

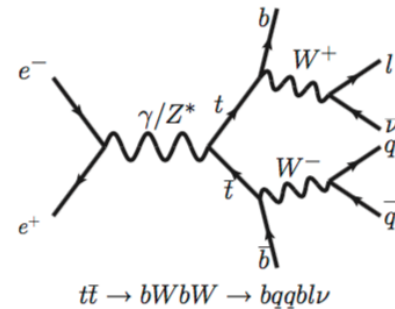
# STUDY OF TOP MOMENTUM

---

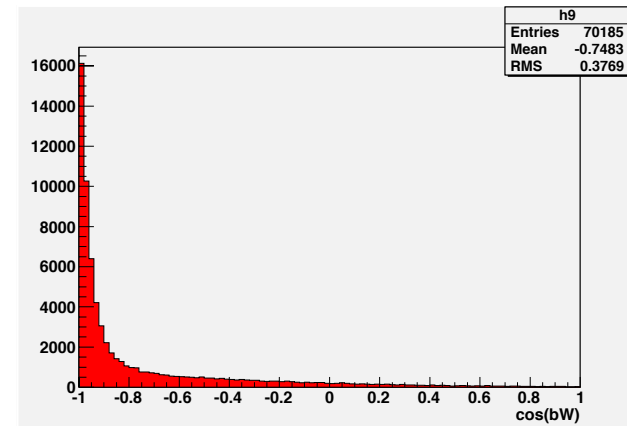
Kiyoaki Ozawa

# cosbW

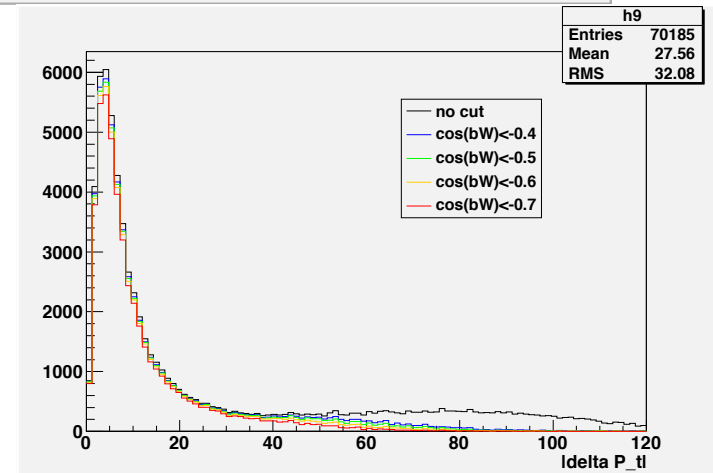
- Peak position of the momentum distribution decided by reducing combinatorial BG.
  - b and W are created back to back in the threshold region of the top pair.
- Cut by  $\cos\theta$  of b and W  
(=cosbW)
- $\Delta P = |P_{\text{rec}} - P_{\text{MC}}|$  is shown in the right graph when changing cosbW cuts.



4jet  
diagram



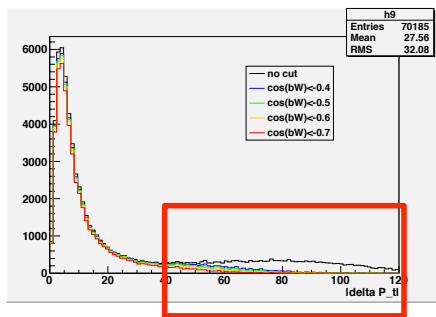
cosbW  
histogram



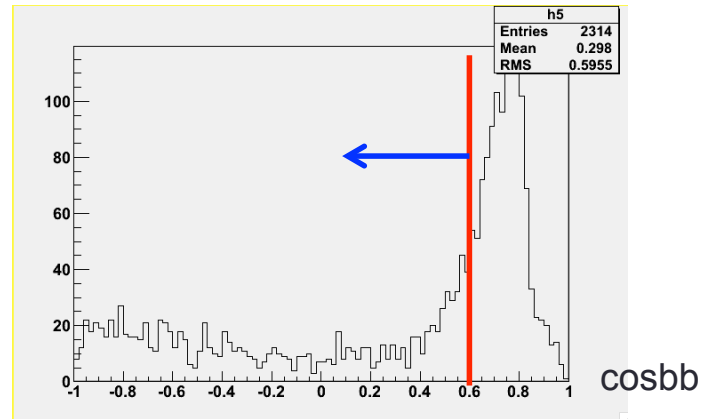
$\Delta P_t = |P_{\text{rec}} - P_{\text{MC}}|$

# cosbb

- $\cos\theta$  of two b (=cosbb) is added to cut value because the event that b jets are close is more likely to be miss reconstructed.



$|\Delta P| > 40 \text{ GeV}$  region



cosbb in  $|\Delta P| > 40 \text{ GeV}$  region

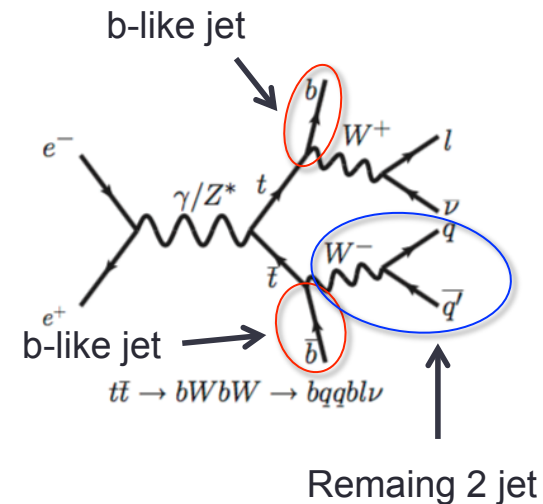
Event number	no cosbW cut	cosbW < -0.4	cosbW < -0.5	cosbW < -0.6	cosbW < -0.7
no cosbb cut	70185	55247 (78.7%)	53364 (76%)	51115 (73.9%)	48242 (72.8%)
cosbb < 0.6		45316 (64.6%)	43840 (62.5%)	42255 (60.2%)	40337 (57.5%)

- These cut value kill too many event.

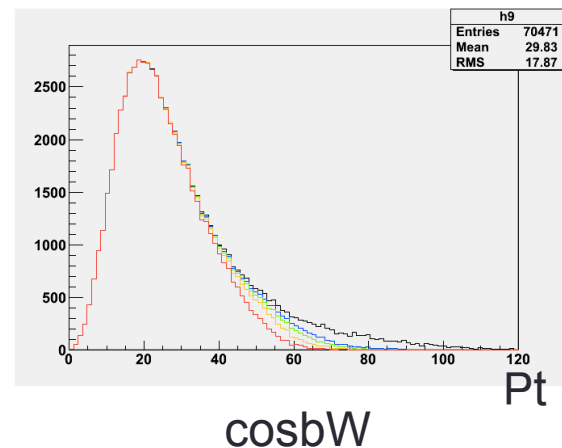
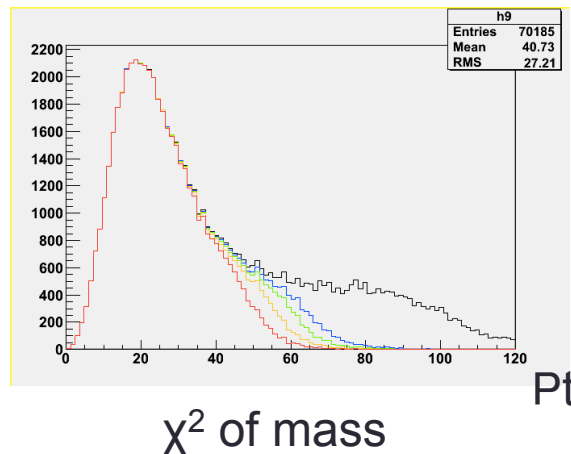
# Pairing

- In 4jet mode, two b-like jets are chosen and W is reconstructed by remaining two jets. Thus, the pairing should be thought about only the combination of b and W.

→ Change the pairing method into  $\cos bW$  from  $\chi^2$  of mass

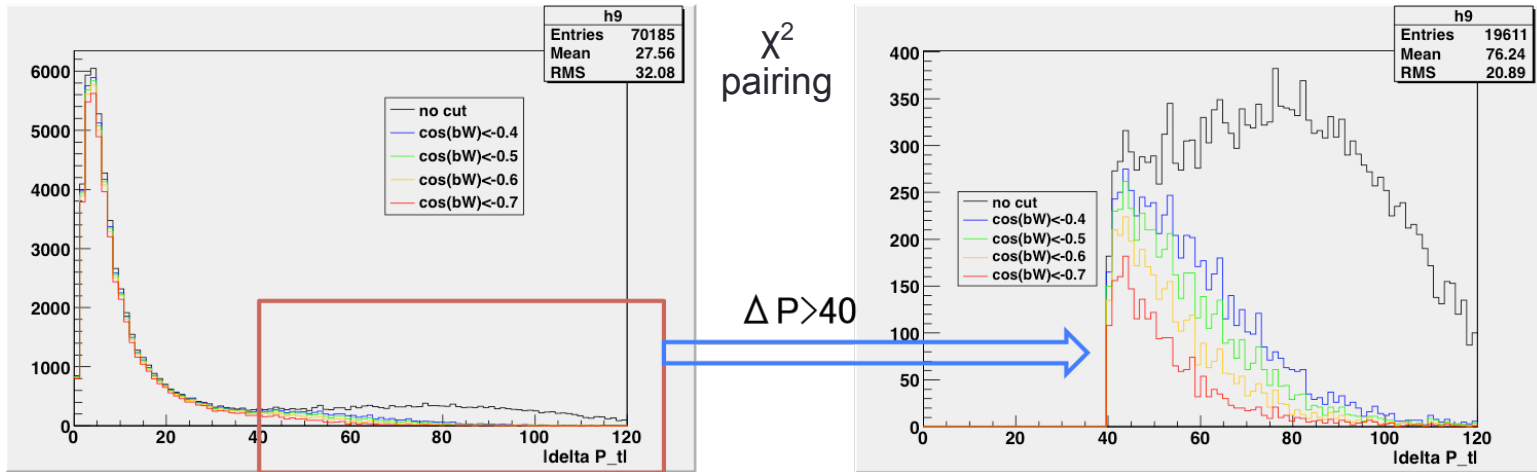


- Momentum distribution of top of each pairing show in the following figures.

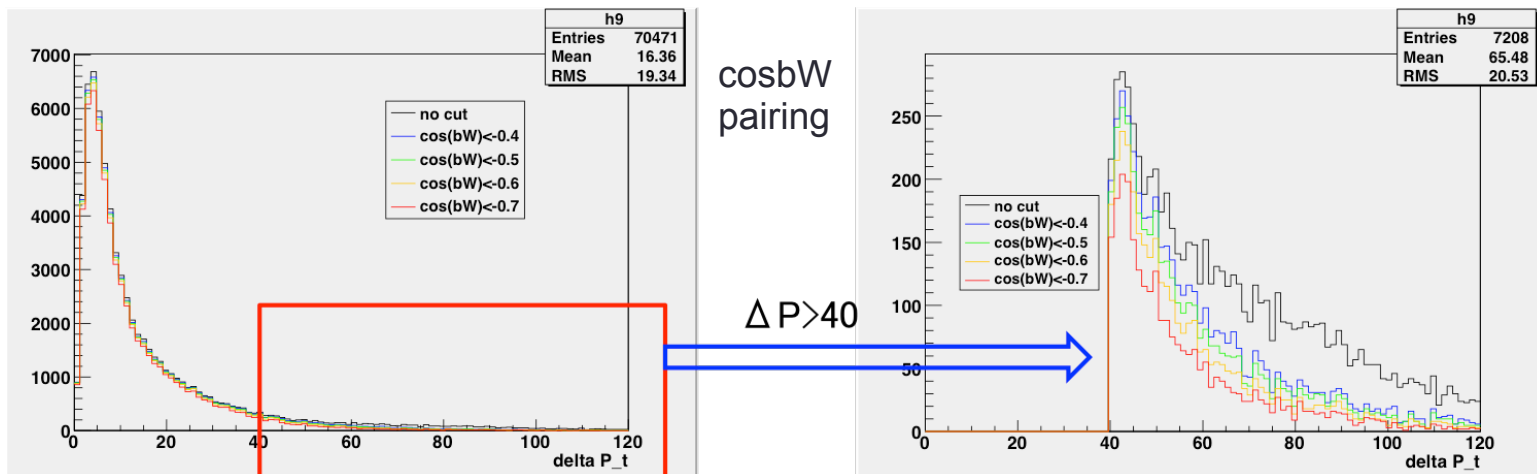


# $\Delta P$

- $|\text{Prec-Pgen}|$  of  $\chi^2$  pairing show in the following figures.

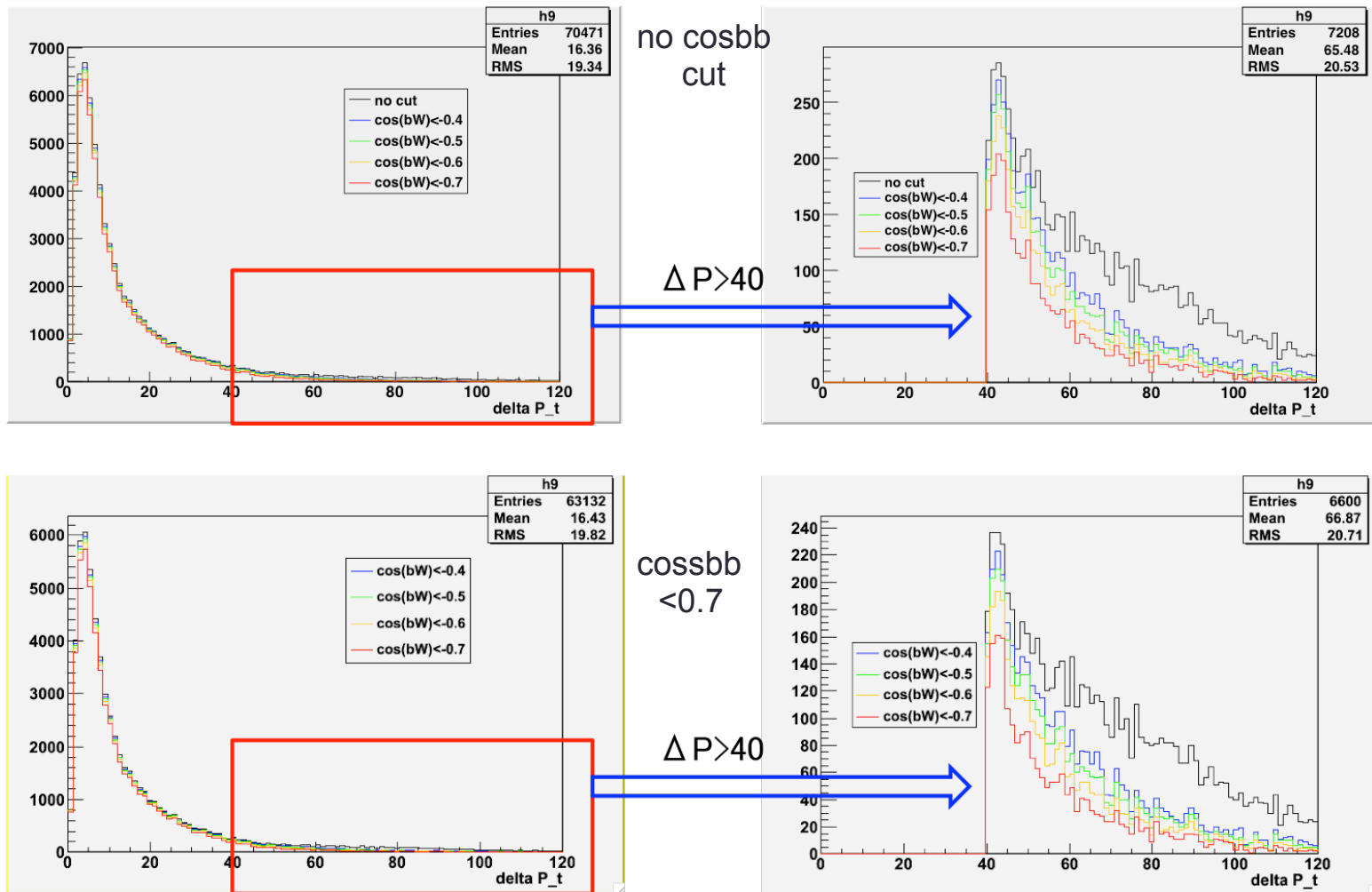


- $|\text{Prec-Pgen}|$  of cosbW pairing show in the following figures.



# cosbb<0.7

- cosbb is added to the cut value. Cut cosbb<0.7 so that efficiency doesn't decrease too much.



- Many differences are not seen.

# Number of Event

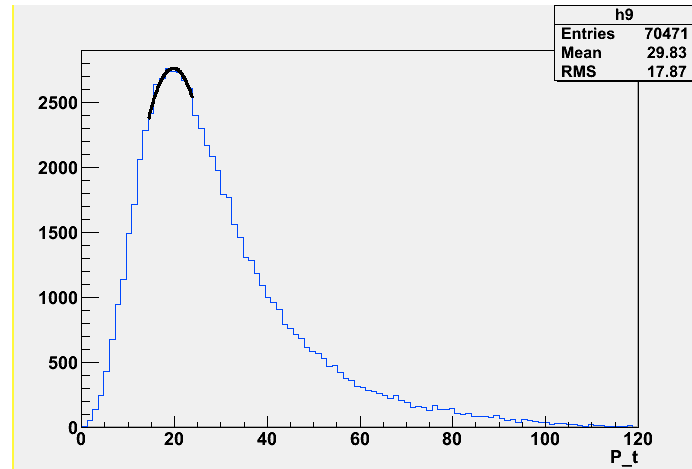
- The following table show the number of event of each cuts.

	no cosbW cut	cosbW<-0.4	cosbW<-0.5	cosbW<-0.6	cosbW<-0.7
no cosbb cut	70471	66549 (94.4%)	65468 (92.9%)	63895 (90.7%)	61291 (87%)
cosbb<0.7		59354 (84.2%)	58349 (82.8%)	56894 (80.7%)	54475 (77.3%)

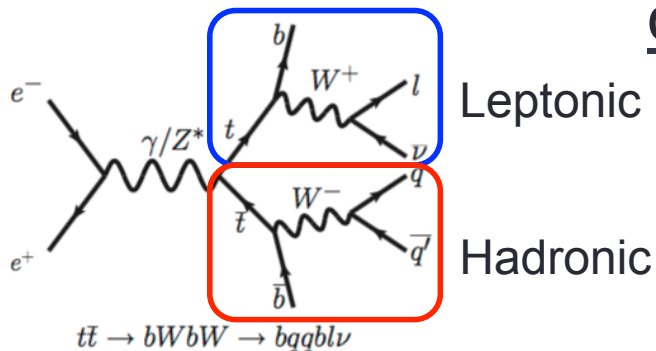
- cosbW and cosbb cut are not sensitive combinatorial BG in pairing of cosbW.

# Peak position

- $\cos bW$  and  $\cos bb$  cut are not used in the pairing of  $\cos bW$ .
- The following figure shows the momentum distribution of top in the pairing of  $\cos bW$ .



- Fit the momentum distribution in following function to know peak position.



$$\frac{\alpha(x - \beta)^2 + C}{}$$

$$\text{Hadronic } \delta P_{\text{peak}} = 0.270 \text{ GeV}$$

$$\text{Leptonic } \delta P_{\text{peak}} = 0.369 \text{ GeV}$$