ttbar threshold

2014/4/4

Tomohiro Horiguchi

I used wrong sample

- Old sample
  - Ttbar samples (~200 fb^{-1} par √s) has “1 TeV” overlay (other samples which has 350 GeV info. were made by Miyamoto-san.).
  - The result will be update in 2 weeks.

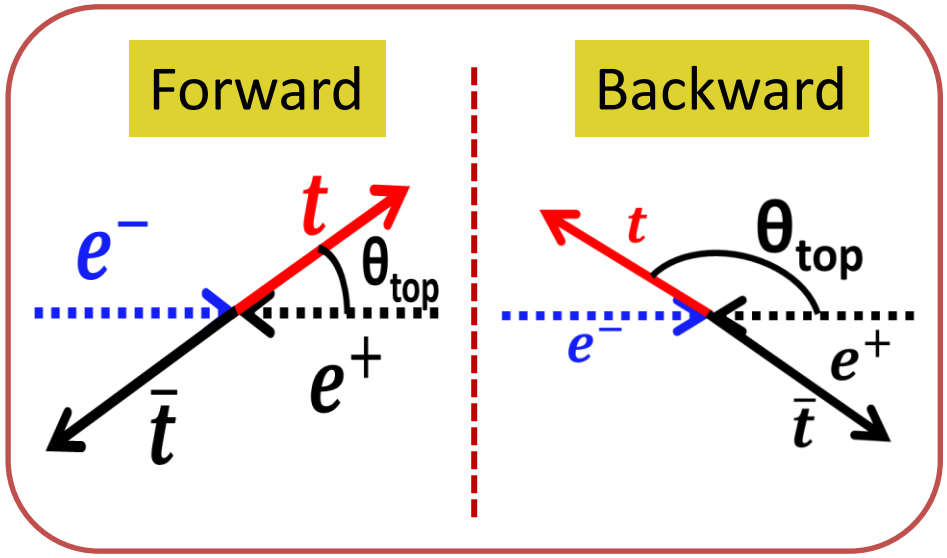
- New sample
  - I made new sample recently.

A_{FB}

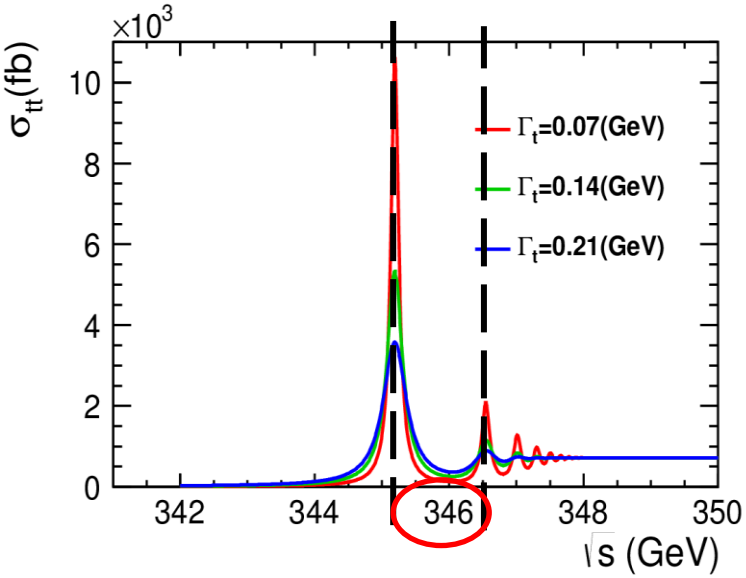
Forward backward asymmetry of top quark (A_{FB})

$$A_{FB} \equiv \frac{N(cos\theta_{top} > 0) - N(cos\theta_{top} < 0)}{N(cos\theta_{top} > 0) + N(cos\theta_{top} < 0)}$$

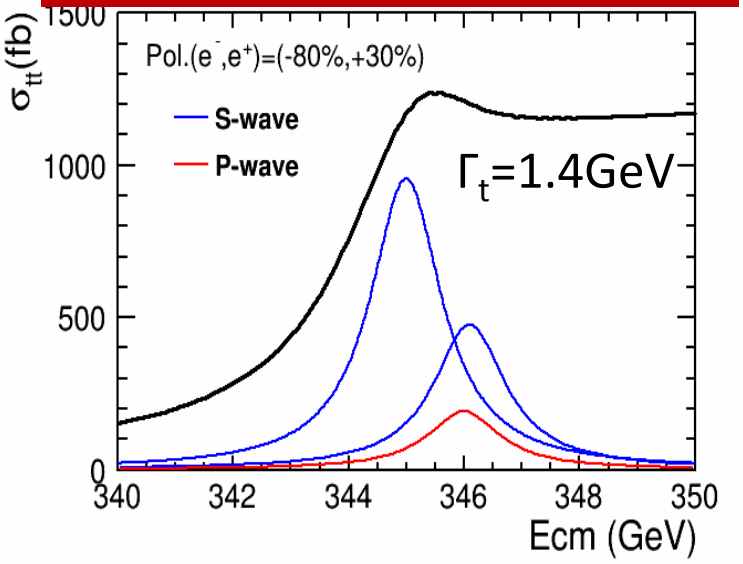
– Since top has large Γt, we can A_{FB} by interfering the resonance of S- and P- wave .



Xs when Γt is very small.

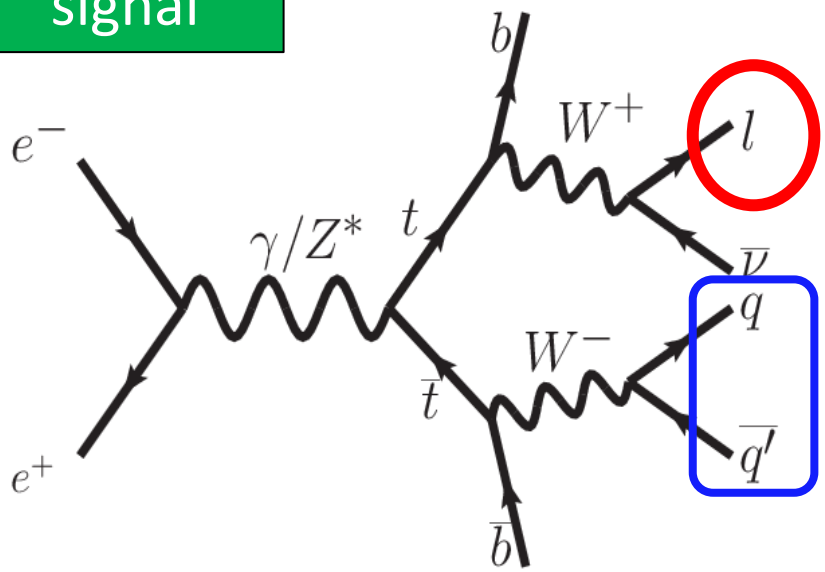


Interference of S- and P-wave



Analysis method

signal

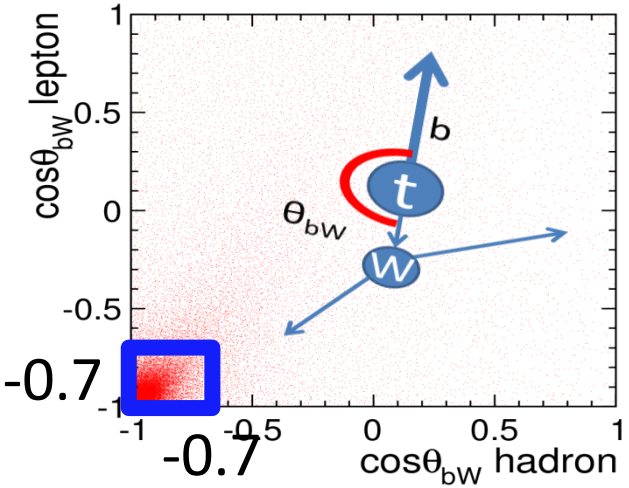


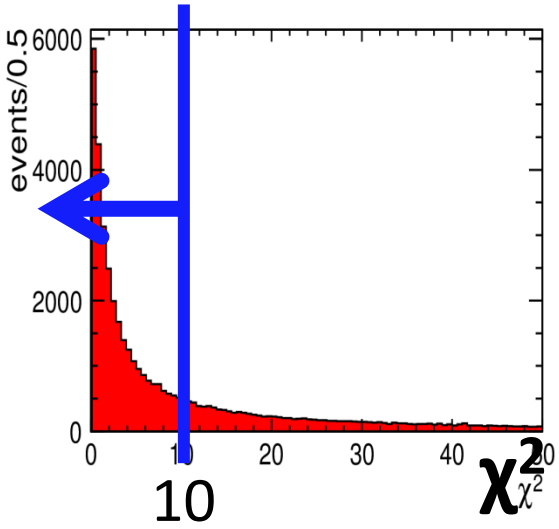
○Top is identified exactly!
⇒Since charge tag of jets is too difficult, isolated lepton is used for ID of top or anti-top.

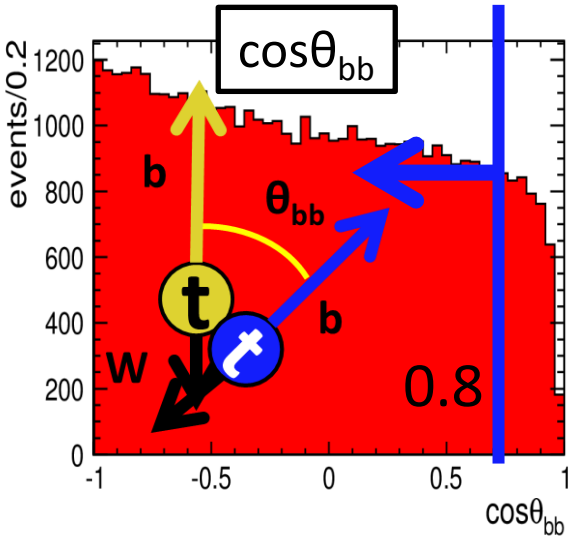
○Top or anti-top which has hadronic decayed W are used for cosθ distribution
⇒Since top quark(leptonic) has missing.

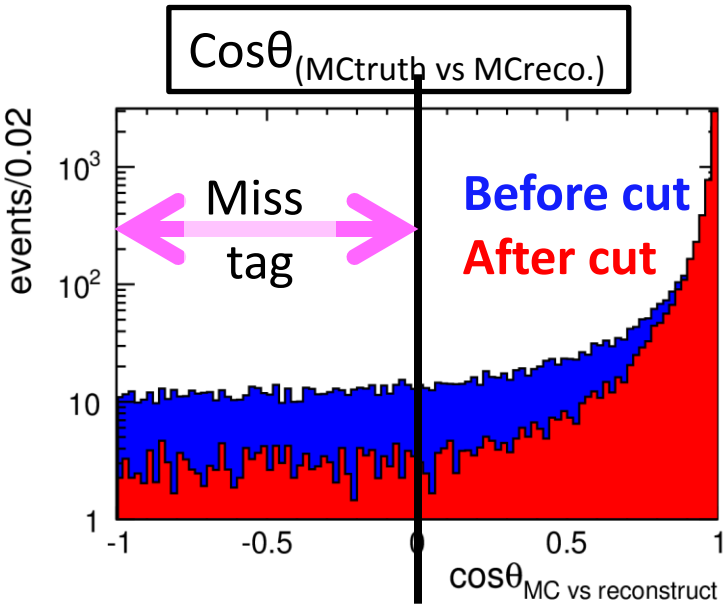
Top tagging

- We must tag the correct top(anti-top)









$$\chi^2 = \frac{(m_t - m_{3j})^2}{\sigma_t^2} + \frac{(m_t - m_{jl\nu})^2}{\sigma_t^2} + \frac{(m_w - m_{2j})^2}{\sigma_w^2}$$

Cut for top ID

$\cos\theta_{bW}$<-0.7, X^2<10, $\cos\theta_{bb}$<0.8

Miss tag is improve!!

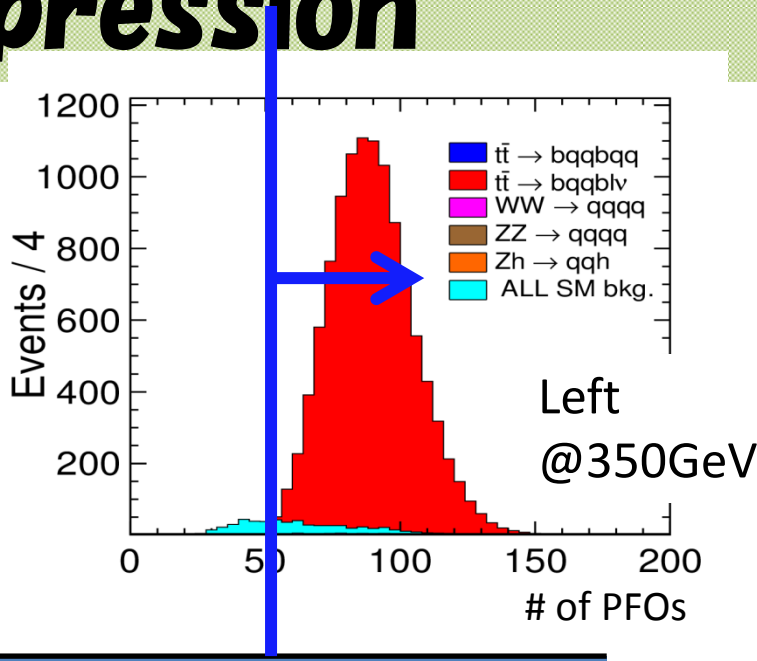
11% ⇒ 2.7 %

Background suppression

- For maximizing the ignificance (S_{top}), bkg. are rejected.

$$S_{top} = \frac{N_{signal}}{\sqrt{N_{signal} + N_{bkg.}}}$$

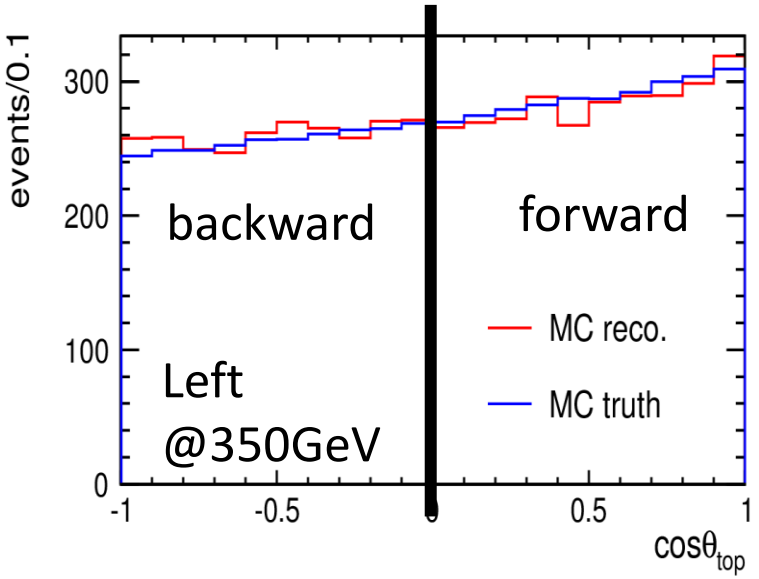
- # of PFOs is used except top taggin cut (previous page).



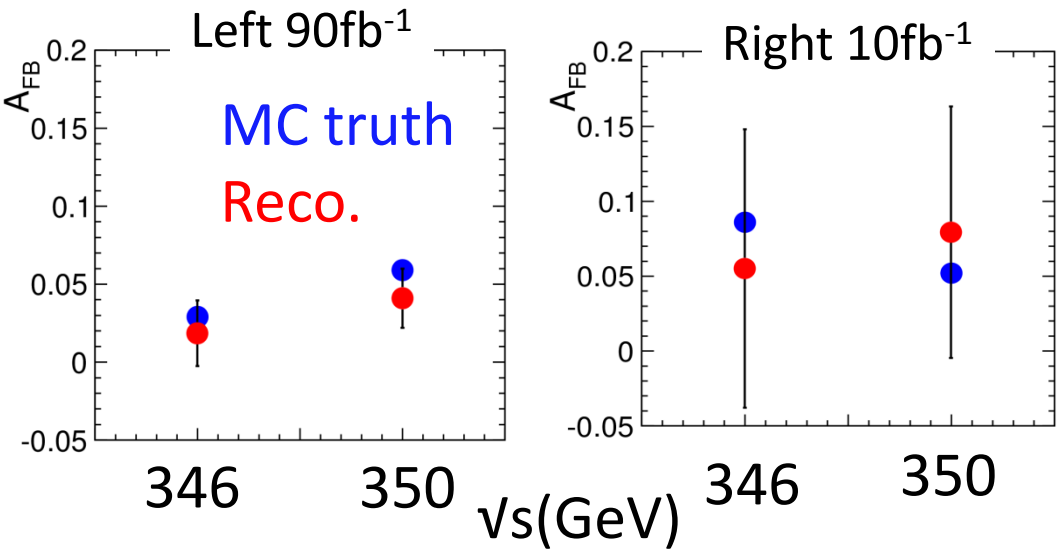
Left 90fb^{-1}	tt4j	tt6j	tt2j	SM bkg.	S_{top}	efficiency
Gen.	28501	29588	6864	18 M	20.5	100
# of l_{iso} = 1	21723	939	2037	0.5 M	28.4	76.2
$\cos\theta_{bW}$<-0.7	20275	897	1871	12187	31.4	71.1
X^2<10	15222	148	346	2158	76.9	53.4
$\cos\theta_{bb}$<0.8	10913	12	14	485	102.1	38.3
# of PFOs > 50	10889	12	11	328	102.7	38.2

Result for measuring A_{FB}

Cosθt



A_{FB}測定の結果



√s (GeV)	346	350
Left(90fb^{-1})	**0.018±0.021**	**0.041±0.019**
Right(10fb^{-1})	**0.055±0.093**	**0.079±0.084**

日本物

My work @ ILC group

- I will leave this group but I have still some work.
  - A_{FB}(my activity will go down, sorry)
  - Write the paper