tth study @ $\sqrt{s}$ = 500 GeV
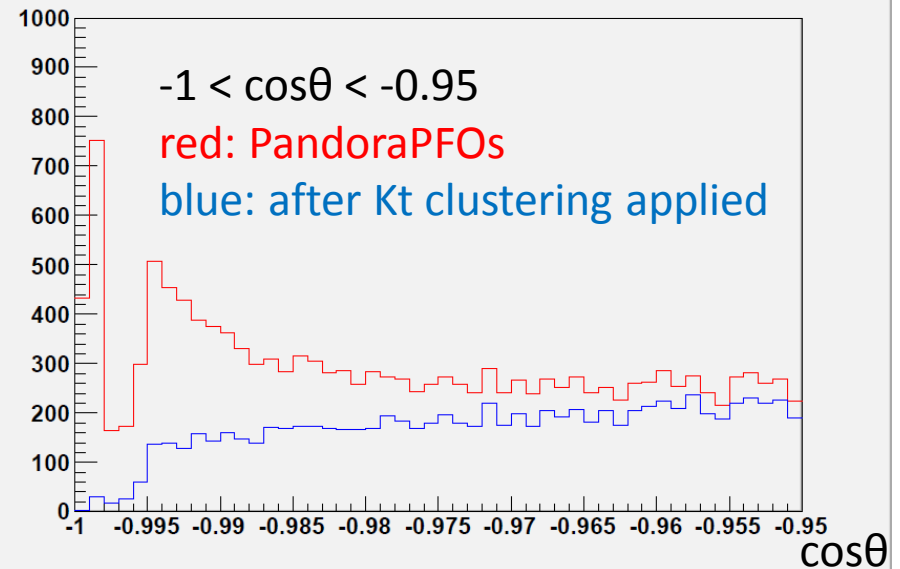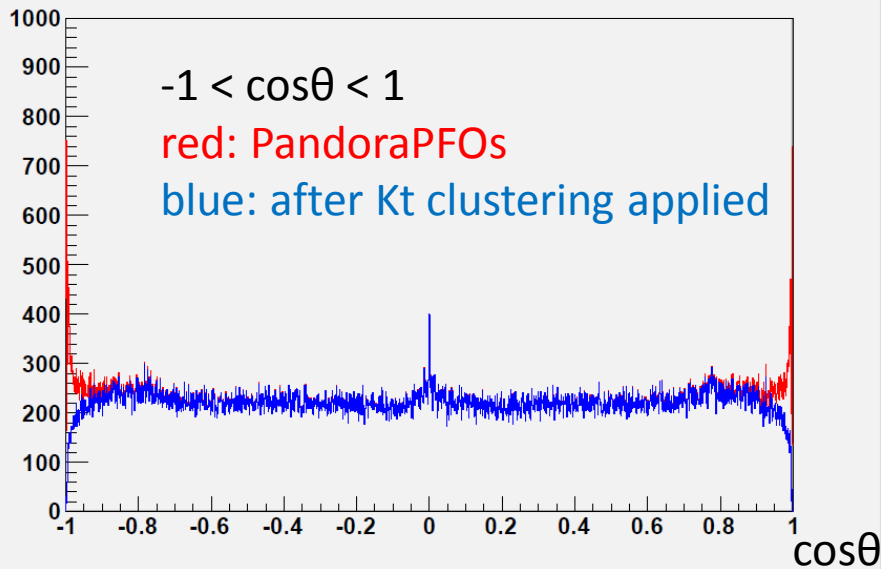
physics & software meeting

2014 Jun. 13

Yuji Sudo (Kyushu University)

tth→8 jet analysis
apply Kt-clustering to reject low Pt background related to beam

parameter of Kt clustering
R = 1.2
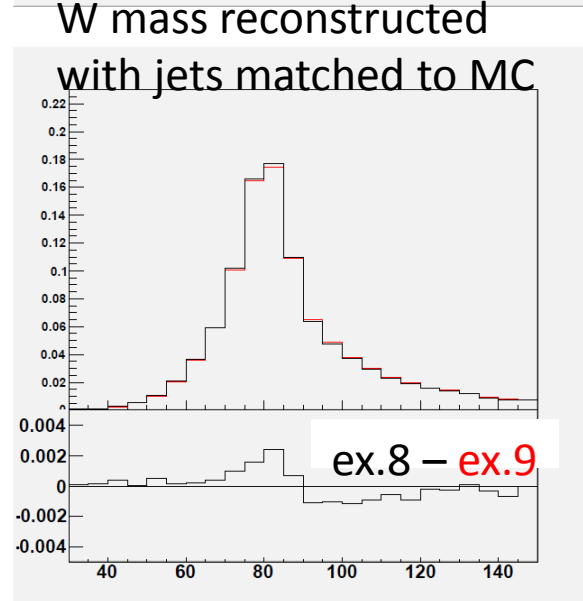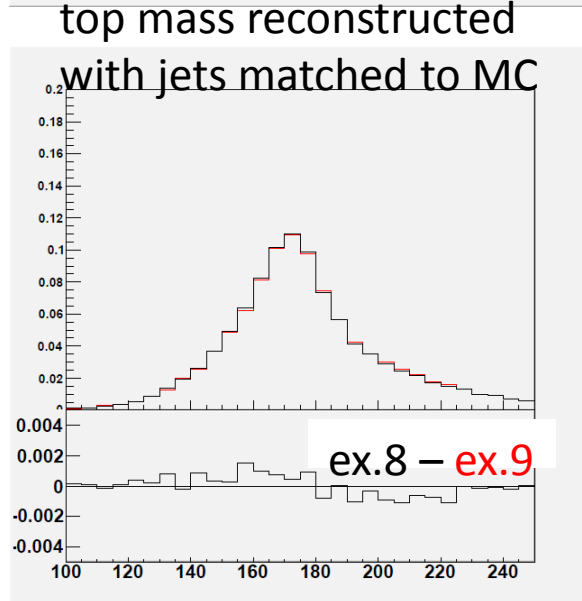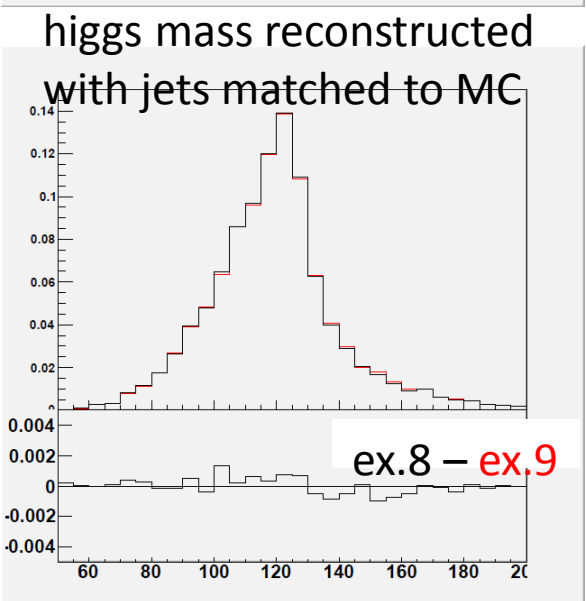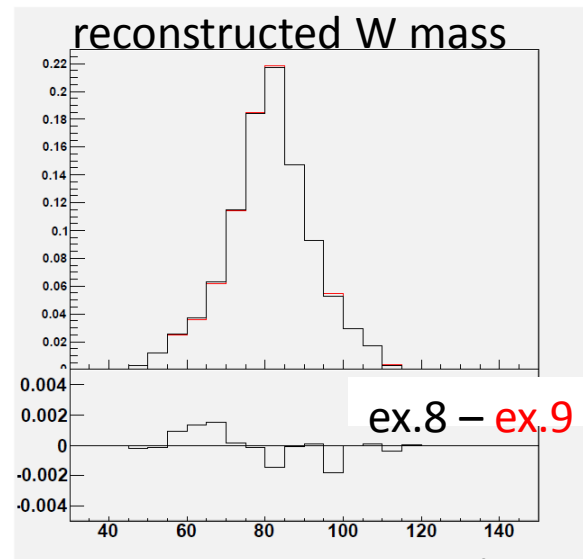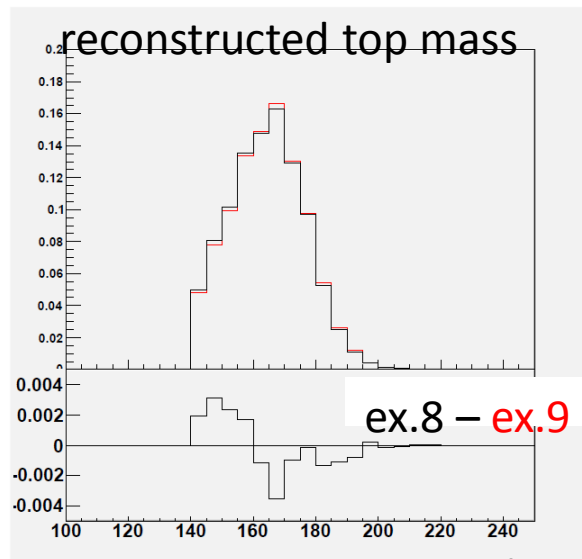ExclusiveNjets = 9

- Kt clustering probably works well

Compare exclusiveNjets 9 and 8 (Kt clustering)

red: exclusive 9, black: exclusive 8

sample: tth→8 jets (h→bb)

reconstructed higgs mass

reconstructed top mass

reconstructed W mass

ex.8 − ex.9

higgs mass reconstructed with jets matched to MC

top mass reconstructed with jets matched to MC

W mass reconstructed with jets matched to MC
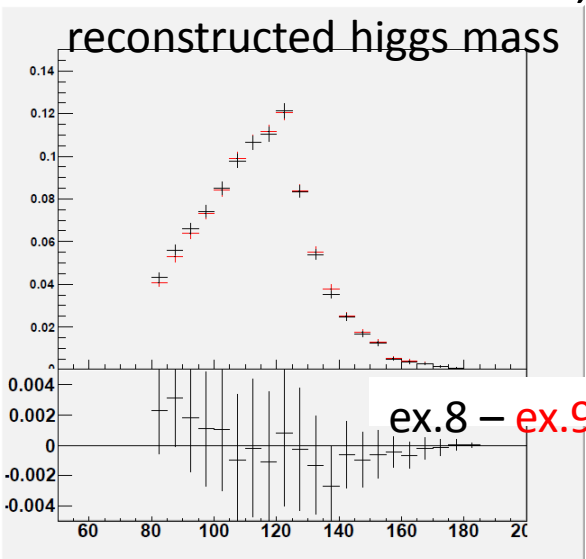
shape difference is small, but reconstructed masses with ex 8 clustering are slightly smaller than ex 9 clustering case systematically

signal acceptance (tth→8jet) after Kt clustering

Kt Exclusive 9 jets Acceptance table (%)		Kt Exclusive 8 jets Acceptance table (%)	
requirement	1Number of Events	requirement	1Number of Events
noCut	100	noCut	100
noIsoLep	92.5494	| noIsoLep	92.6416
8jetReq	87.1534	| 8jetReq	86.7569
4bjetReq	49.5736	| 4bjetReq	48.828
absCosThetaLT0.99	48.7956	| absCosThetaLT0.99	48.4241
chi2Lt13.2	39.0186	| chi2Lt13.2	38.0486
hcandMjj>80	34.8868	| hcandMjj>80	33.6774
jet01EnergySum	28.0097	jet01EnergySum	27.3439
jet567EnergySum	28.0097	jet567EnergySum	27.3439
Mtop>140	26.0822	| Mtop>140	25.3291

ExclusiveNjets = 9 is slightly better but there is no significant dirrerence.

reconstructed mass – MC

reconstructed mass : using jets matched to MC

MC: MC truth – v

higgs

top
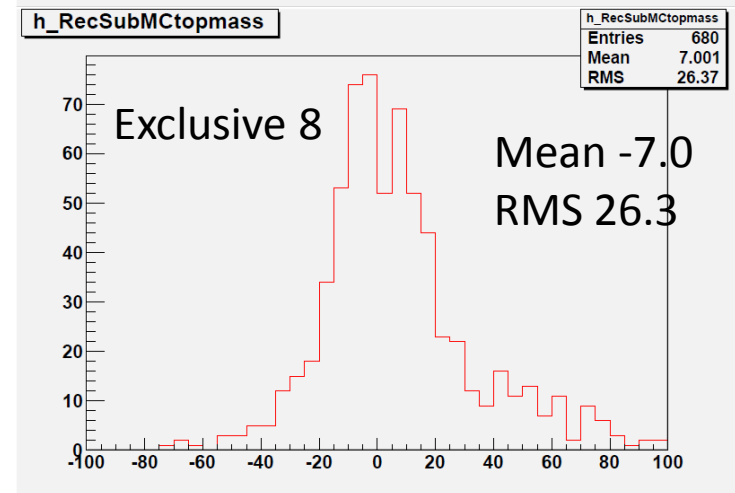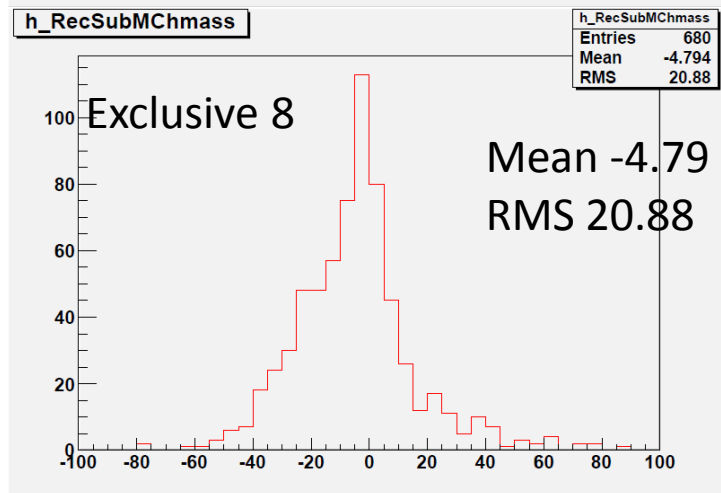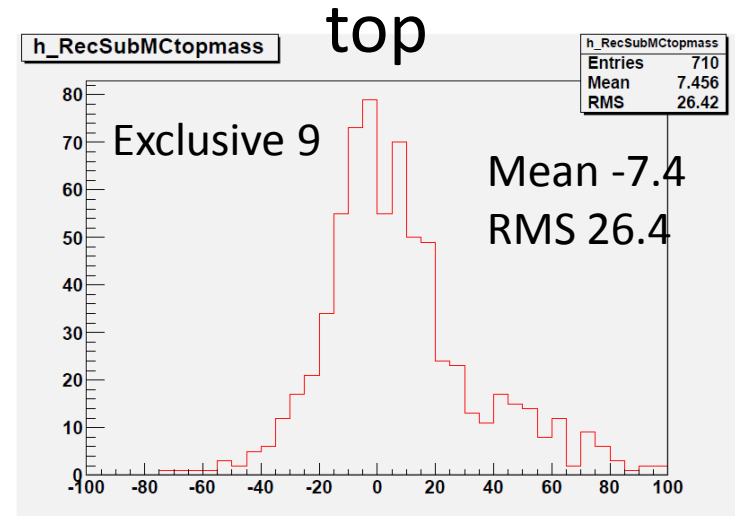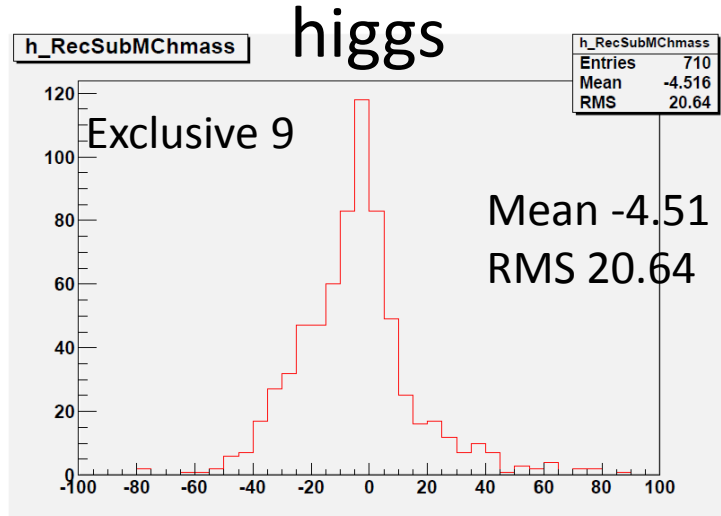
ex 9, N matched = 710 (/2500)

ex 8, N matched = 680 (/2500)

summary

- difference between ExclusiveNjets 9 and 8 is small.

- Exclusive 9:
signal acceptance is better than exclusive 8.
Number of events with reconstructed jets matched to MC greater than exclusive 8.

- Exclusive 9 is better than 8 in tth→8jets sutdy