

# Alternative background reconstruct for SMH associated process by W boson.

July 25, 2012@FNAL practice

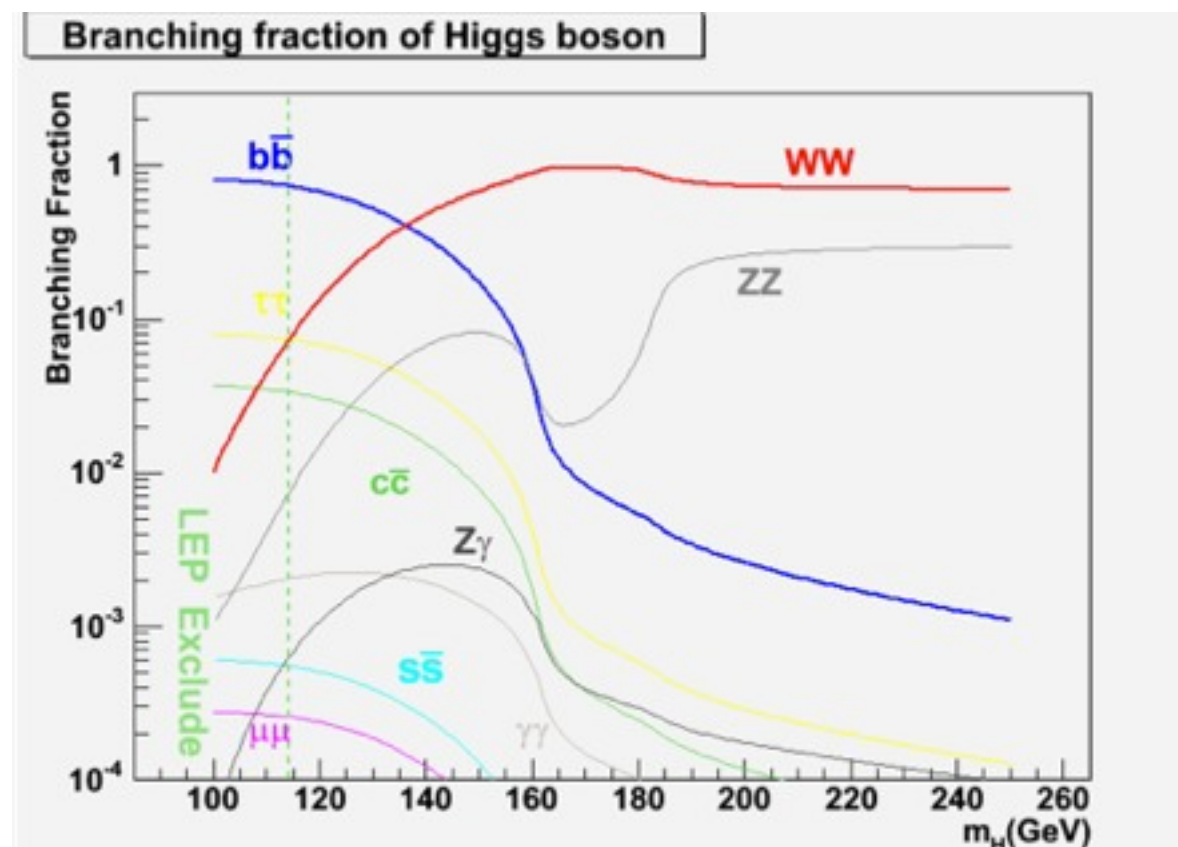
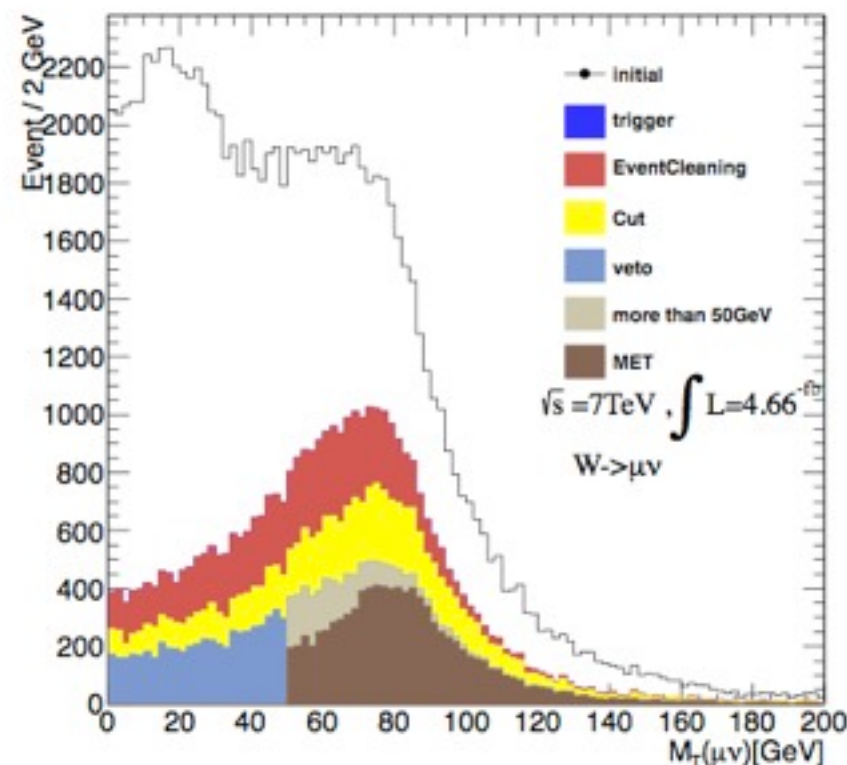
Takaki, Ishibashi

# in this talk

- Introduction
- motivation
- MC data, analysis flowchart
- MadGraph
- Summary & Plan

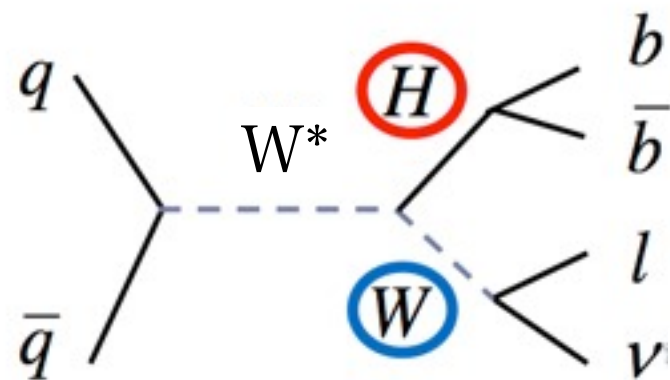
# introduction

- in low mass Higgs(110~150GeV), Higgs to  $b\bar{b}$  mode decay is **ascendancy**.
- If W has decayed to  $l\nu$ . Higgs search in the event that WH associated production is therefore **effective**.

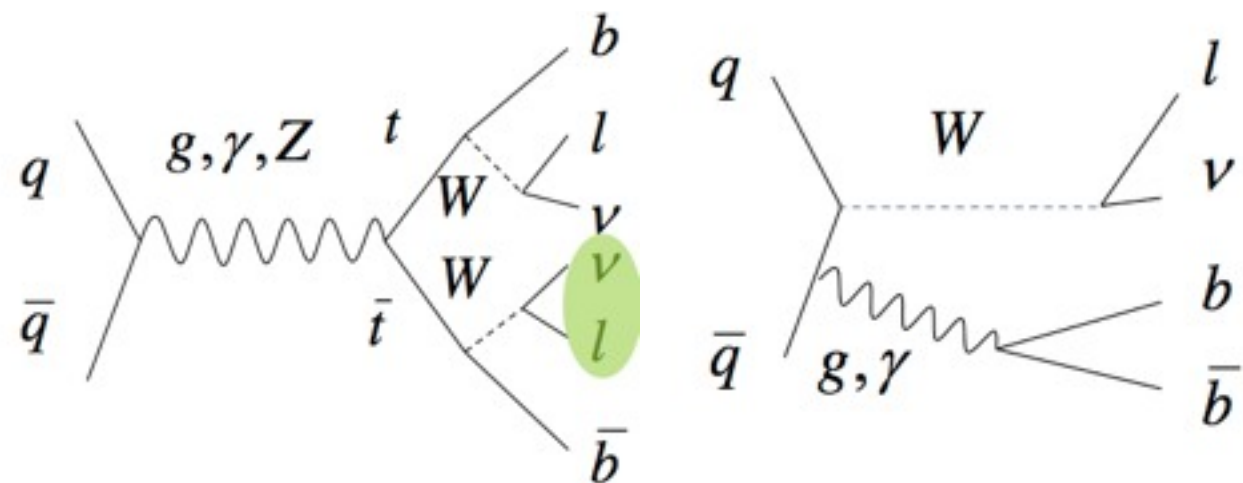


# motivation

signal :  $WH \rightarrow l\nu b\bar{b}$



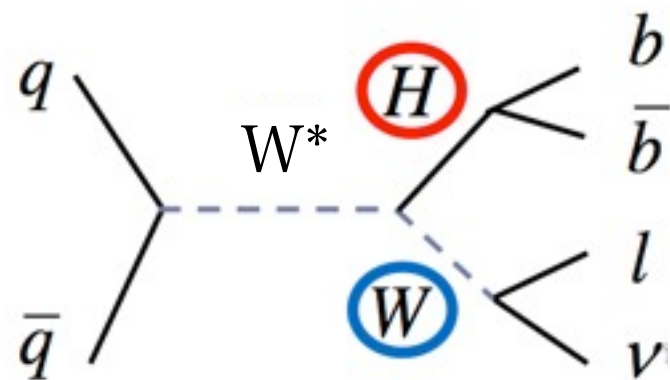
main B.G. :  $t\bar{t}$ ,  $wbb$



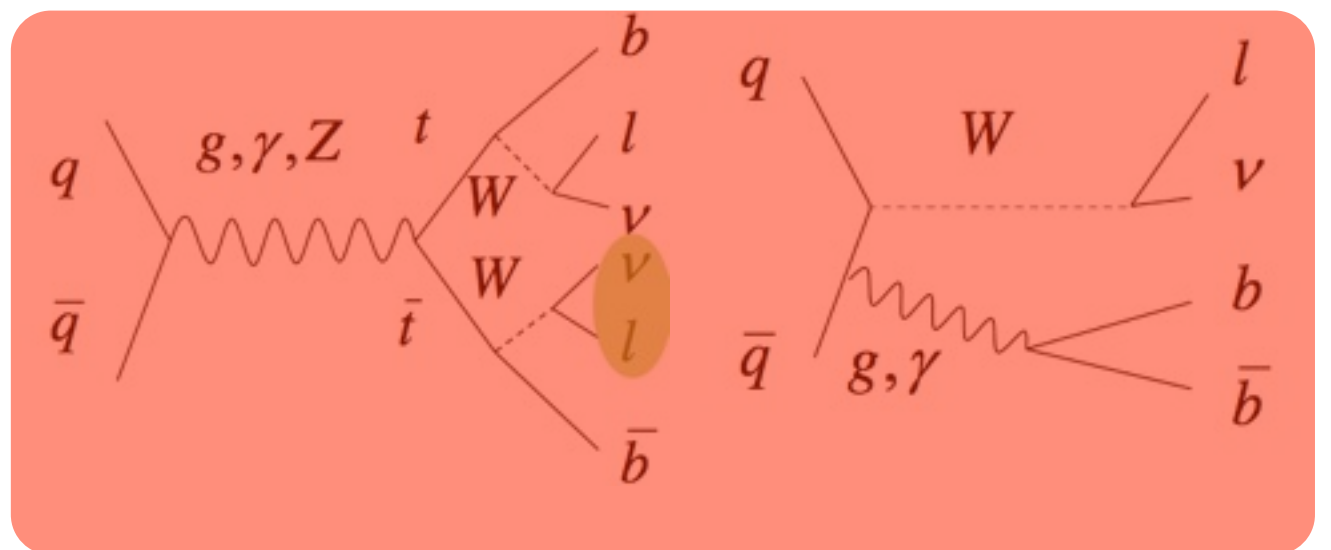
- Suppressing  $t\bar{t}$  B.G., want to get rid of  $W+bb$  B.G.

# motivation

signal :  $WH \rightarrow l\nu b\bar{b}$



main B.G. :  $t\bar{t}$ ,  $wbb$



- Suppressing  $t\bar{t}$  B.G., want to get rid of  $W+b\bar{b}$  B.G.
- using top Matrix Element(M.E.)

# driven MC data, analysis flowchart

- I used some the MC samples as preliminary analysis

- sample state

- signal(**120GeV**)

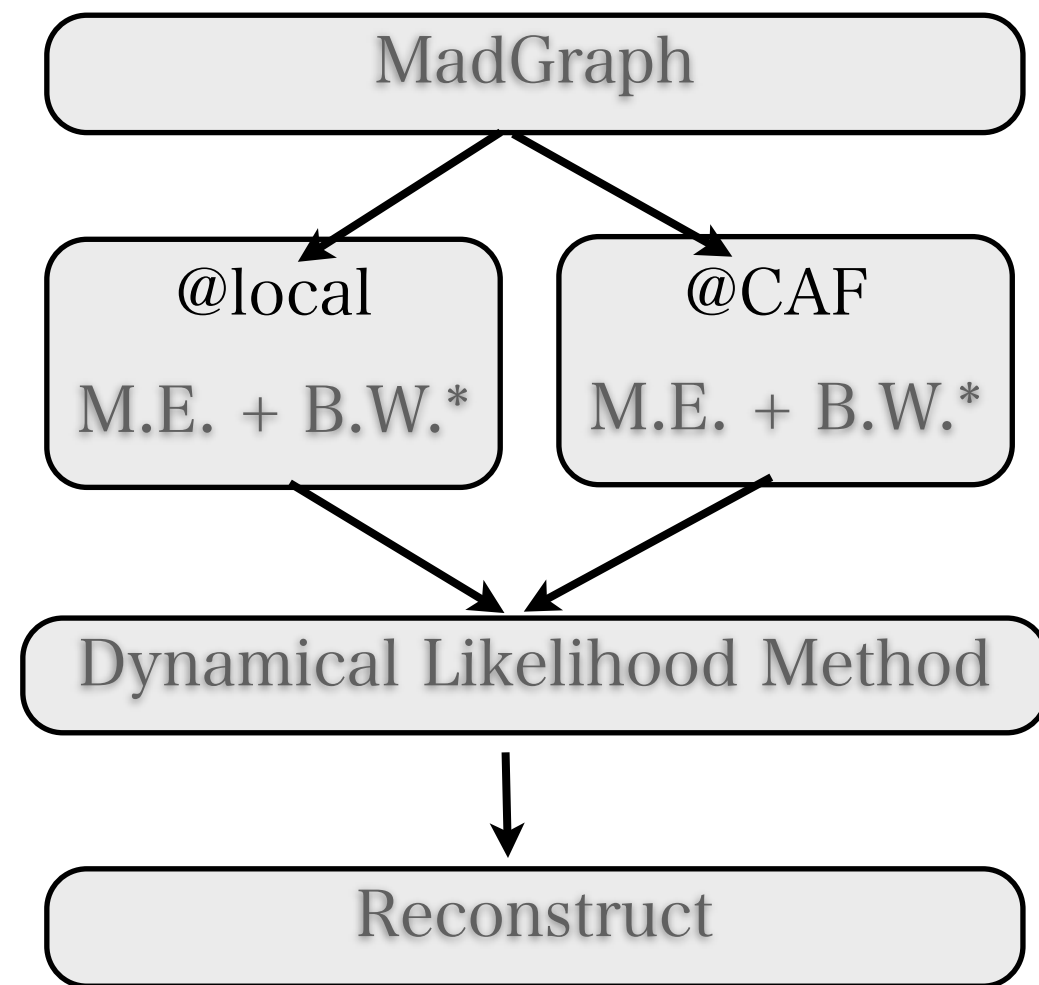
- $W^{*-} \rightarrow WH \rightarrow l\nu b\bar{b}$

- BG process

- $t\bar{t}$ bar, single top, wbb

- $W \rightarrow e\nu/\mu\nu$

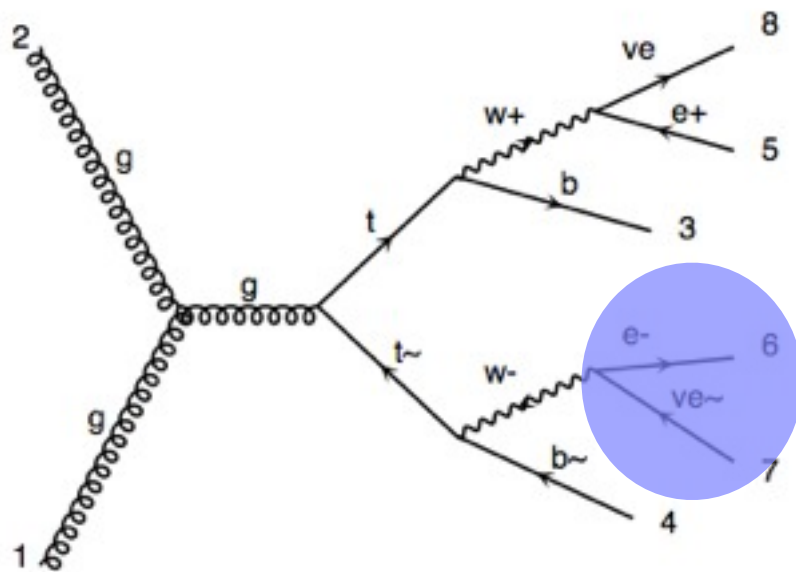
- used MC :  
chgt1c(signal),  
stop00(single top),  
ttop75( $t\bar{t}$ bar),  
btop0w,btop5w(Wbb)



\*Brieg Wigner

# MadGraph

**I** High Energy Physics  
Illinois



- input momentum

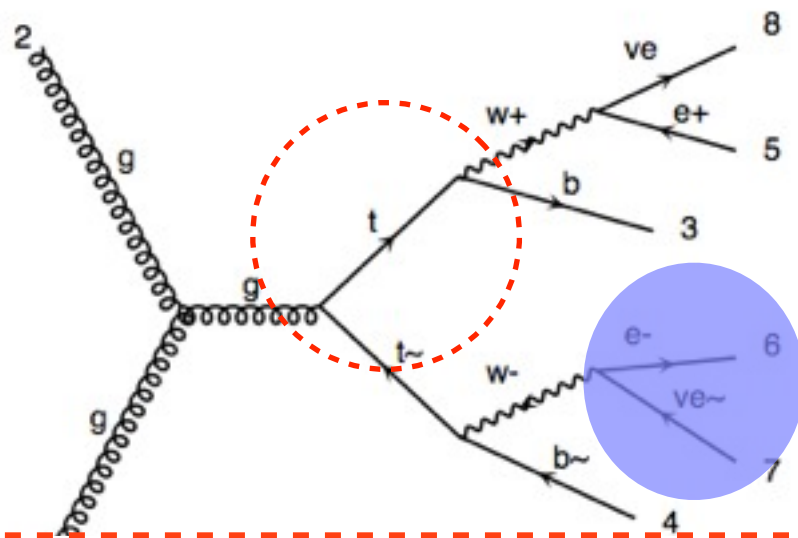
$$P_{\text{top}} = P_b + P_{\text{lep}} + P_{\text{nu}}$$

fig : was calculated to MadGraph

- The whole top decay process has not been calculated.
- Part of top decay process was calculated.

# MadGraph

**I** High Energy Physics  
Illinois



- input momentum

$$P_{\text{top}} = P_b + P_{\text{lep}} + P_{\text{nu}}$$

fig : was calculated to MadGraph

M.E.+Breig Wigner

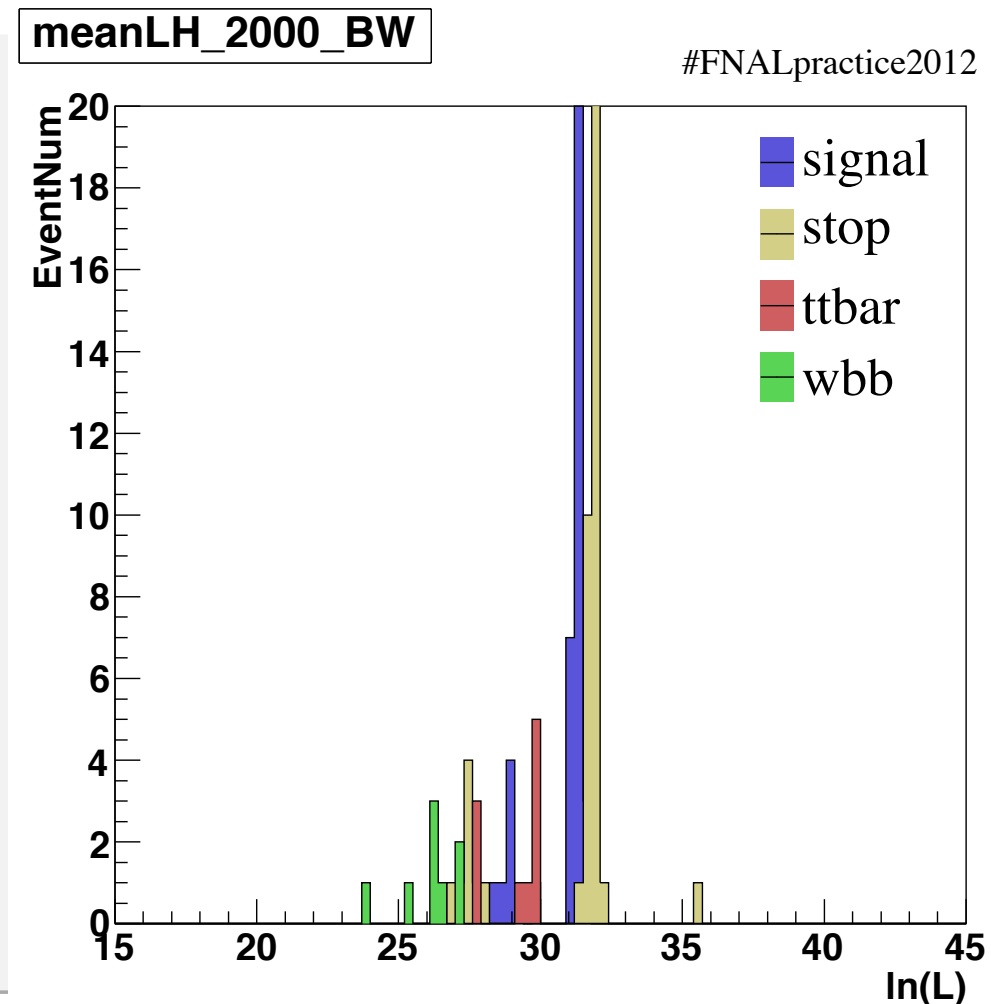
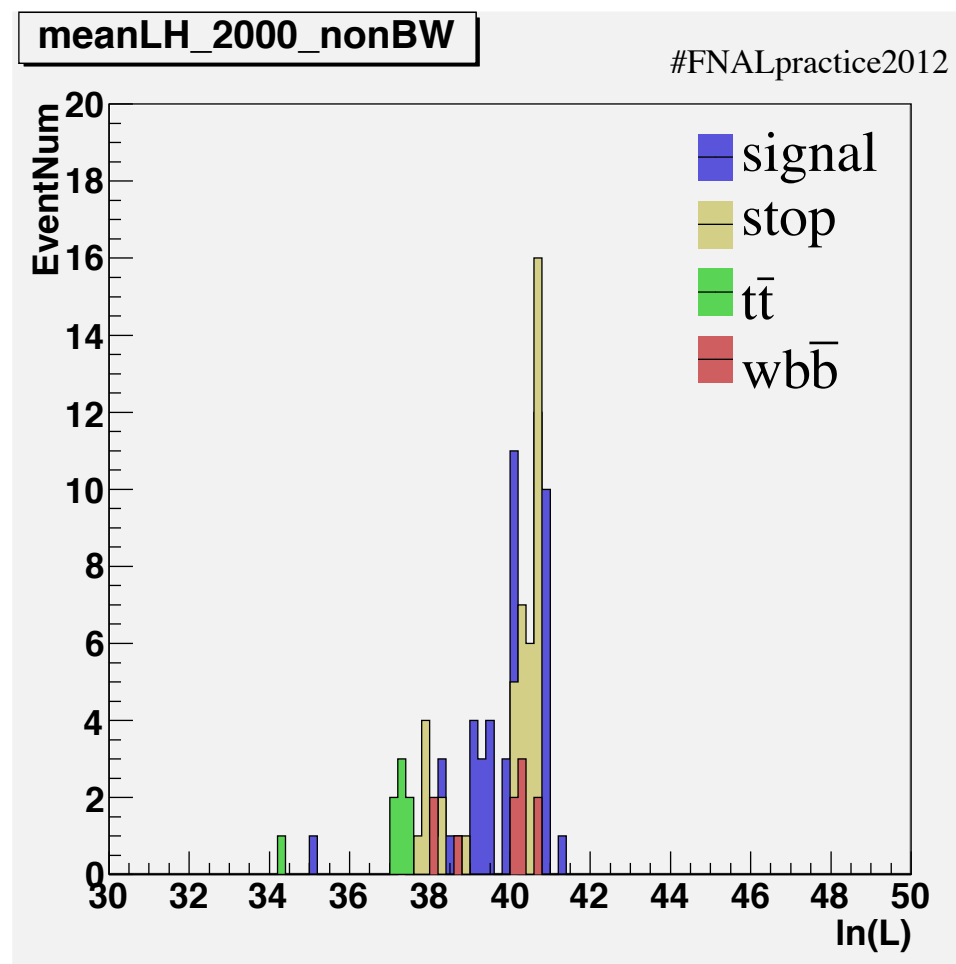
calculated.

- Part of top decay process was calculated.

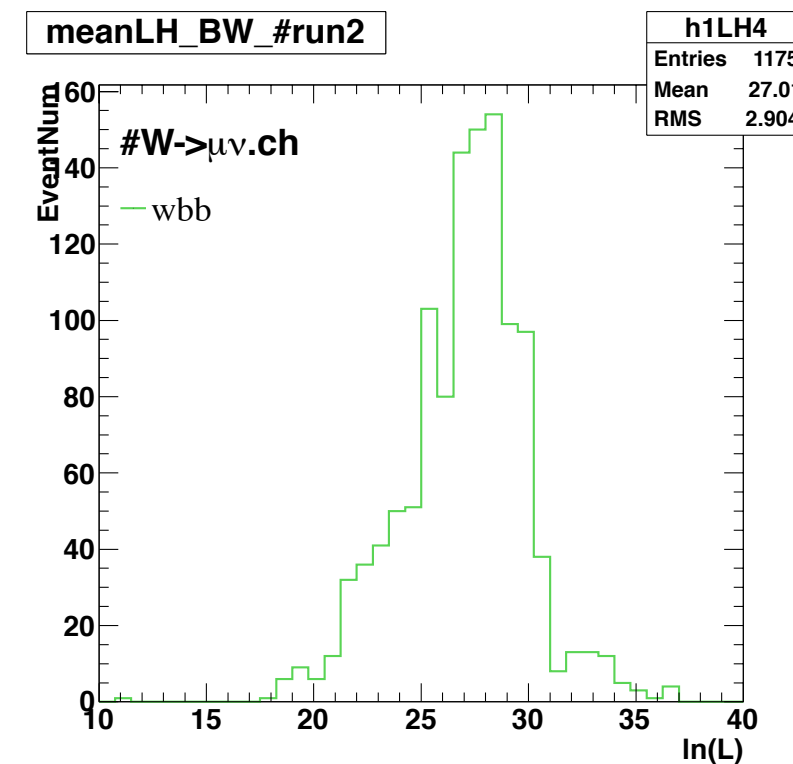
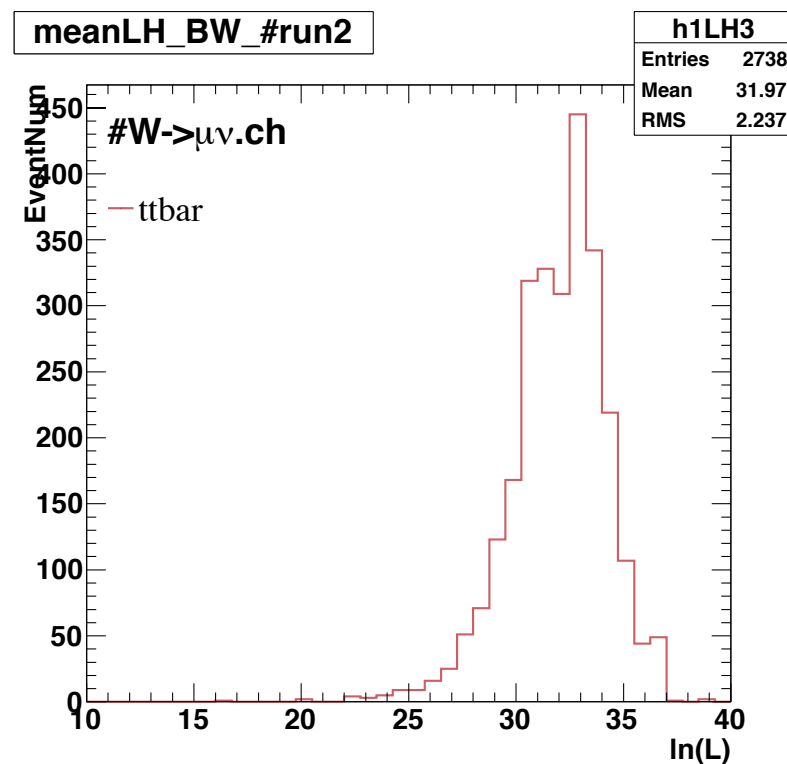
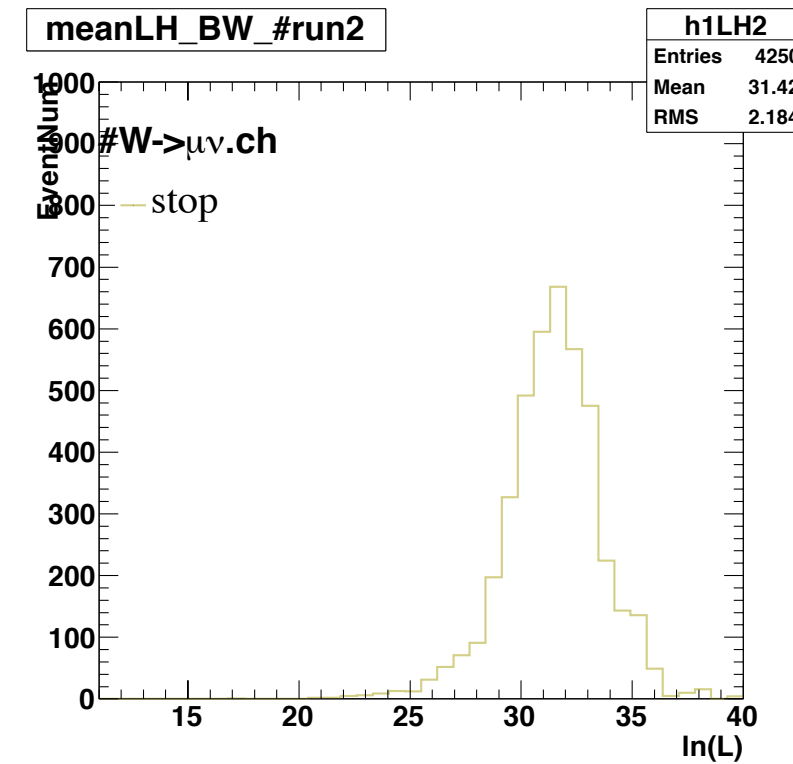
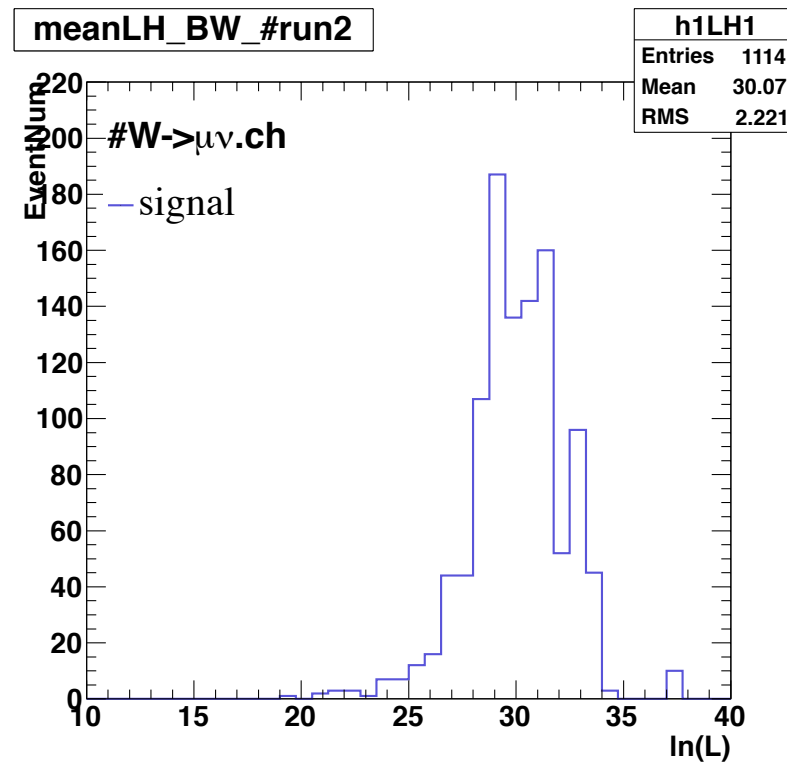


# maenLH non-B.W./B.W @local

- The reconstituted particles put B.W., more feature of top.

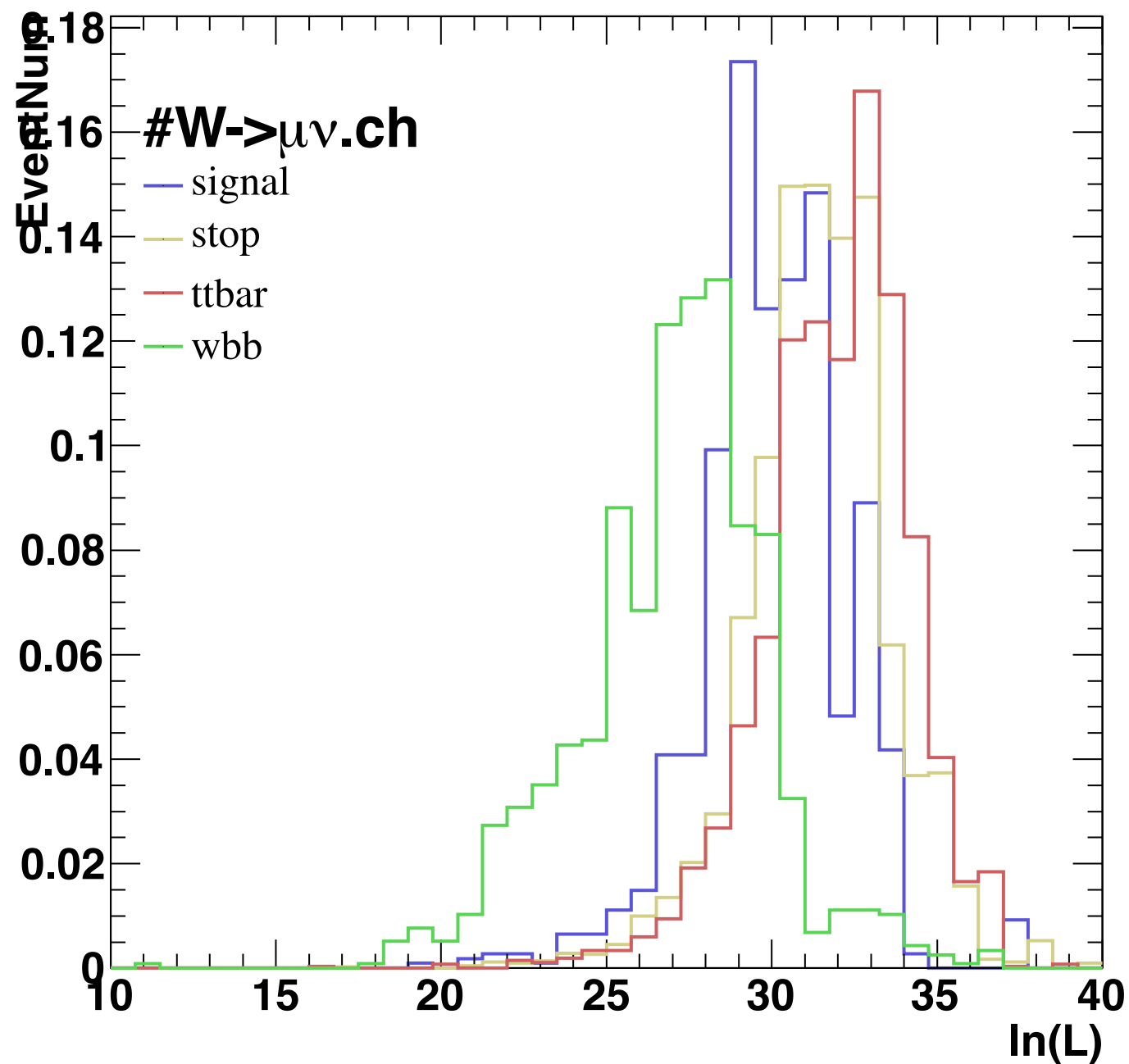


# Result #meanLH dis. select $\mu$ @CAF

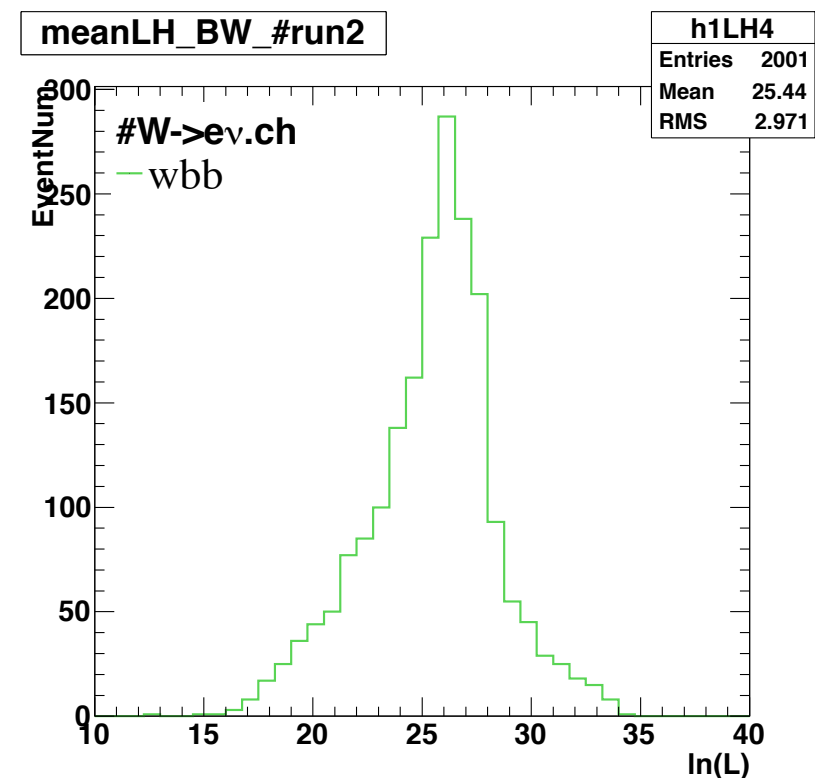
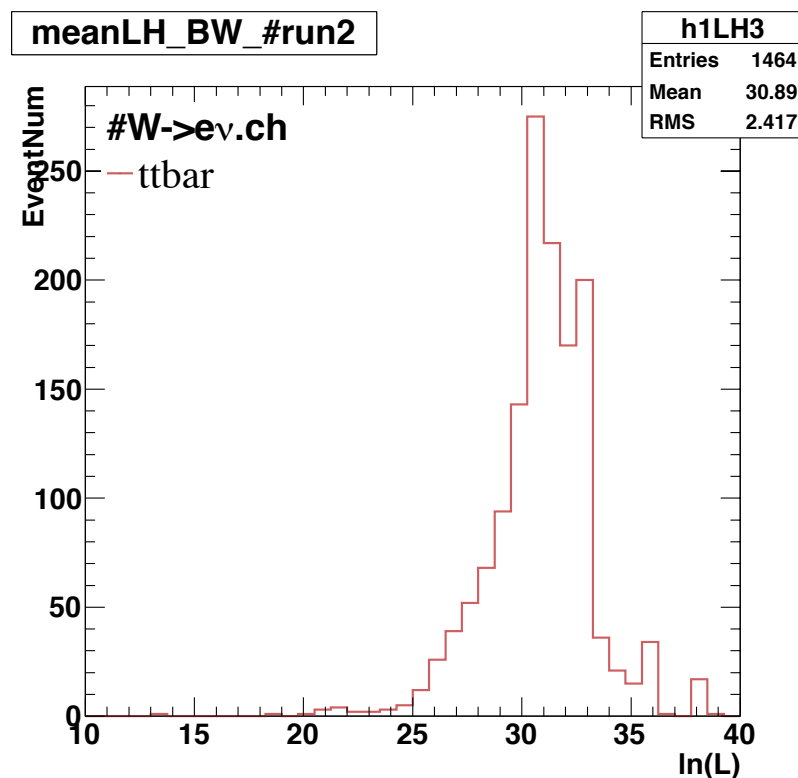
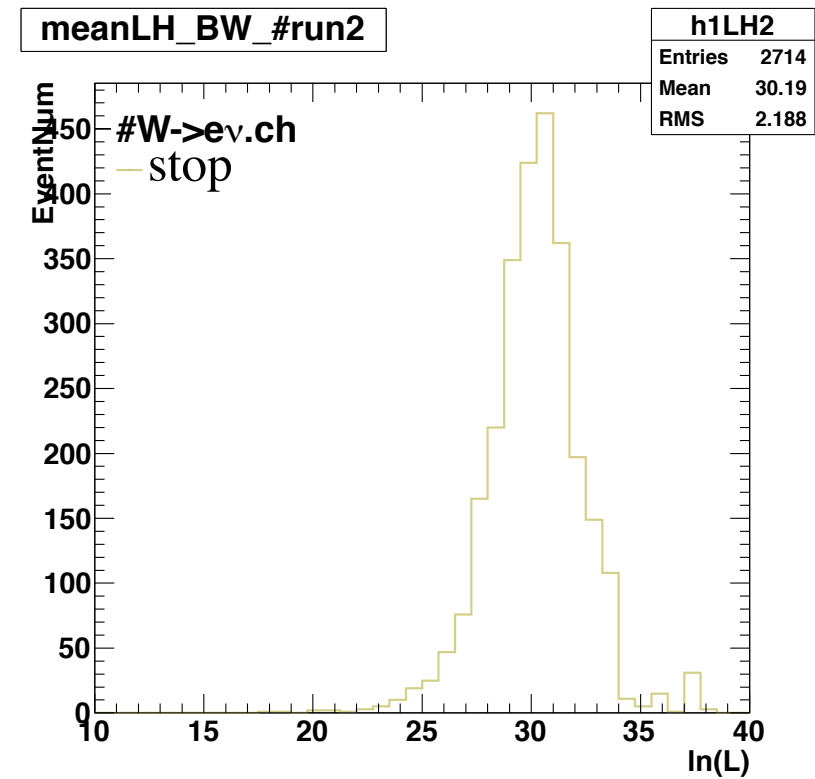
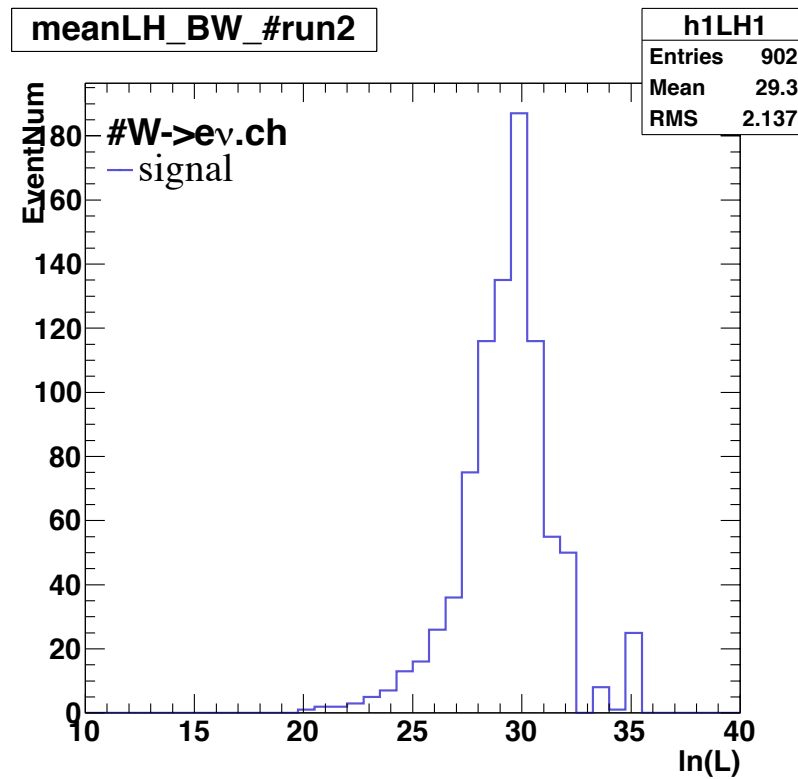


# Result #meanLH dis. select $\mu$ @CAF

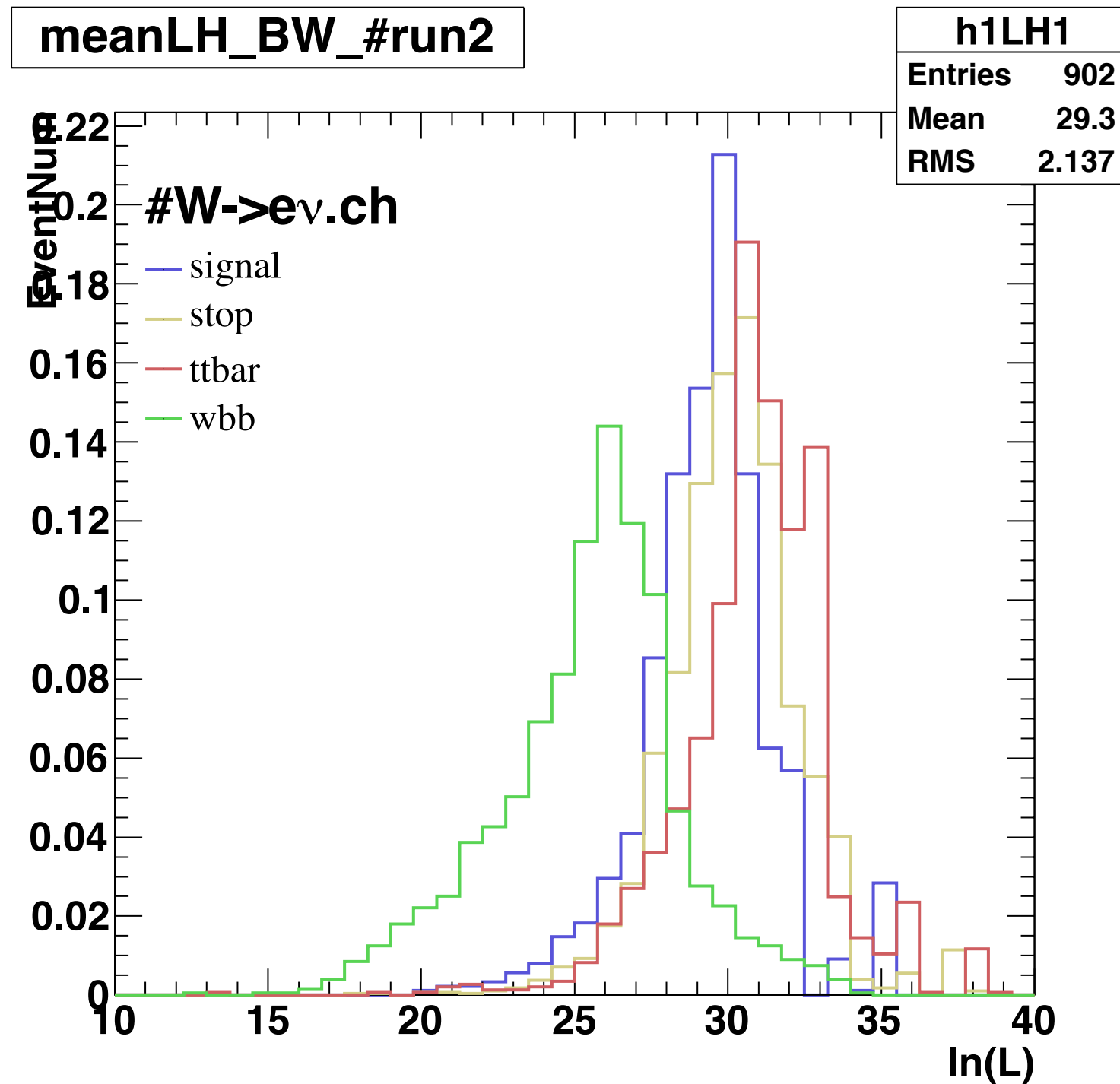
meanLH\_BW\_#run2



# Result #meanLH dis. select e@CAF



# Result #meanLH dis. select e@CAF



# Summary & Plan

S.

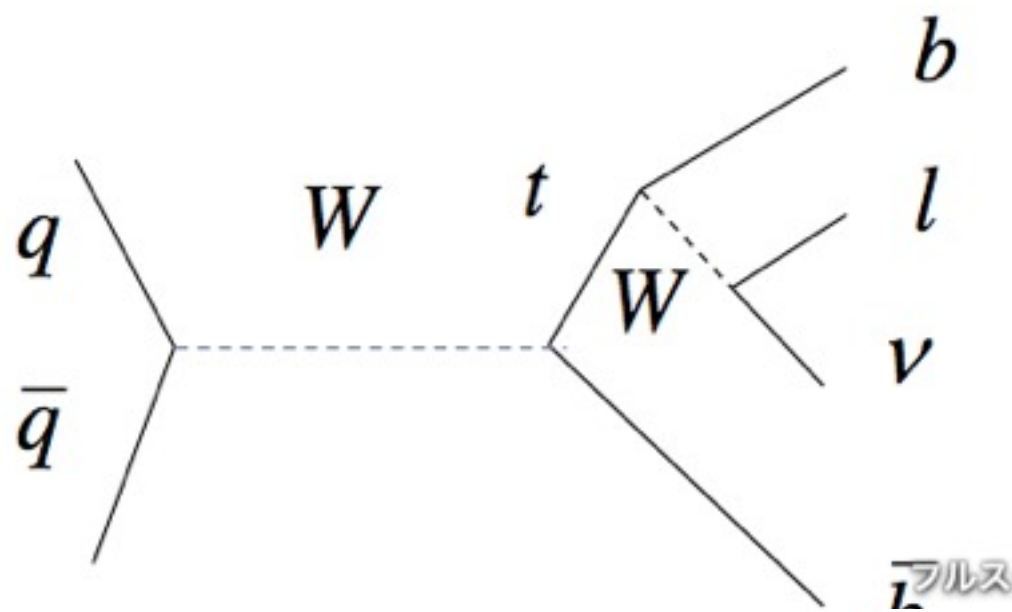
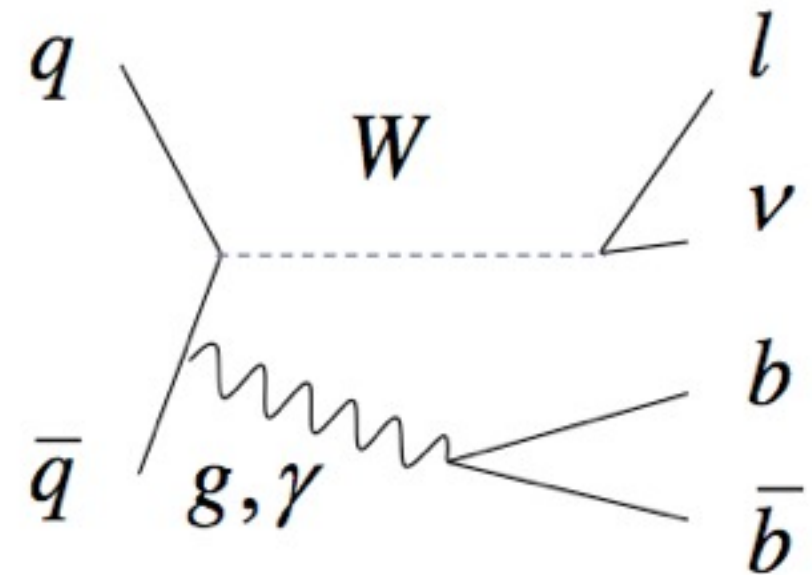
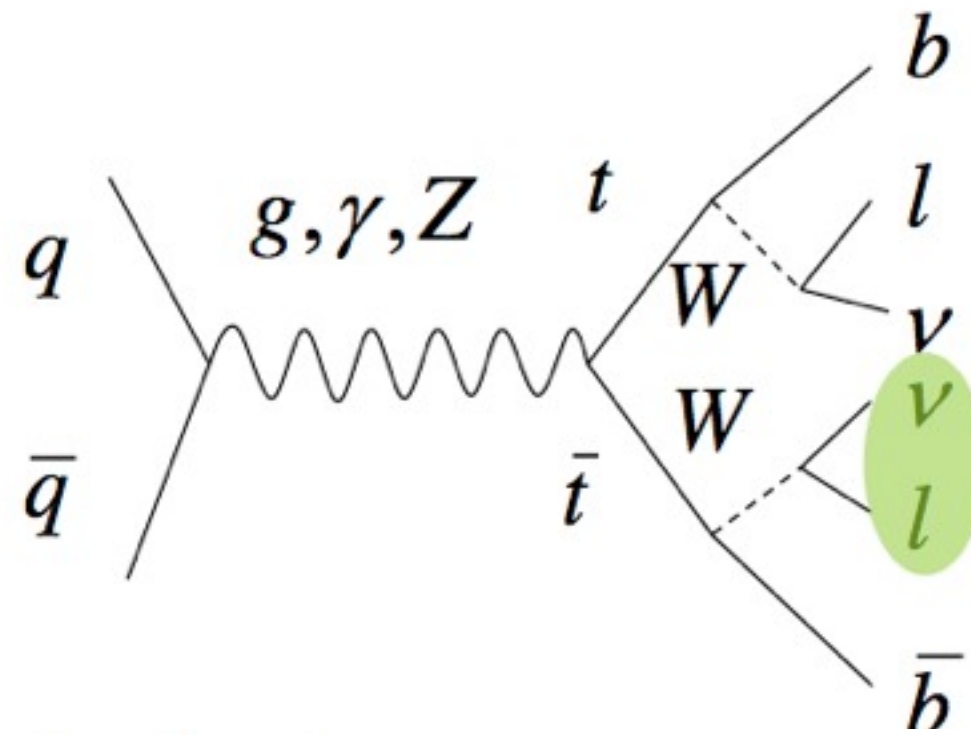
- B.W./non-B.W. meanLH was reconstructed in local.
- Increase statistic, and meanLH was reconstructed in Grid.
- Is found, can eliminate Wbb B.G.

P.

- Increase data, to approach ttbar B.G.

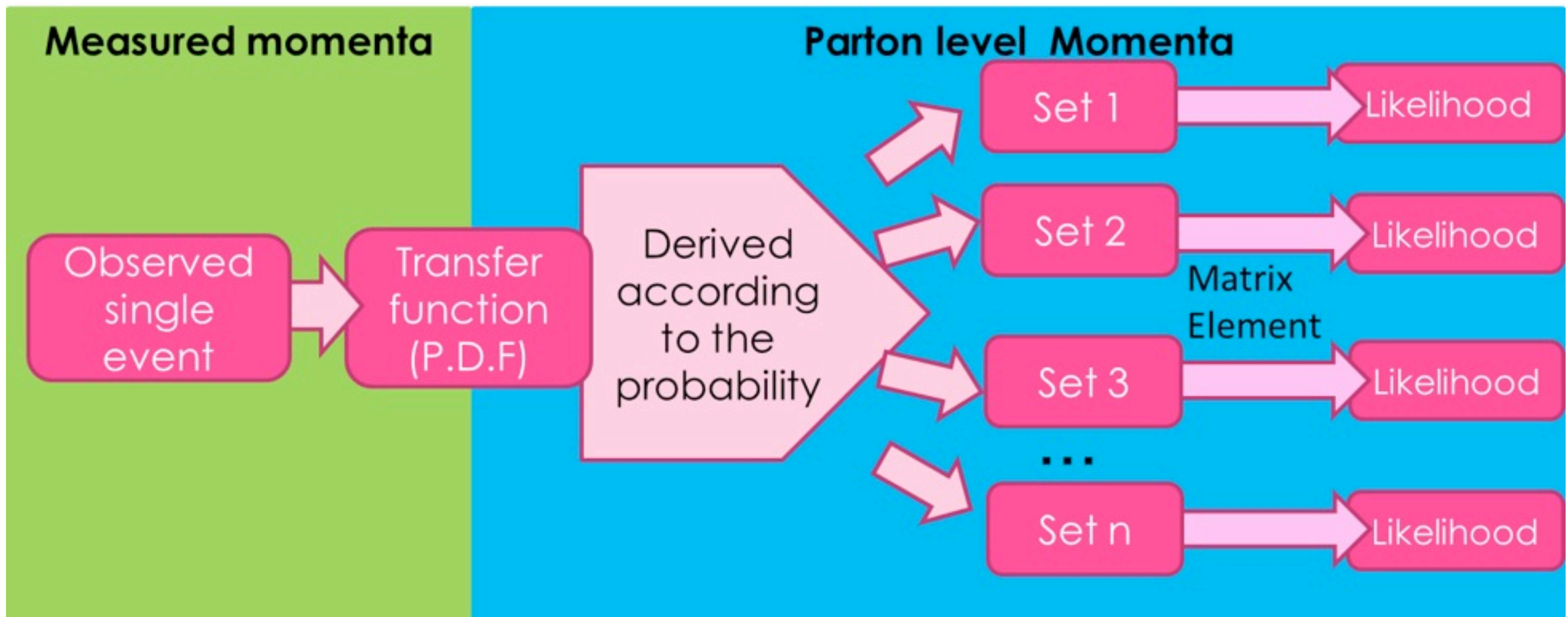
back up

# main B.G.





# Dynamic Likelihood Method



$$L = \frac{d\sigma}{d\Omega} w$$

L:likelihood, w:transfer function

# Dynamic Likelihood Method

- イベント毎に $w$ の確率分布に従ってパートン運動量得る
- 得られたパートンレベルの運動量からM.E.を計算する
- 1 イベントの平均 $L1$ を出す、 $L1$ と $mtop1$ の関数をとる
- 全イベントの平均 $Ltotal$ を出す、 $Ltotal$ と $mtop.total$ の関数をとる

# a Production fraction in CDF Grid



	signal	ttbar	stop	wbb
Event Num-e	66000	112000	220000	550000
-mu	66000	112000	220000	350000
production file-e	65%	72%	58%	83%
-mu	100%	100%	99%	94%