

Systematic Error

1. Try to set up the frame for systematic error study with the old tree
2. Varied some analysis cuts to calculate systematic error:

Analysis Cuts	Default	Var1	Var2
Chi2topo	≤ 2	≤ 3	≤ 1
Chi2ndf	≤ 5	≤ 6	≤ 4
Chi2primary_pi	≥ 10	≥ 3	≥ 20
Chi2primary_he	≤ 2000	≤ 3000	≤ 1000
Ldl	≥ 3.5	≥ 3	≥ 4
L	≥ 3.4	≥ 2	≥ 4
Dca_he	≤ 1	≤ 1.5	≤ 0.8

Signal Extraction	Default	Var1	Var2
Mass Window	3sigma [2.9872,2.9961]	4sigma [2.9857,2.9975]	2sigma [2.9887,2.9946]

Will consider other sources in the future:
Tracking, MC weighting (bolt T)

each time vary one cut and go through all steps, compare the results.

For example, varying chi2topo gives 3 results (default,var1,var2)

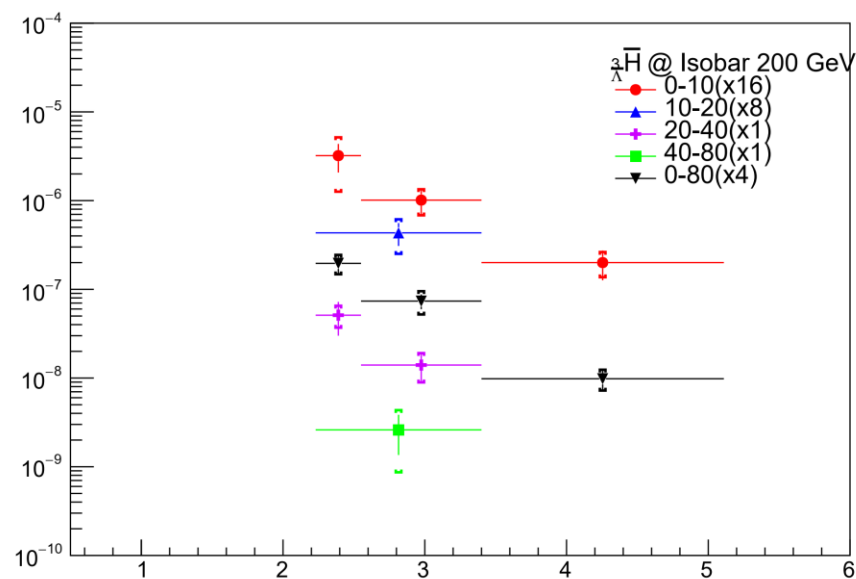
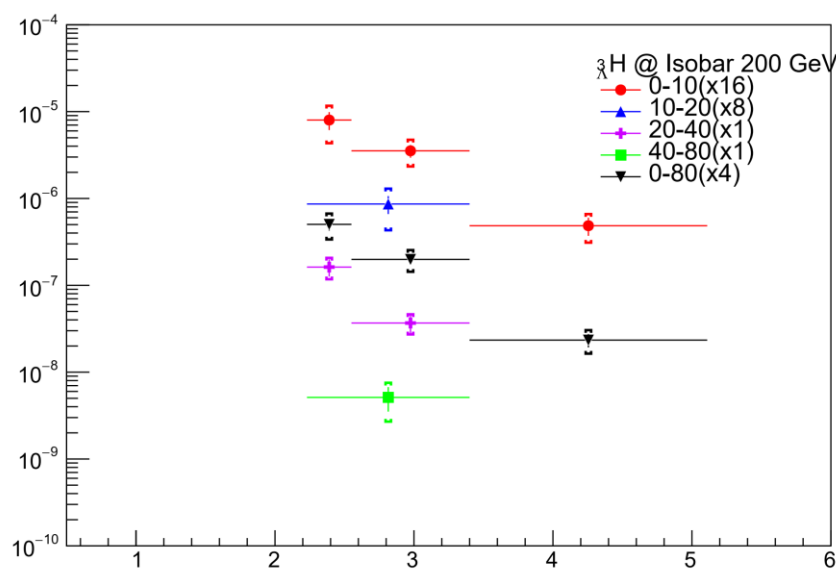
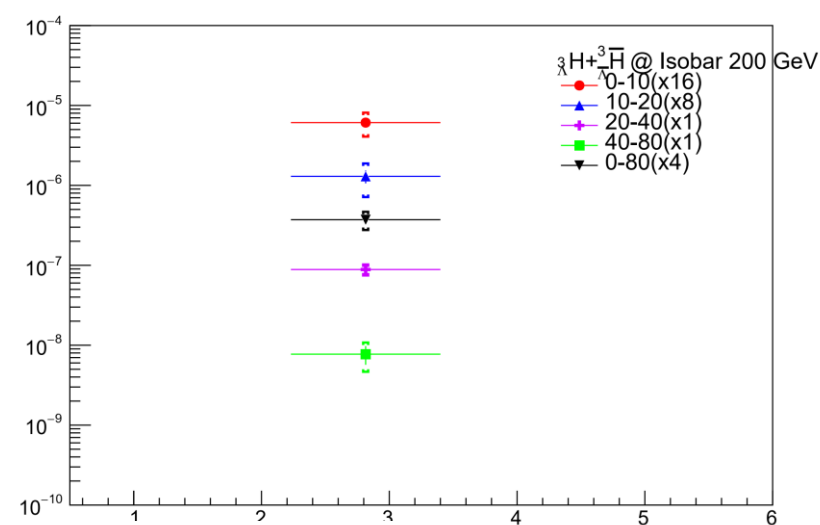
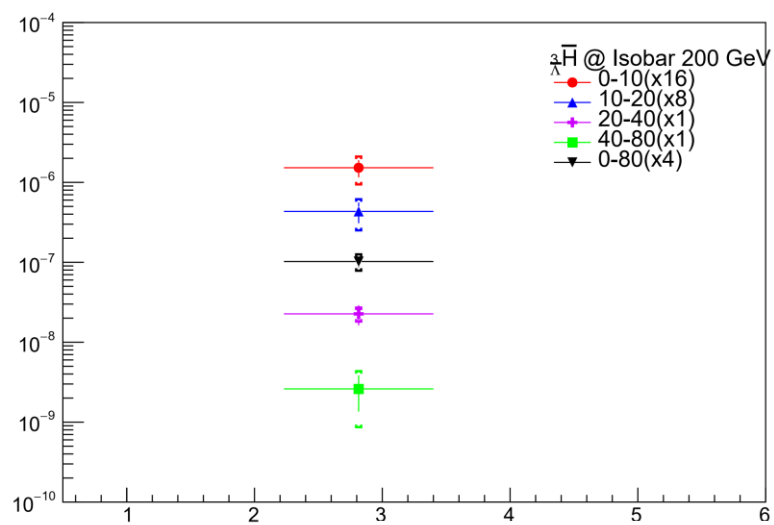
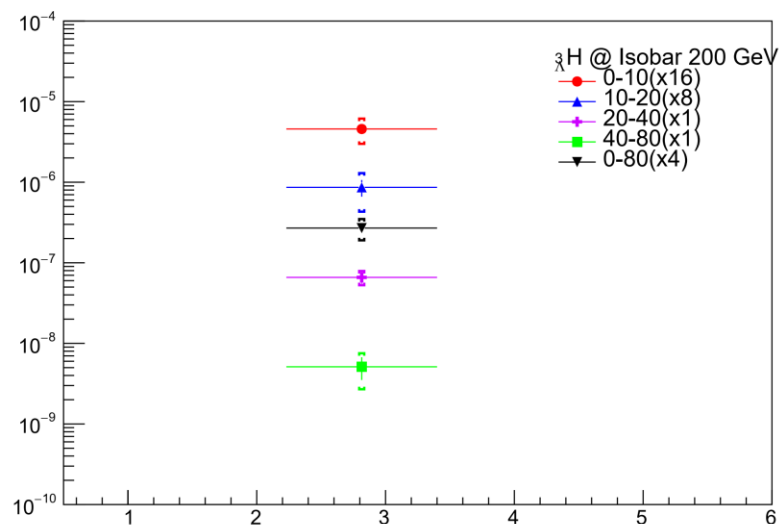
Set systematic error = $(\text{Max} - \text{Min})/2$

statistic error = default

central value = default

linearly add errors from the same table, square add errors from different table

Systematic Error



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p      0_10    No.1 Bin      sys_ana_cuts:  0.344697      sys_mass_window 0.0282128      total  0.34585
p      10_20   No.1 Bin      sys_ana_cuts:  0.497168      sys_mass_window 0.0644353      total  0.501326
p      20_40   No.1 Bin      sys_ana_cuts:  0.195314      sys_mass_window 0.0467157      total  0.200824
p      0_80    No.1 Bin      sys_ana_cuts:  0.293805      sys_mass_window 0.0305616      total  0.295391
p      40_80   No.1 Bin      sys_ana_cuts:  0.466335      sys_mass_window 0.0835244      total  0.473756
Info in <TCanvas::Print>: pdf file ./figure/yield_p_mode0.pdf has been created
m      0_10    No.1 Bin      sys_ana_cuts:  0.371342      sys_mass_window 0.0860756      total  0.381188
m      10_20   No.1 Bin      sys_ana_cuts:  0.387845      sys_mass_window 0.161931      total  0.420292
m      20_40   No.1 Bin      sys_ana_cuts:  0.196967      sys_mass_window 0.0284429      total  0.19901
m      0_80    No.1 Bin      sys_ana_cuts:  0.230493      sys_mass_window 0.0204151      total  0.231395
m      40_80   No.1 Bin      sys_ana_cuts:  0.654148      sys_mass_window 0.133365      total  0.667605
Info in <TCanvas::Print>: pdf file ./figure/yield_m_mode0.pdf has been created
pm     0_10    No.1 Bin      sys_ana_cuts:  0.329576      sys_mass_window 0.0426739      total  0.332327
pm     10_20   No.1 Bin      sys_ana_cuts:  0.445459      sys_mass_window 0.0594345      total  0.449406
pm     20_40   No.1 Bin      sys_ana_cuts:  0.152277      sys_mass_window 0.0386509      total  0.157105
pm     0_80    No.1 Bin      sys_ana_cuts:  0.255627      sys_mass_window 0.0187187      total  0.256311
pm     40_80   No.1 Bin      sys_ana_cuts:  0.392378      sys_mass_window 0.0660829      total  0.397904
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p      0_10    No.1 Bin      sys_ana_cuts:  0.449234      sys_mass_window 0.09337      total  0.458834
p      0_10    No.2 Bin      sys_ana_cuts:  0.338939      sys_mass_window 0.0261305      total  0.339945
p      0_10    No.3 Bin      sys_ana_cuts:  0.349414      sys_mass_window 0.0932499      total  0.361643
p      10_20   No.1 Bin      sys_ana_cuts:  0.497168      sys_mass_window 0.0644353      total  0.501326
p      20_40   No.1 Bin      sys_ana_cuts:  0.269169      sys_mass_window 0.0608462      total  0.27596
p      20_40   No.2 Bin      sys_ana_cuts:  0.257987      sys_mass_window 0.0357032      total  0.260445
p      0_80    No.1 Bin      sys_ana_cuts:  0.326957      sys_mass_window 0.0453883      total  0.330092
p      0_80    No.2 Bin      sys_ana_cuts:  0.278959      sys_mass_window 0.0228839      total  0.279896
p      0_80    No.3 Bin      sys_ana_cuts:  0.300164      sys_mass_window 0.0344862      total  0.302138
p      40_80   No.1 Bin      sys_ana_cuts:  0.466335      sys_mass_window 0.0835244      total  0.473756
Info in <TCanvas::Print>: pdf file ./figure/yield_p_mode1.pdf has been created
m      0_10    No.1 Bin      sys_ana_cuts:  0.605805      sys_mass_window 0.0483838      total  0.607734
m      0_10    No.2 Bin      sys_ana_cuts:  0.255058      sys_mass_window 0.202855      total  0.325891
m      0_10    No.3 Bin      sys_ana_cuts:  0.310958      sys_mass_window 0.0526935      total  0.315391
m      10_20   No.1 Bin      sys_ana_cuts:  0.387845      sys_mass_window 0.161931      total  0.420292
m      20_40   No.1 Bin      sys_ana_cuts:  0.249721      sys_mass_window 0.119871      total  0.277002
m      20_40   No.2 Bin      sys_ana_cuts:  0.355178      sys_mass_window 0.0724196      total  0.362486
m      0_80    No.1 Bin      sys_ana_cuts:  0.224483      sys_mass_window 0.100916      total  0.246124
m      0_80    No.2 Bin      sys_ana_cuts:  0.28701      sys_mass_window 0.0586481      total  0.292941
m      0_80    No.3 Bin      sys_ana_cuts:  0.259523      sys_mass_window 0.0477713      total  0.263883
m      40_80   No.1 Bin      sys_ana_cuts:  0.654148      sys_mass_window 0.133365      total  0.667605
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