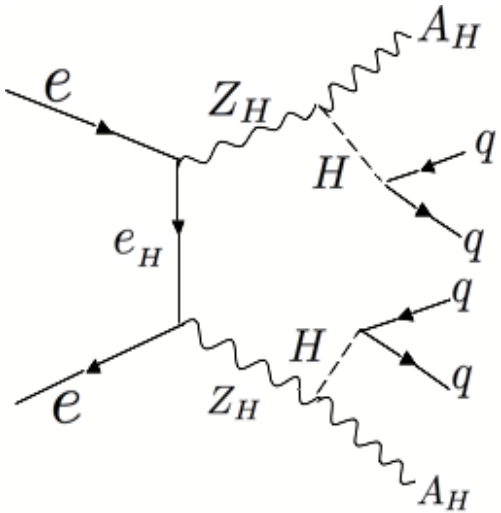
Simulation environment

Signal

- e^+e^- -> Z_H Z_H (99.52fb)



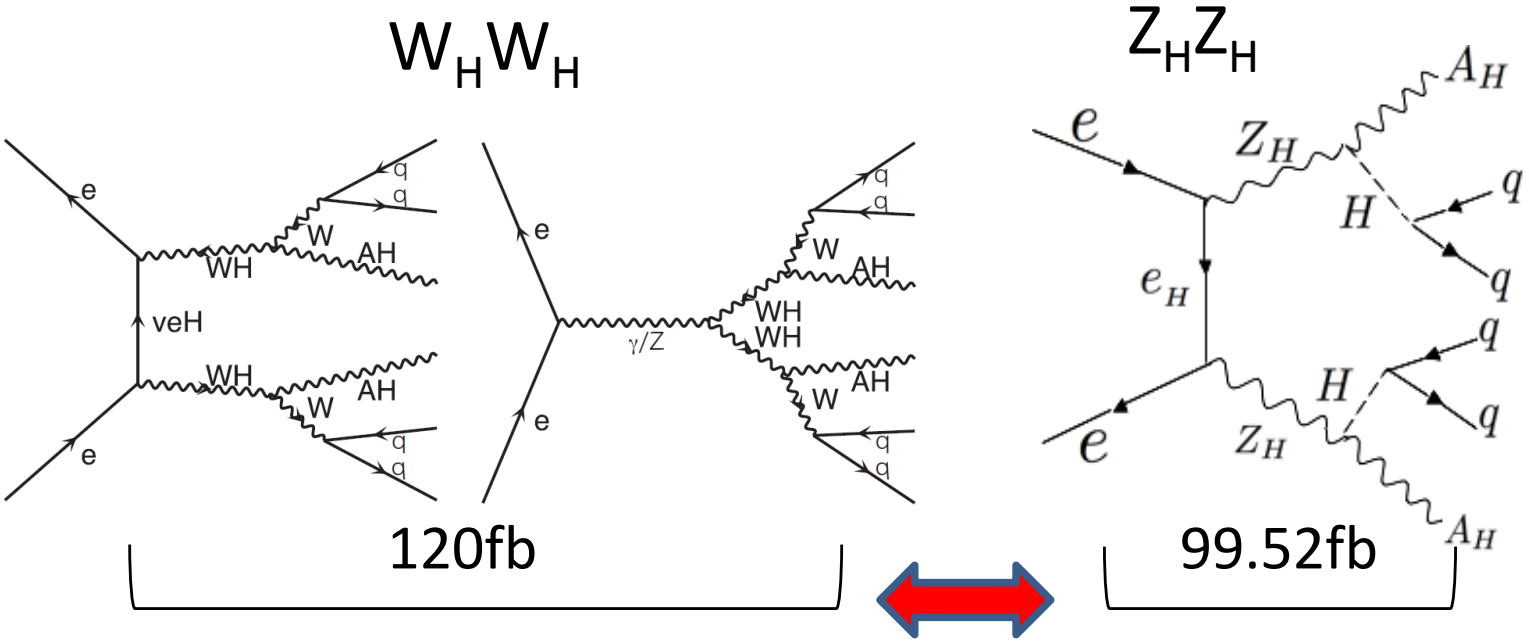
Background

- e^+e^- ->WW (3069fb)
- e^+e^- ->tt (192.9fb)
- e^+e^- ->WWZ (63.86fb)
- e^+e^- -> vvWW (14.67fb)

√s = 1 TeV
Luminosity=500 fb^{-1}
No beam polarization
Higgs mass=134GeV

Simultaneous fitting

- Using the fact that A_H mass can be obtained both from W_HW_H&Z_HZ_H , I performed simultaneous fit.
  - Sasakisan's W_HW_H analysis was used

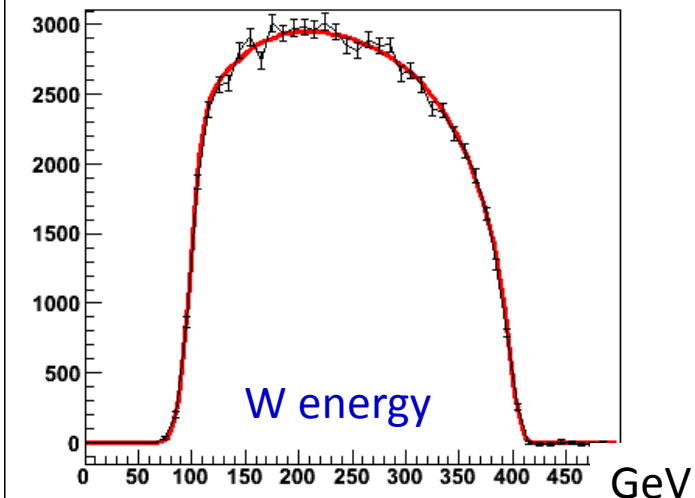


simultaneous mass fitting

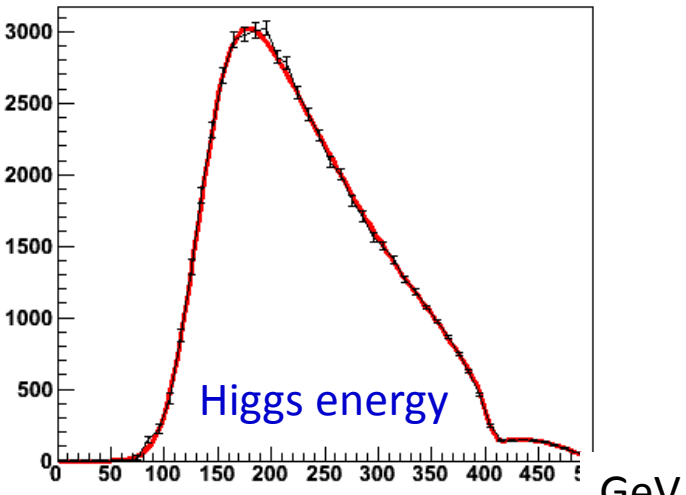
Used fitting function:

- $W_H W_H$: 1 error function+6th polynomial (fluctuating Signal)
  2 edges and normalization are free
- $Z_H Z_H$: 2 error functions+6th polynomial (fluctuating SG+BG)
  2 edges and 2 normalizations are free
- Both distributions are well fit.

$W_H W_H$



$Z_H Z_H$

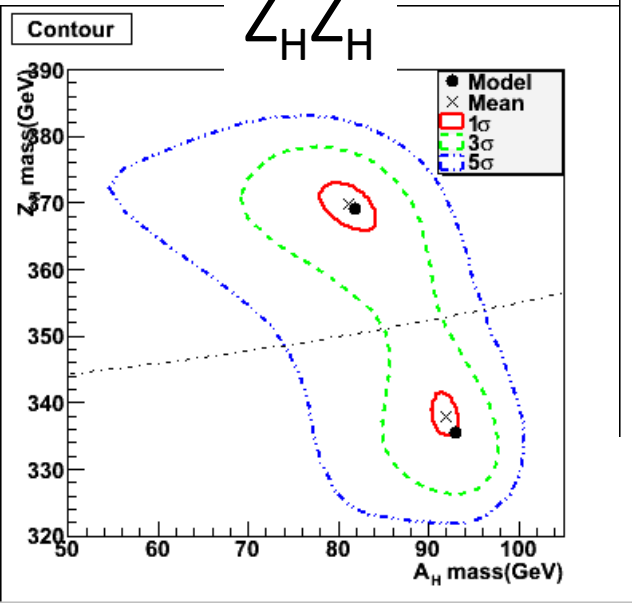


Counter plot using simultaneous fit

- Using the fact that A_H mass can be obtained both from $W_H W_H$&$Z_H Z_H$, I performed simultaneous fit.
- Both A_H mass & Z_H mass resolution improved.

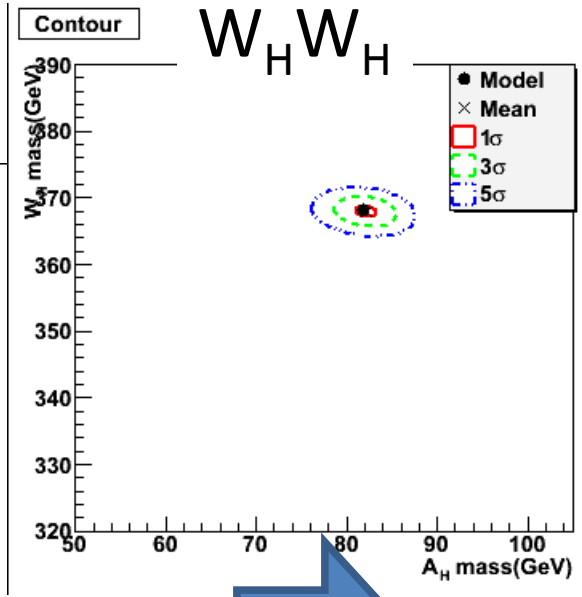
Before

$Z_H Z_H$



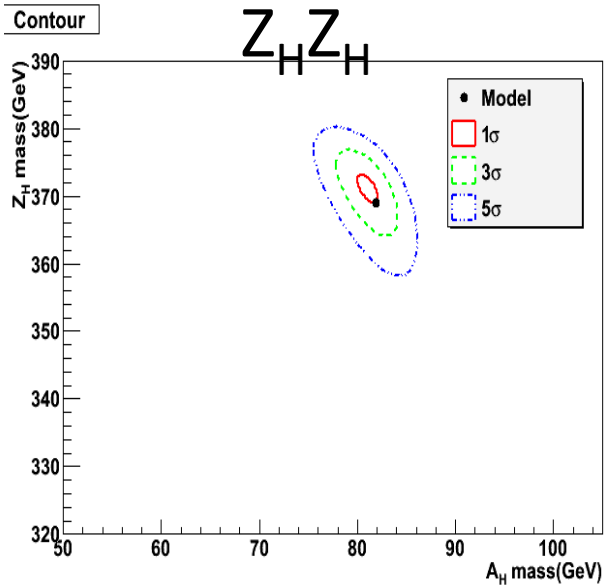
Before

$W_H W_H$



After

$Z_H Z_H$

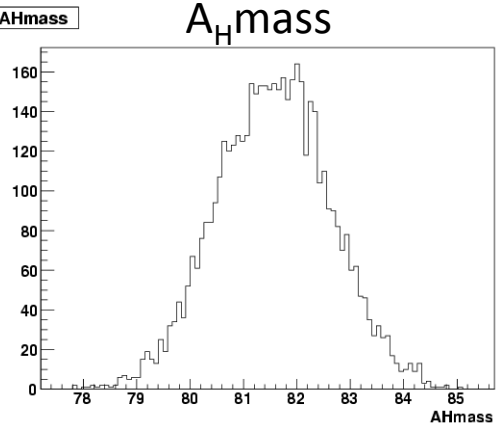


Result of simultaneous fit

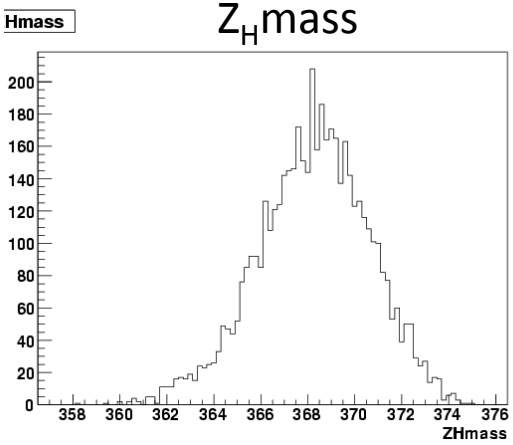
Performed the following process 5000 times:

- fluctuate the normalization by a Gaussian with standard deviation the magnitude of statistical error
- fit and find mass

$A_H$mass



$Z_H$mass



$A_H$mass=81.56±1.06 GeV
$Z_H$mass=368.2±2.4 GeV
$W_H$mass=368.1±0.7 GeV
True A_H :81.9 Z_H :369 W_H:368

Mass resolution	A_H (before)	A_H (after)	W_H/Z_H (before)	W_H/Z_H (after)
W_HW_H	1.4% →	1.3%	0.23% →	0.20%
Z_HZ_H	4.2% →	1.3%	1.3% →	0.56%