



# Study in top pair creation threshold range

M1

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# Top quark

The top quark has the following features

- Perturbation calculation is possible from asymptotic freedom because energy scale is big.
- Because life time is very short, top decays before it becomes a hadron.

We can inspect the property of the quark more exactly by studying the top quark.

The mainly parameter to inspect from the top is

mass of the top

width of the top

yukawa coupling

coupling constant of strong interaction

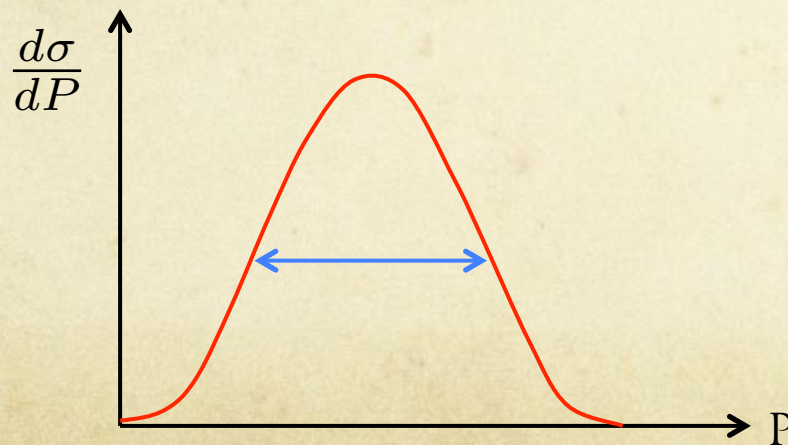
# The momentum measurement of the top

Horiguchi-san studied two measuring method of the parameter.

I analyze the momentum measurement of the top.

I simulate top decay and reconstruct the momentum of the top.

And I'll calculate  $\Gamma_t$  function and  $\alpha_s$  function.



Width of the graph  $\rightarrow \Gamma_t$  function

Position of the peak  $\rightarrow \alpha_s$  function

# Decay process

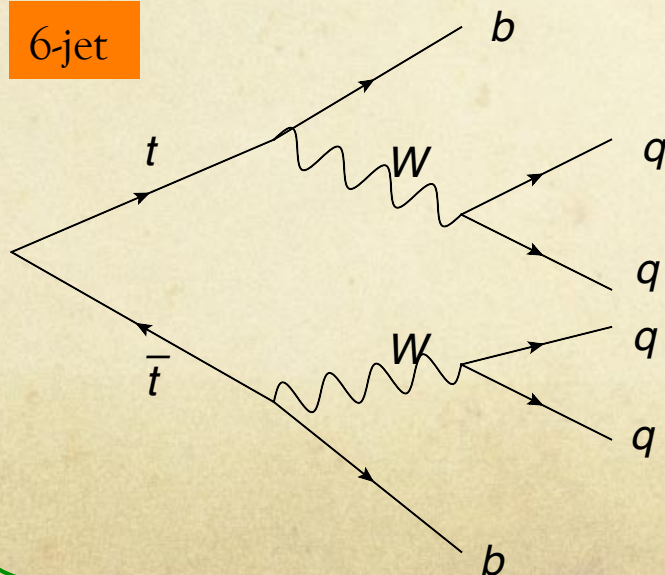
I reconstruct following two decay process.

These are decay processes of W boson having high probability.

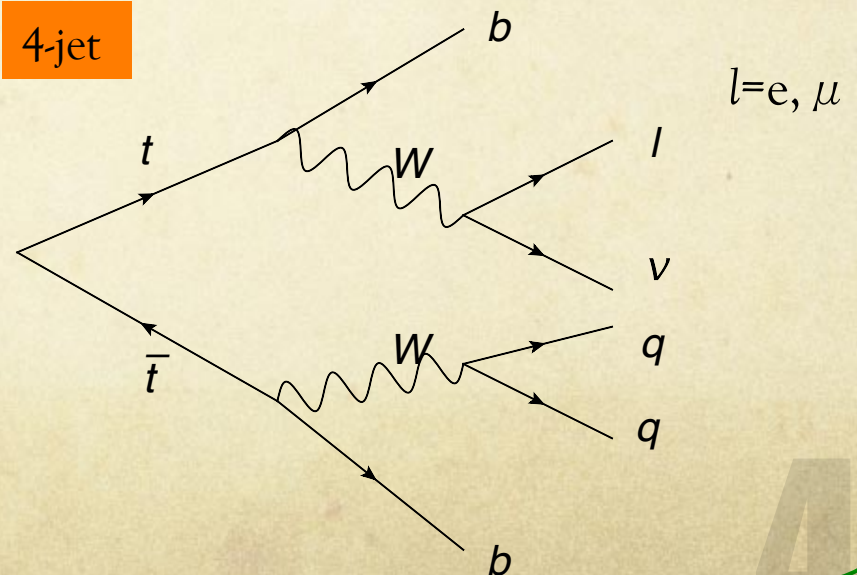
Because it is easy to do distinction of W bosons, I begin to analysis 4-jet.

Branching Ratio	
6-jet	45%
4-jet	44%
2-jet	11%

6-jet



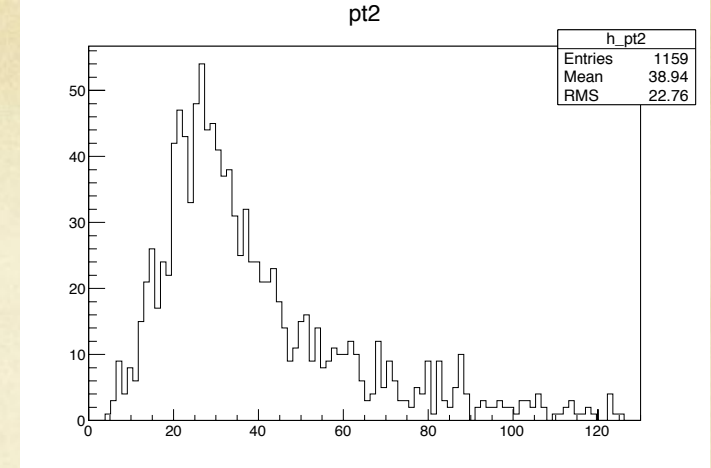
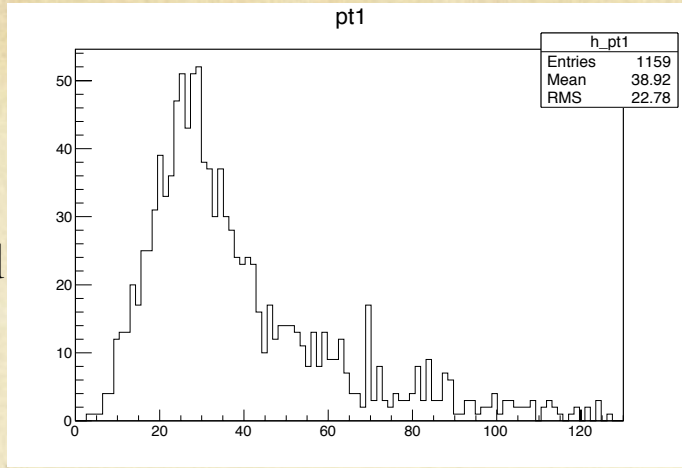
4-jet



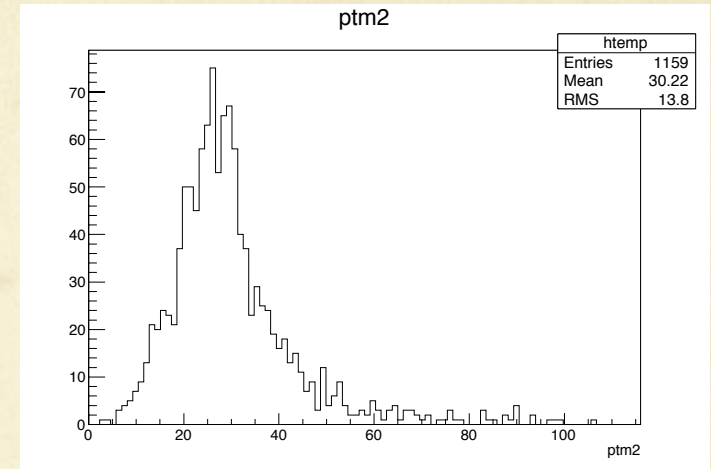
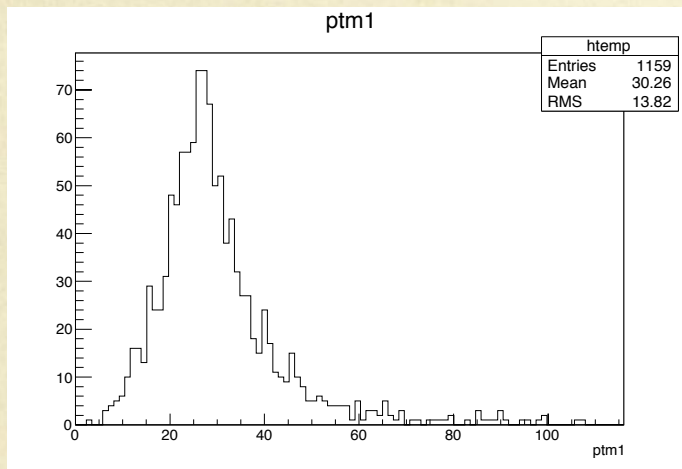
$l=e, \mu$

4jet

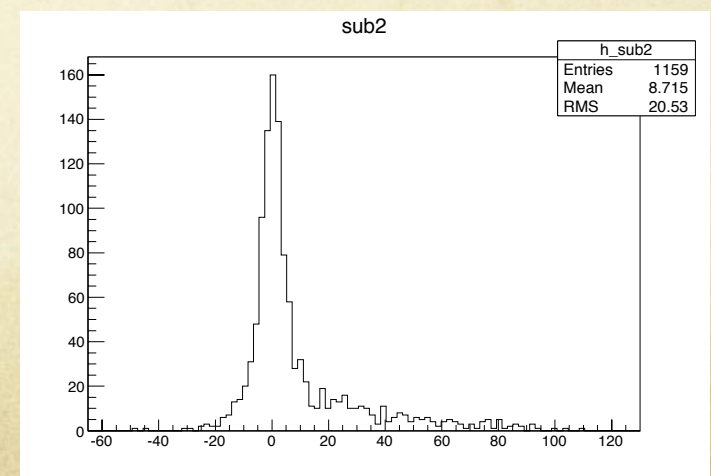
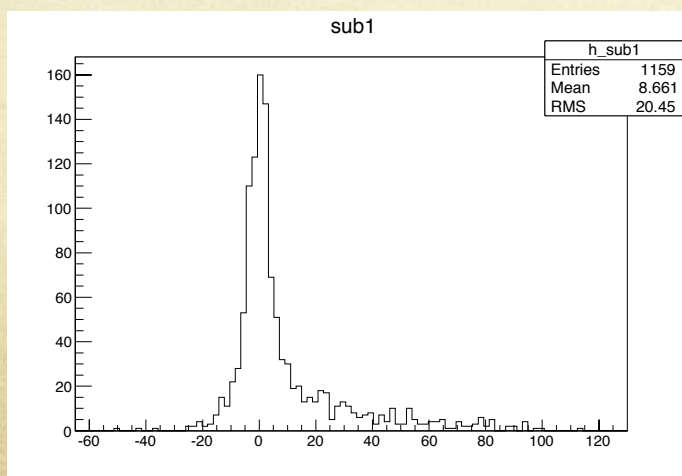
Reconstructed



Monte Carlo



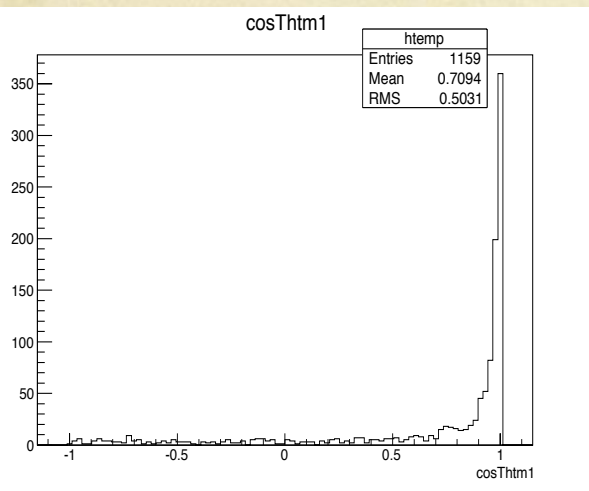
Subtraction



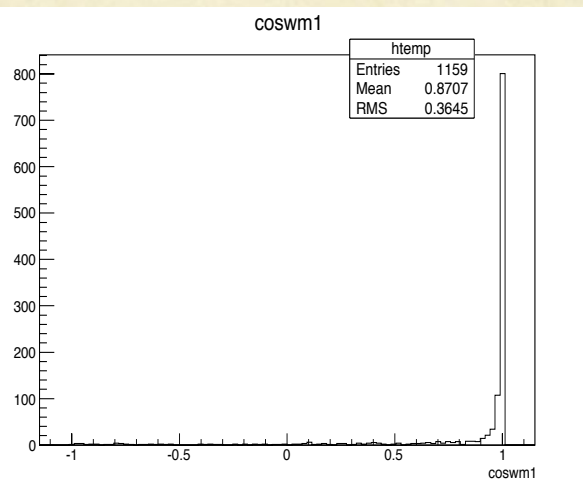
# Check combination of reconstructed particle and MC particle

- Those figures show the cosine of momentum vector of reconstructed top and Monte Carlo top

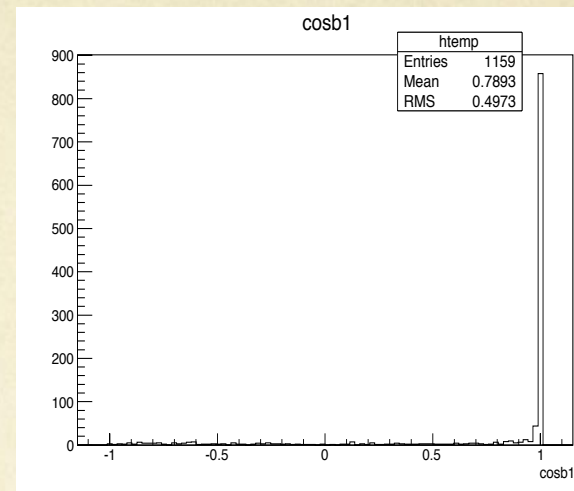
Hadronic top



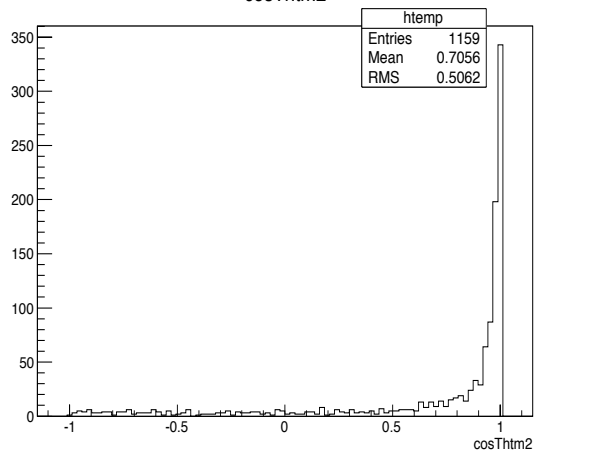
Hadronic W



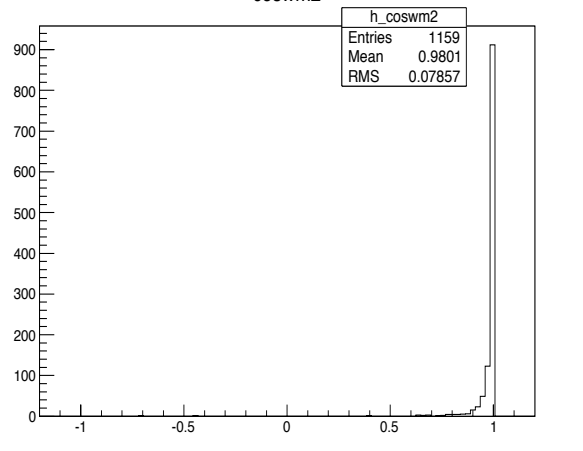
Hadronic b



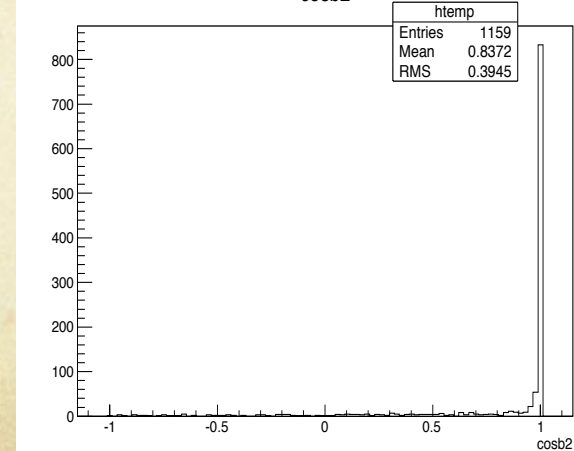
cosThm2



coswm2



cosb2



Leptonic top

Leptonic W

Leptonic b

# Check correlation of mass and momentum

This is a correlation diagram of reconstructed mass and momentum of top

hadronic

leptonic

