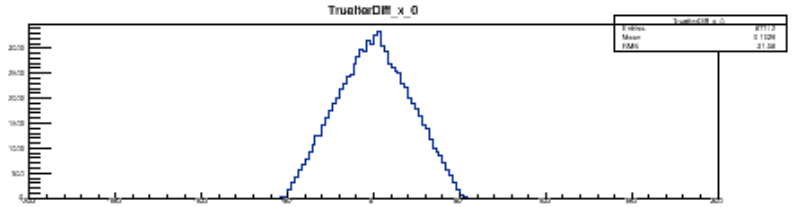
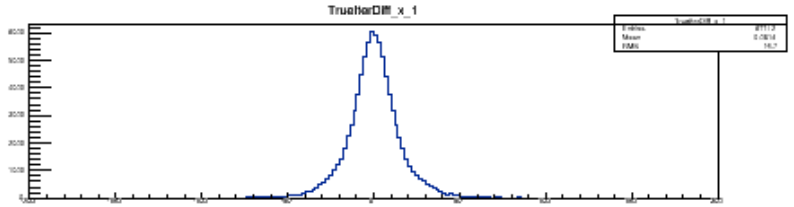
Report 170329

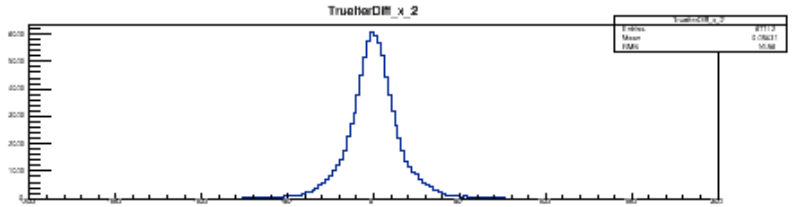
Iteration of KL X,Y Vertex

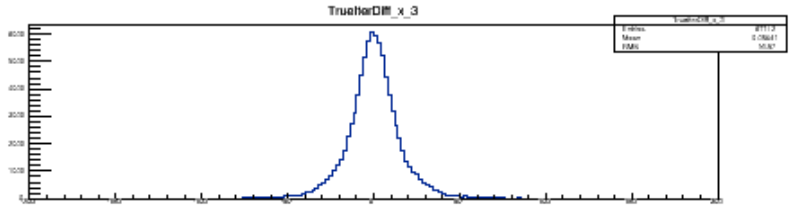
- Reconstructed KlongVertex X, Y with regard to COE
- Reconstructed 6th Gamma Energy using Reconstructed KlongVertex X, Y

Iterated KlongVertexX

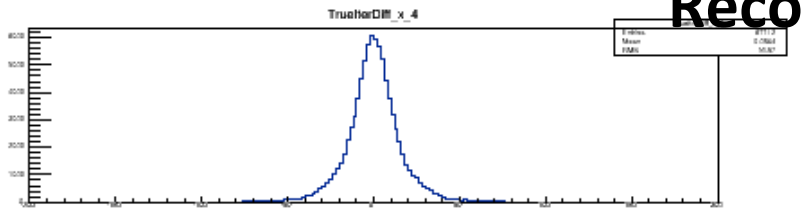


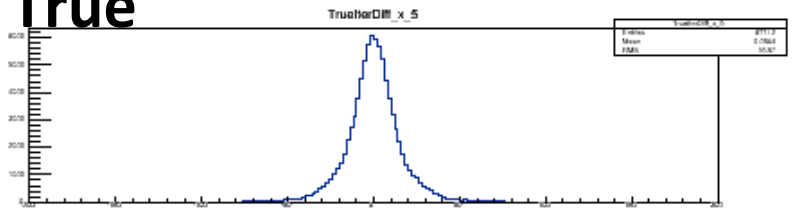


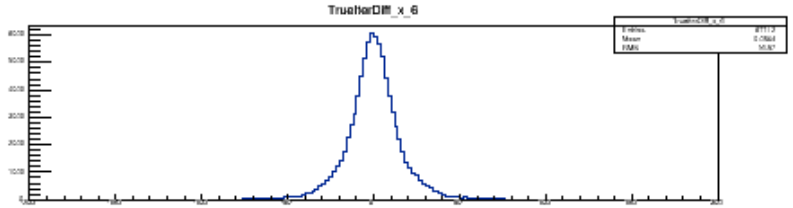


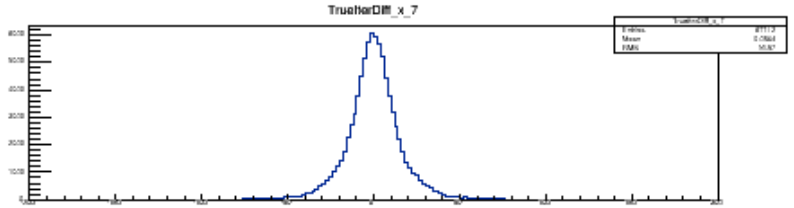


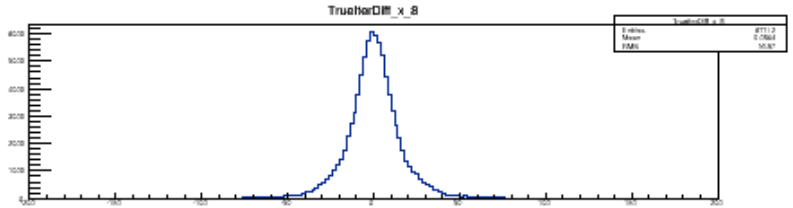
Recon. - True

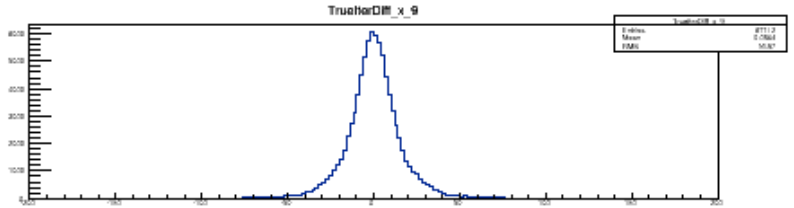




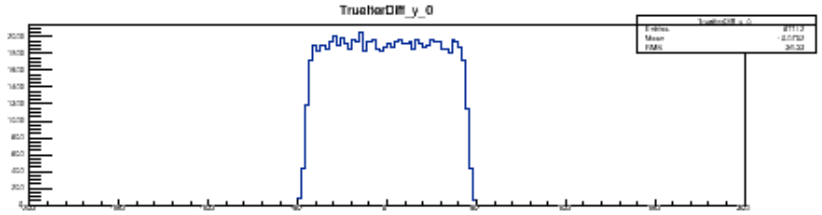


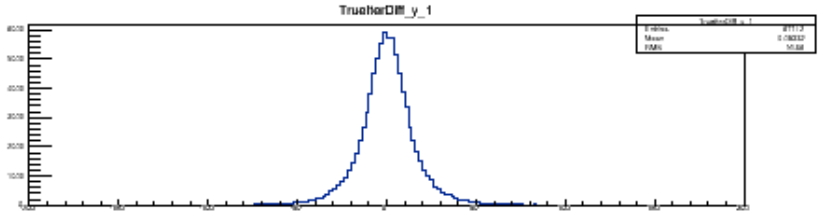


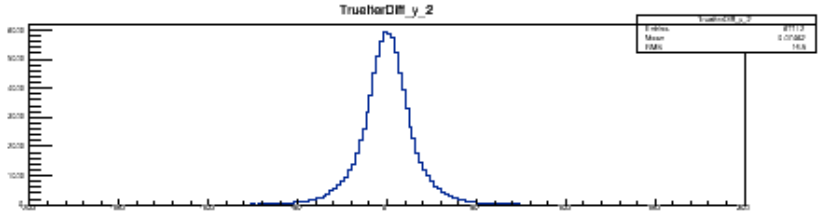


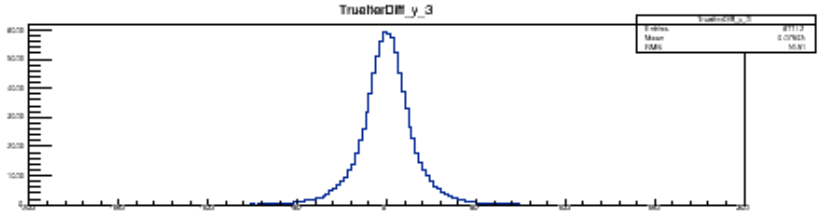


Iterated KlongVertexY

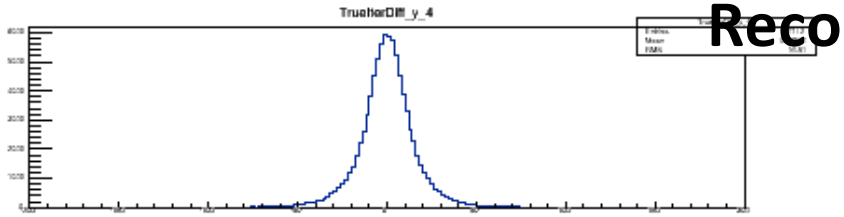


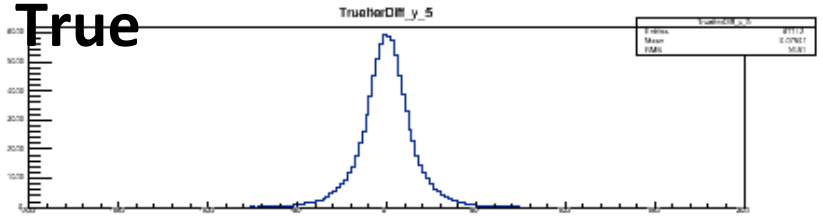


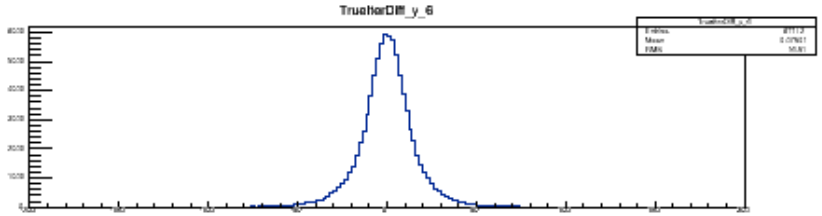


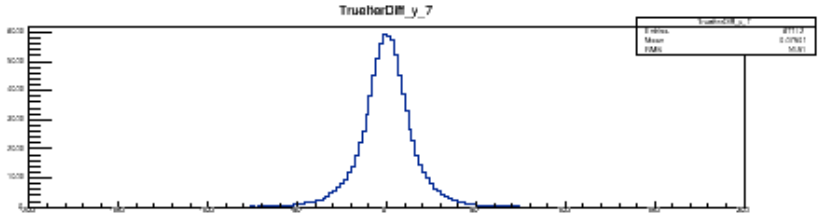


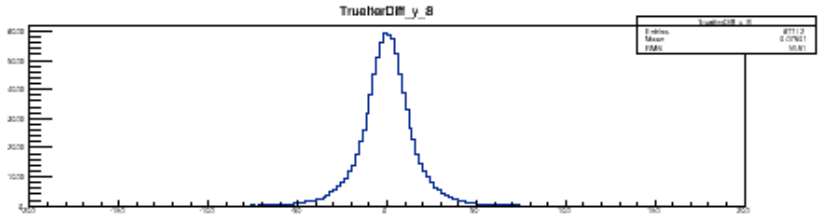
Recon. - True

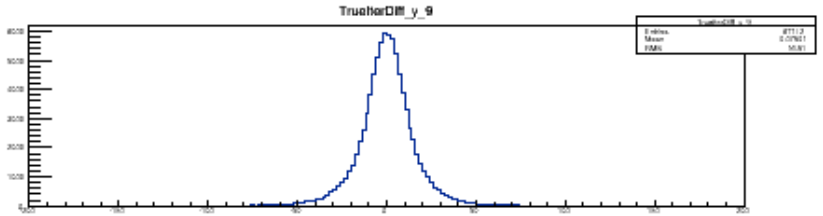




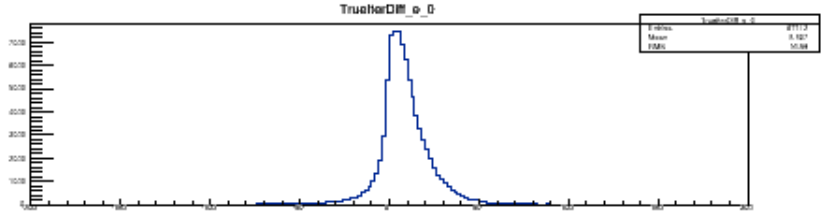


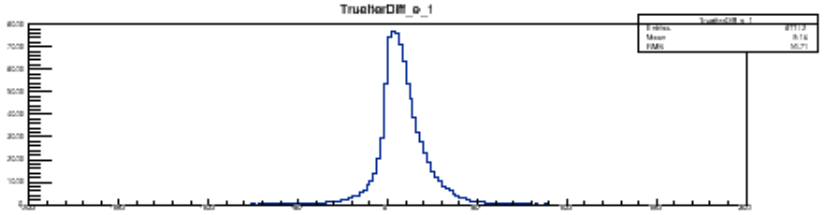


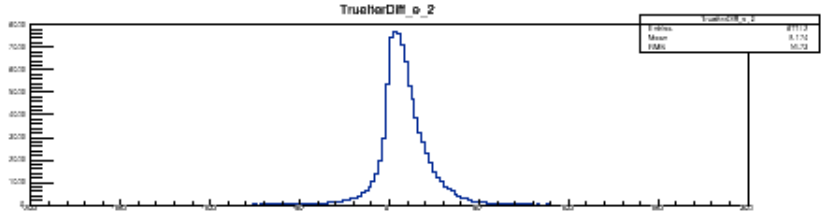


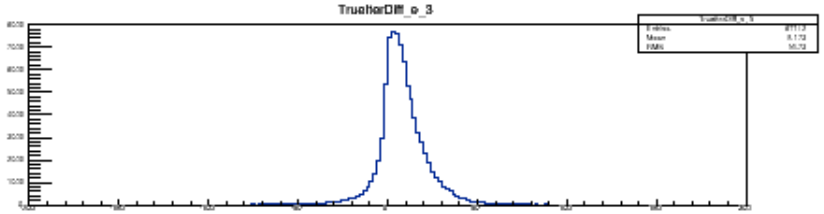


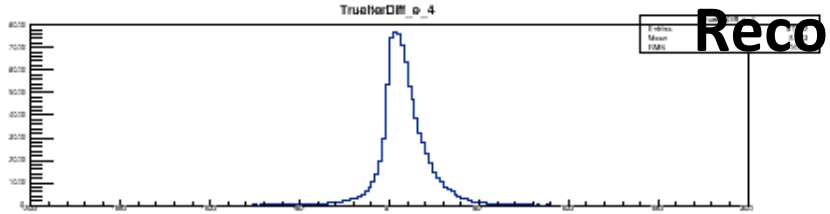
Iterated 6th Gamma Energy



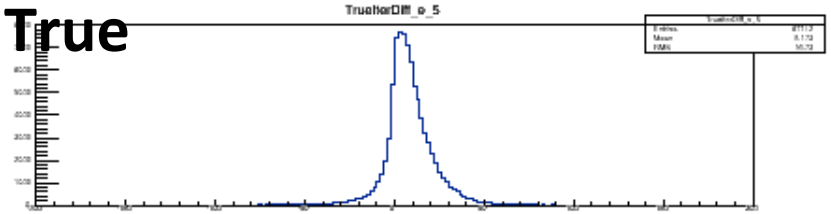


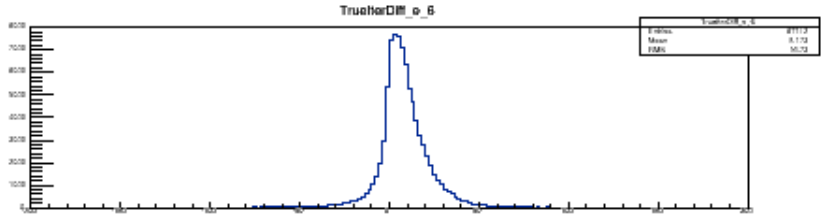


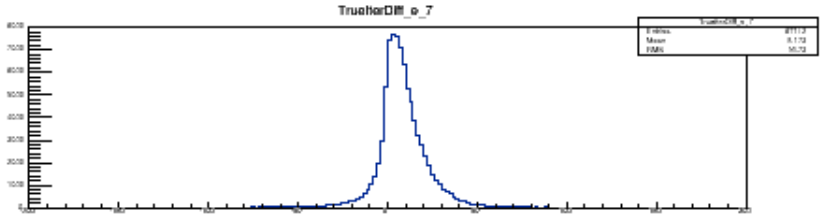


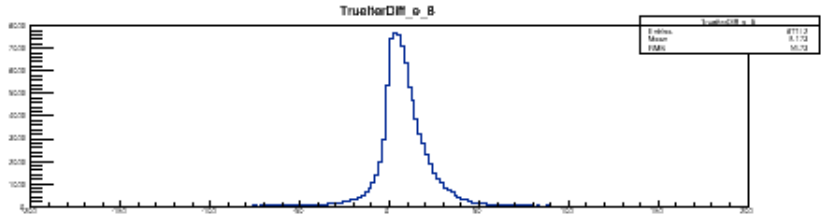


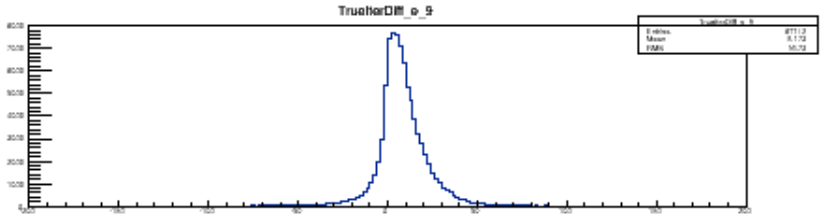
Recon. - True



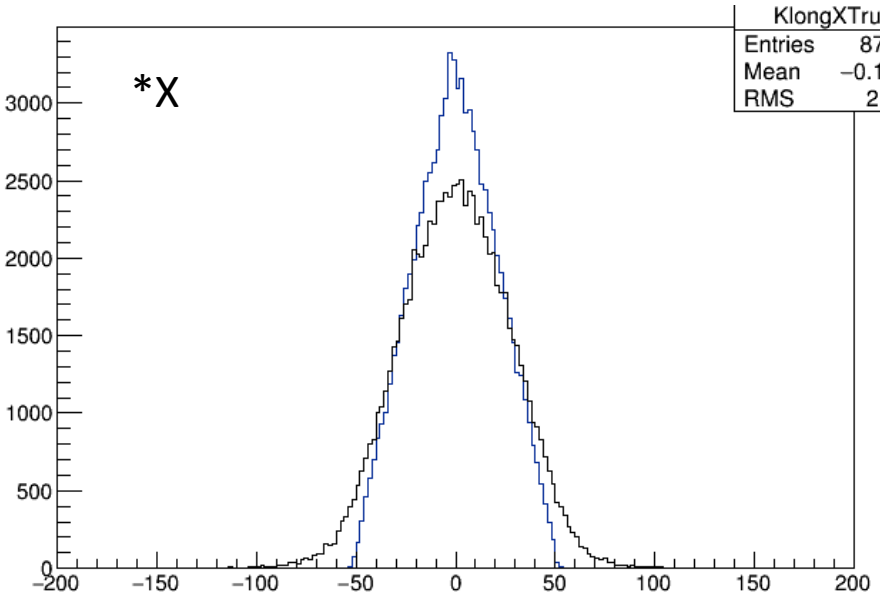


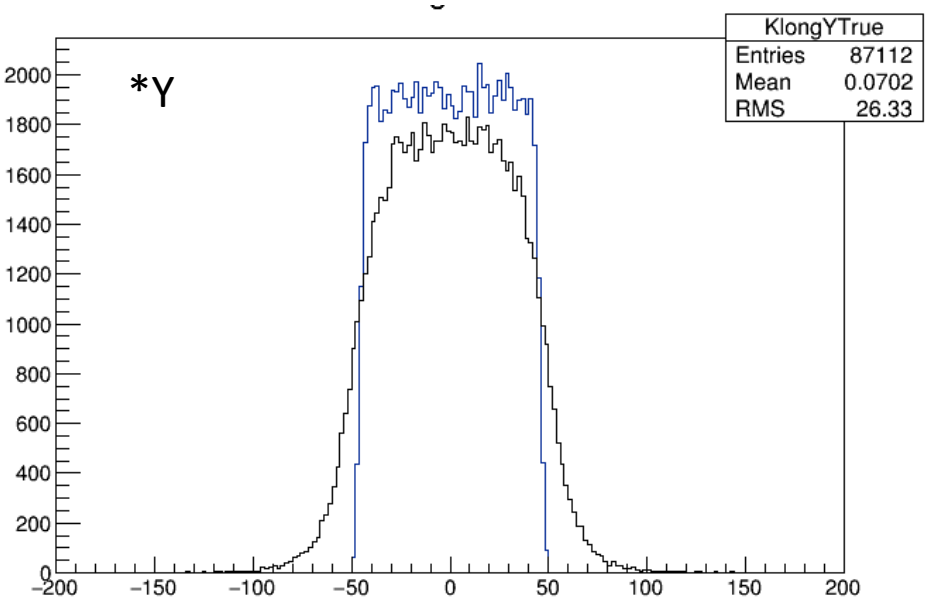




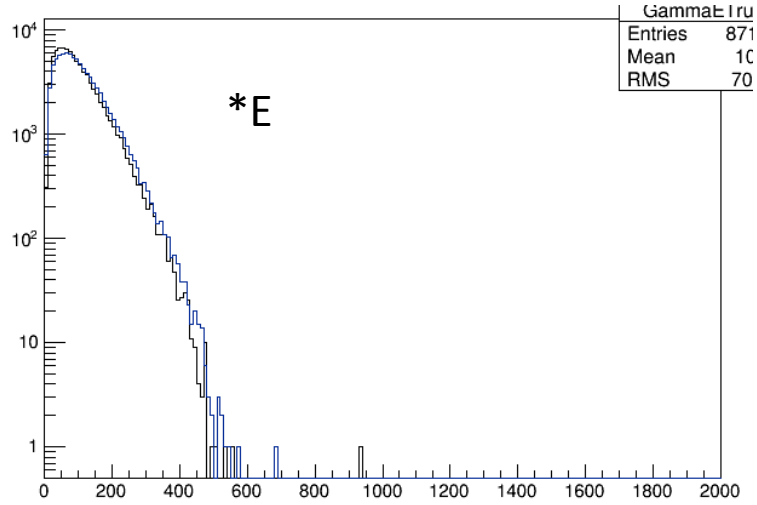


KlongVertex X, Y & 6th Gamma energy

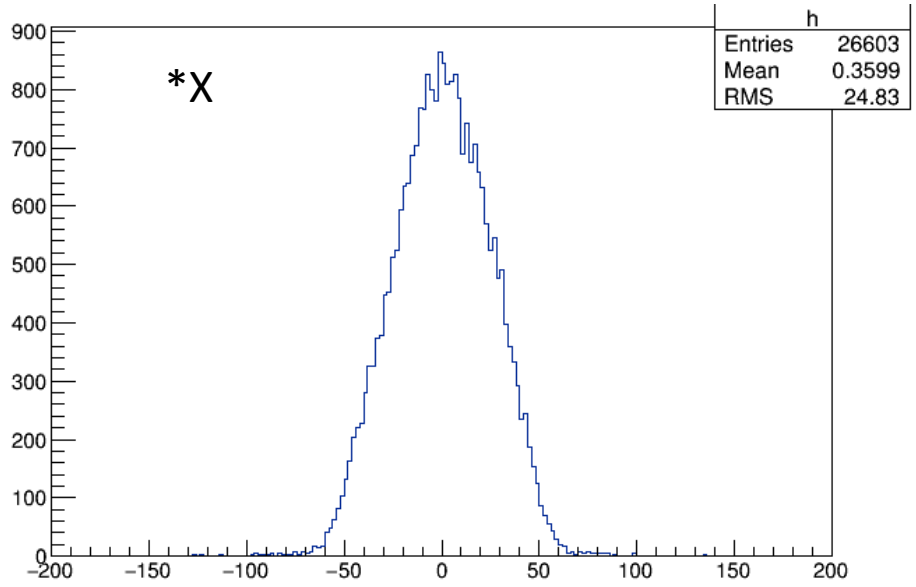


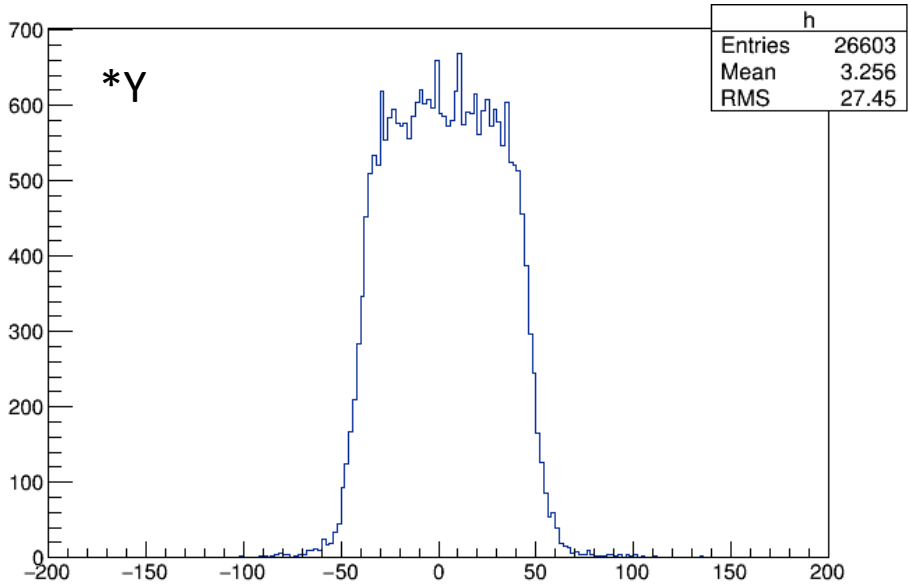


- Blue Line : Generation
- Black : Recon.
  - 9th Iteration

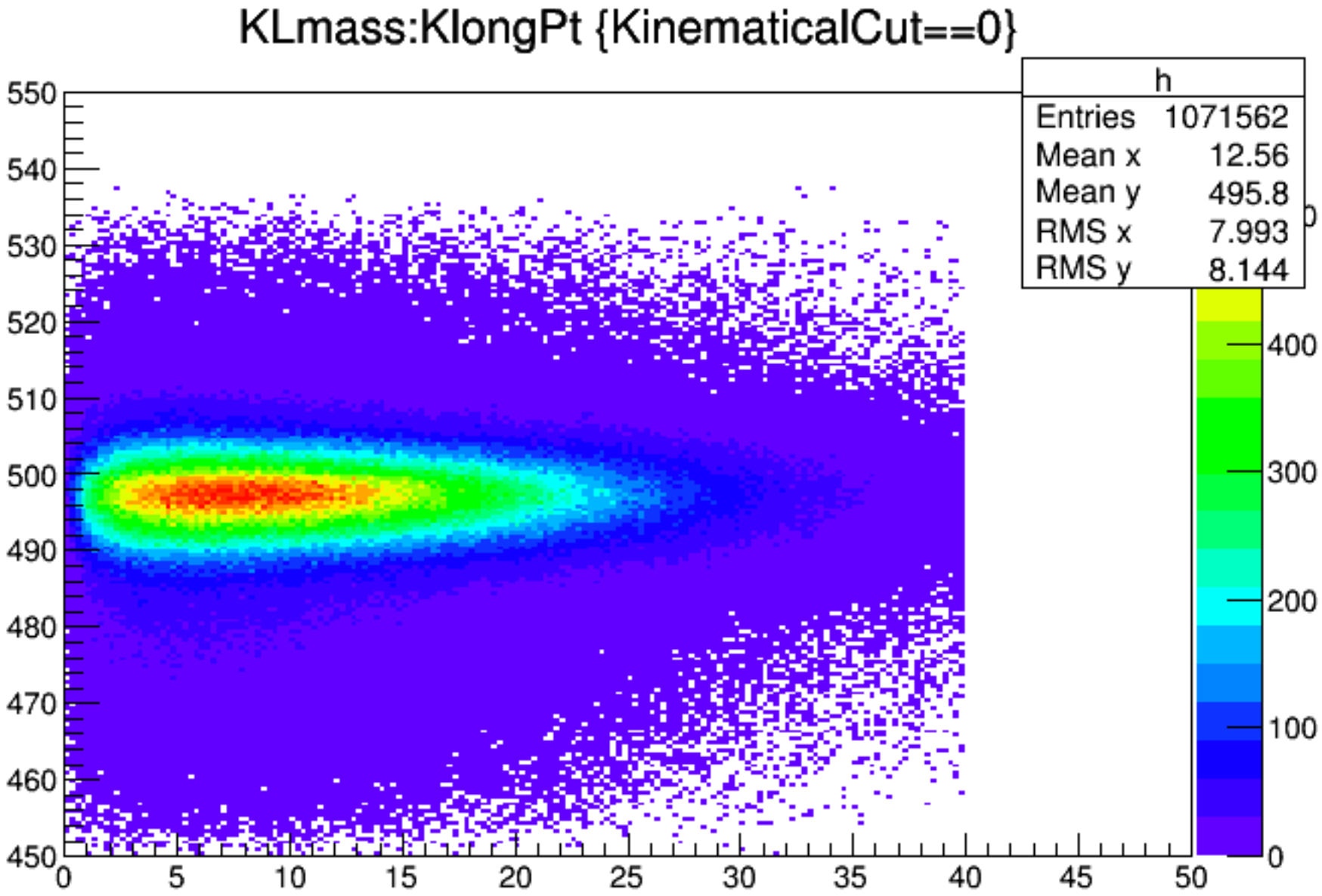


At g6ana


*X
h
Entries 26603
Mean 0.3599
RMS 24.83
900
800
700
600
500
400
300
200
100
0
−200
−150
−100
−50
0
50
100
150
200


*Y
h
Entries 26603
Mean 3.256
RMS 27.45
700
600
500
400
300
200
100
0
−200
−150
−100
−50
0
50
100
150
200

KlongPt vs KlongMass



Summary of pipig analysis

- All Kinematical Cut + Detector Veto
- Acceptance evaluation using MC generation
- Upper limit in 2015 data
- Signal Box
  - Klong Mass- Klong Pt Region
  - Klong Mass = +/- 15 [MeV/c^2]
  - Klong Pt < 30 MeV/c

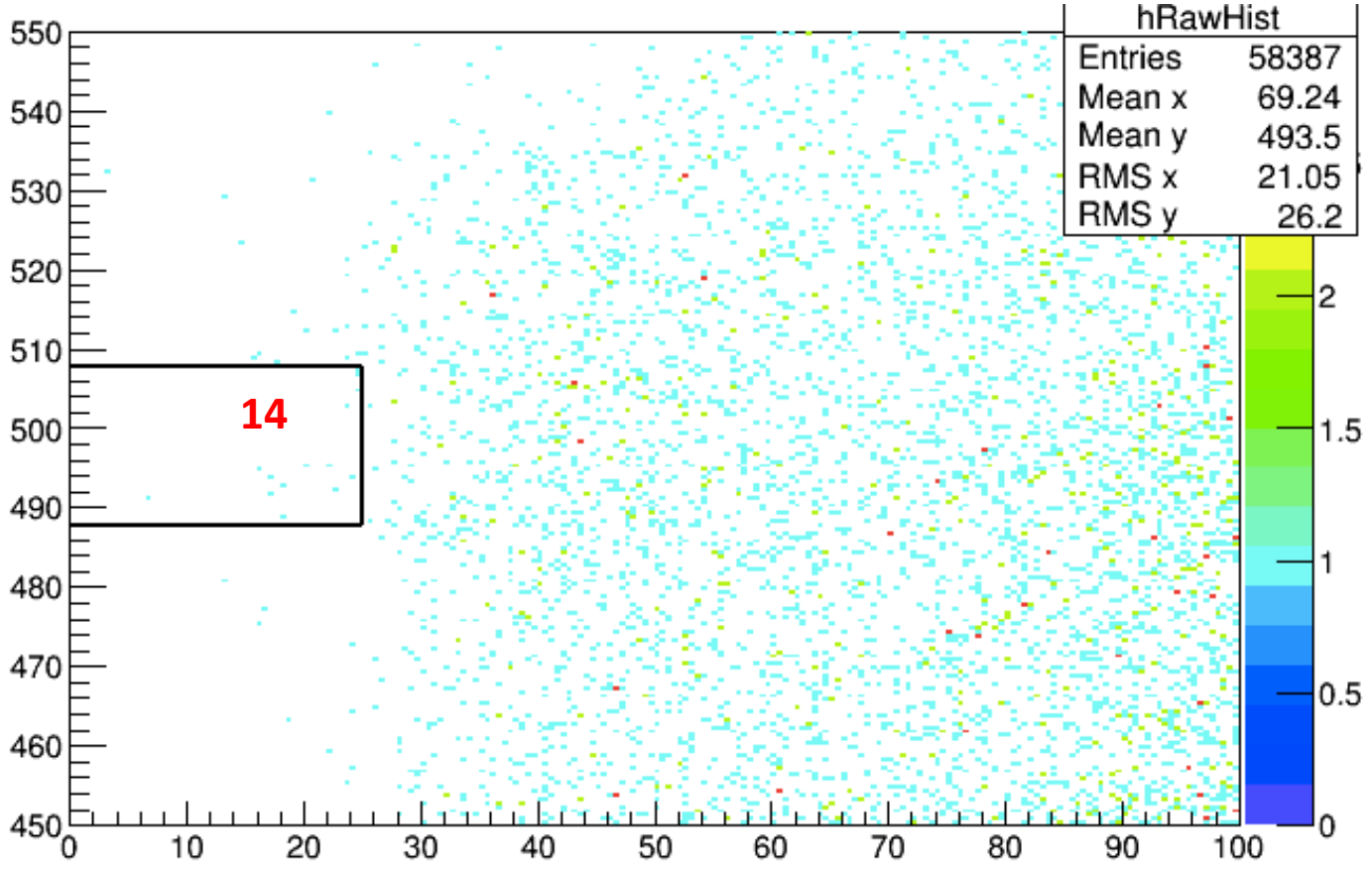
Kinematical Cut list

Cut Variable	Selected region	Cut Variable	Selected region
1st chi2	<2	Shape chi2	< 10
2nd chi2 – 1st chi2	>10	Pi0 mass	< +/- 10 [MeV/c^2]
Pi0 mass diff	<+/-5 [MeV/c^2]	Dalitz cut	Graphical Cut
Gamma energy	100<e<2000 [MeV]	klong vertex	2500<vtz<5500 [mm]
Radial gamma position	150<r<850 [mm]		
Gamma distance	> 150 [mm]		
Fake pi0 mass	< +/-15 [MeV/c^2]		

- Fake Pi0 Mass
  - Invariant mass of 5th gamma + one gamma among 4

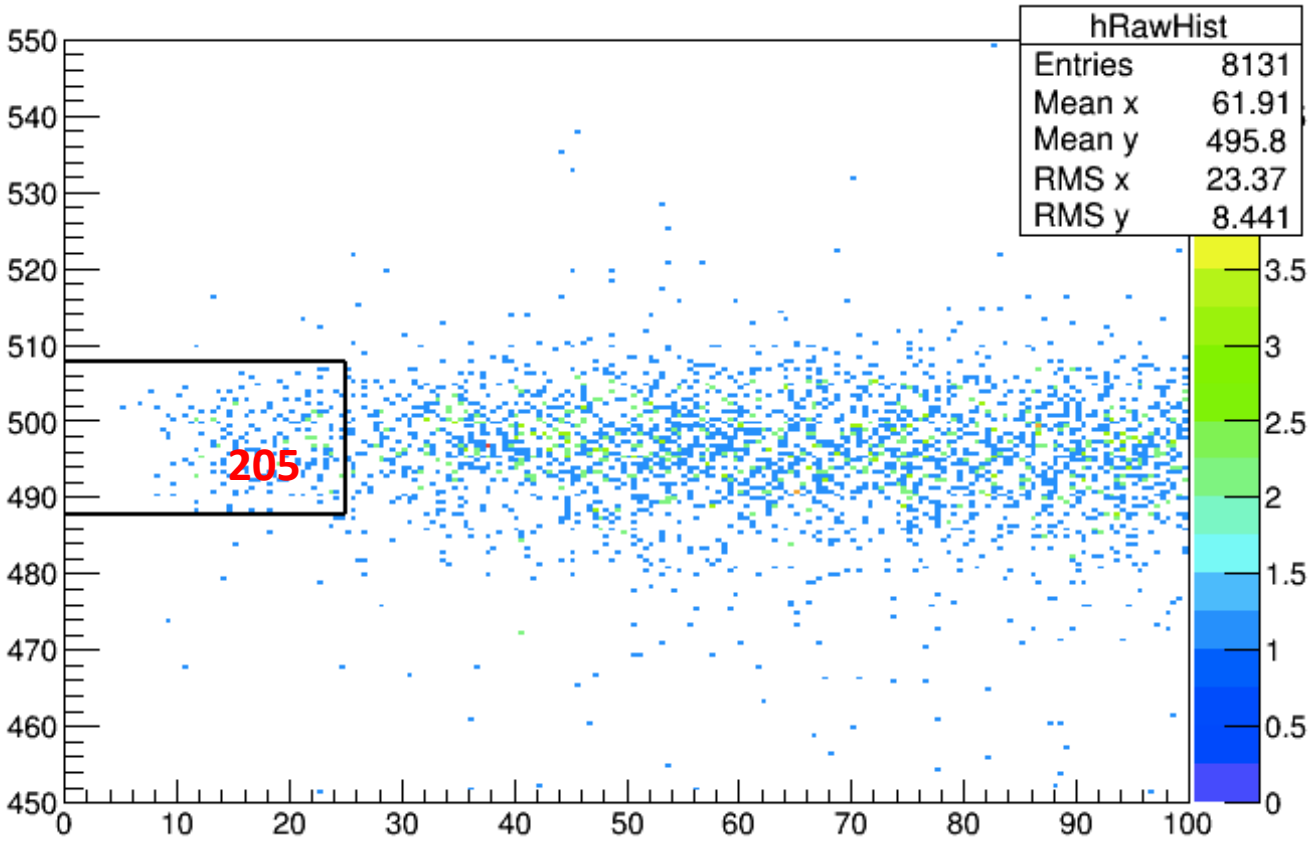
Kinematical Cut + Detector Veto

- Checking the changes of #events in signal box after applying all cuts.



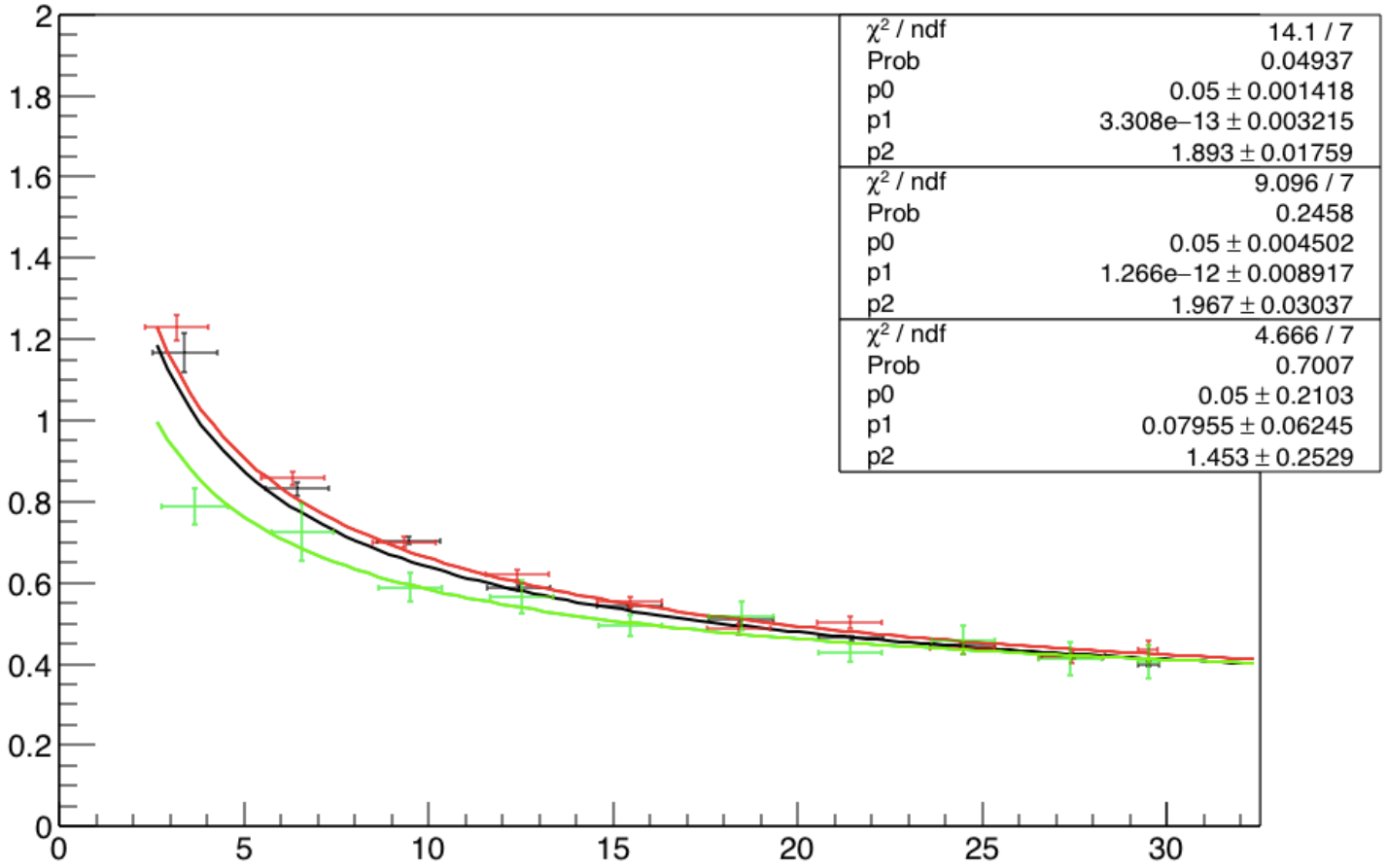
2015 All data

Acceptance, upper limit



- #KLs = 10^9 at the starting point of KOTO system
  - With KL pipig mode
  - Acceptance = one event per $4.87*10^7$ KL pipig
- In 2015 data, $1.28*10^{11}$ KL
  - With assumption that there are no events in signal box(currently, we have 14 events)
  - Upper limit = $4.87*10^7 / 1.28*10^{11} = 3.80*10^{-4}$

Timing resolution in full deposited energy region



Applying Vertex Time Cut to 5g+1g analysis

- 222329->10178 (Run62)
- Mass distributions which survive vertex time cut