Muon Isolation Analysis
Status Report
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Status

We are looking for a way to separate out muons from our dark photon signal and hence distinguish them from muons coming from noises like resonances, Drell-Yan process, etc...

We studied the distribution of the number of tracks within different cone sizes about the leading muon as a function of invariant mass of dimuon.

Preselections

PV with the largest ndof

GRL

Removal of bad jets

Trigger: EF_mu18_MG

Muon Pt > 10GeV

Eta < 2.4

z0_exPV < 10mm & d0_exPV < 10mm

z0sig_exPV < 10mm & d0sig_exPV < 10mm

Staco on combined muon

Integrated luminosity ~ 1fb^-1

Track Definition

Good track is defined as follow

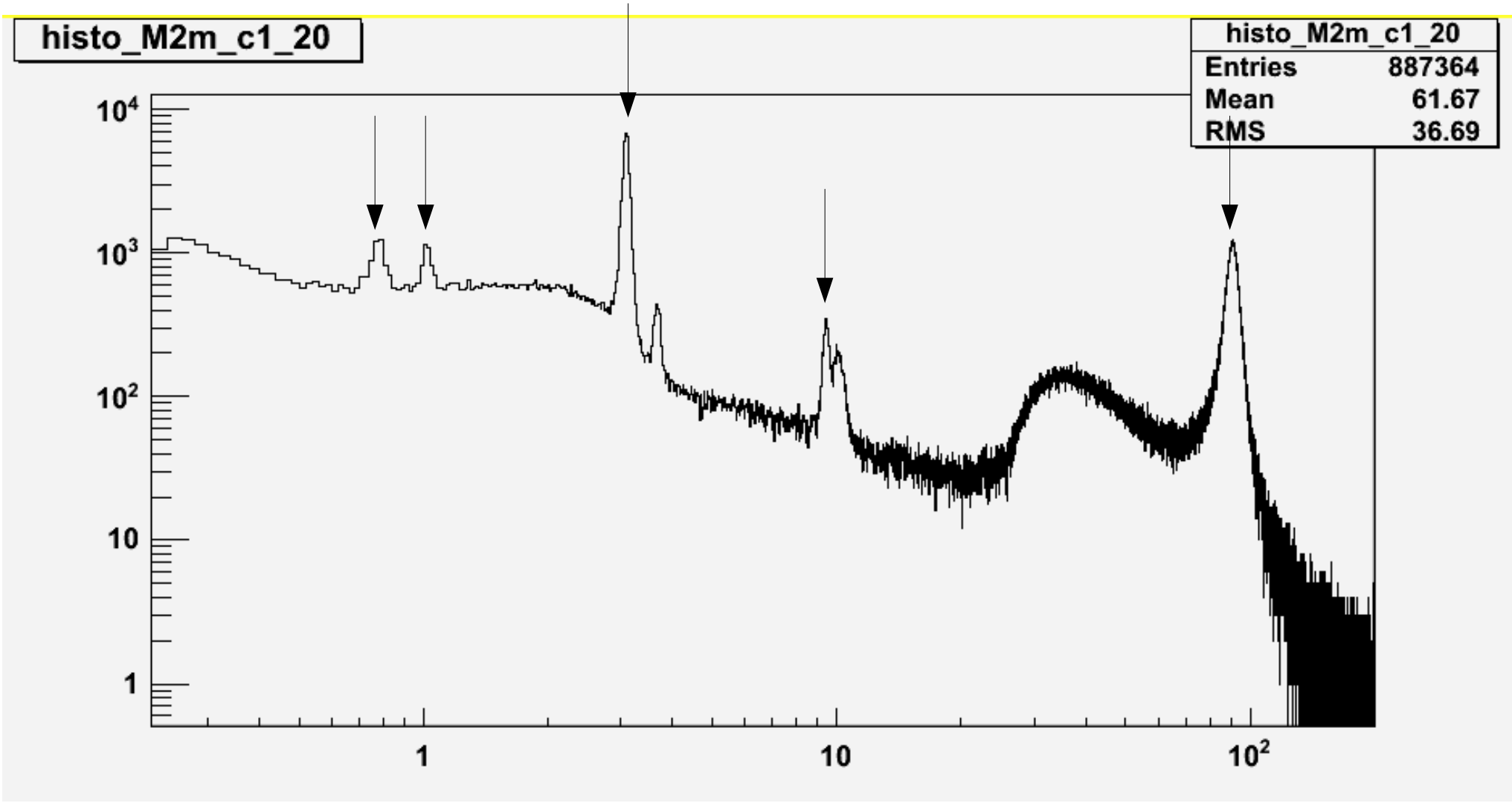
trkpt5_pt > 1GeV

trkpt5_nPixHits > 1

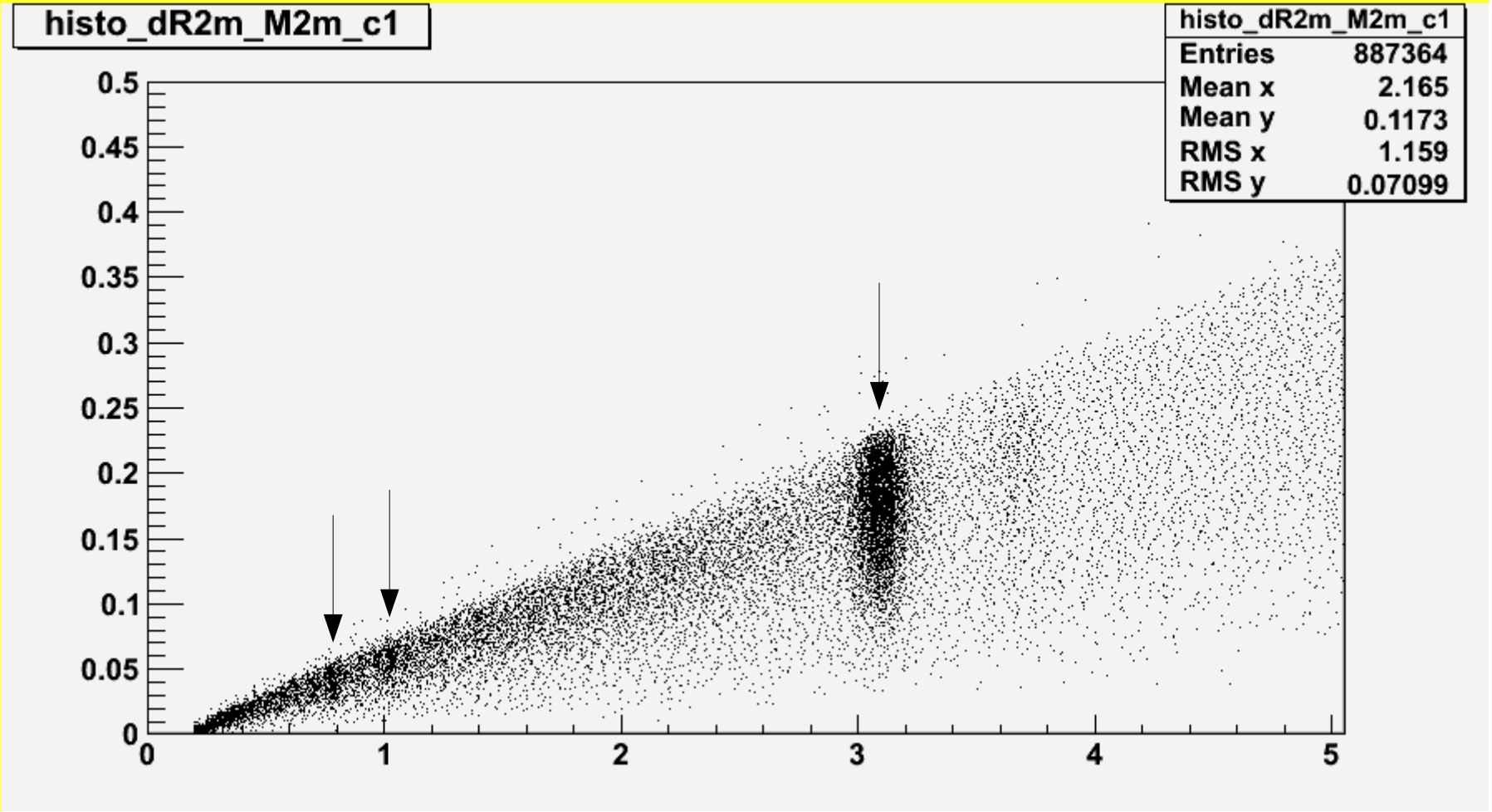
trkpt5_nSCTHits > 5

We counted the number of tracks (nTrk - 1) within a certain cone size from the leading muon.

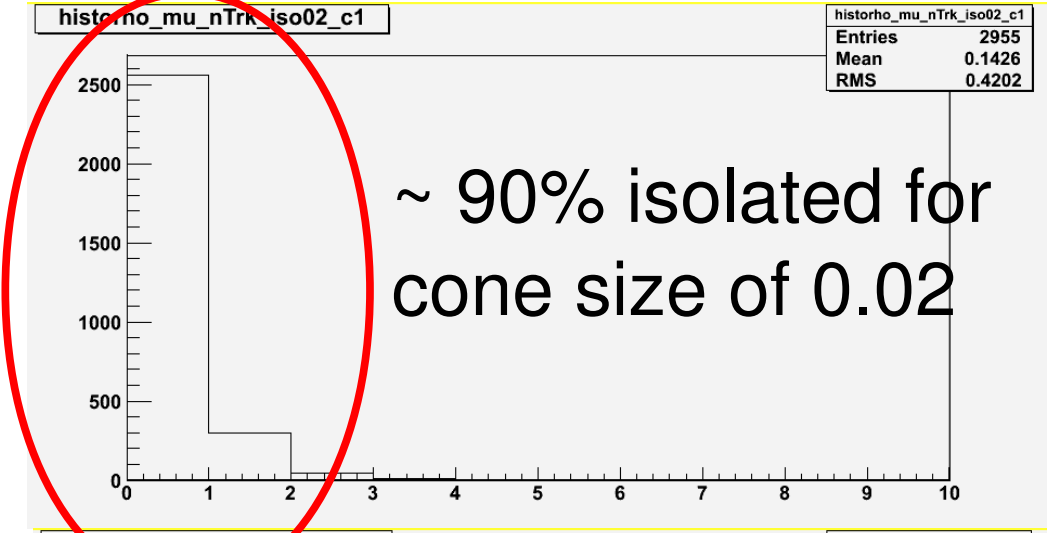
M2m Distribution

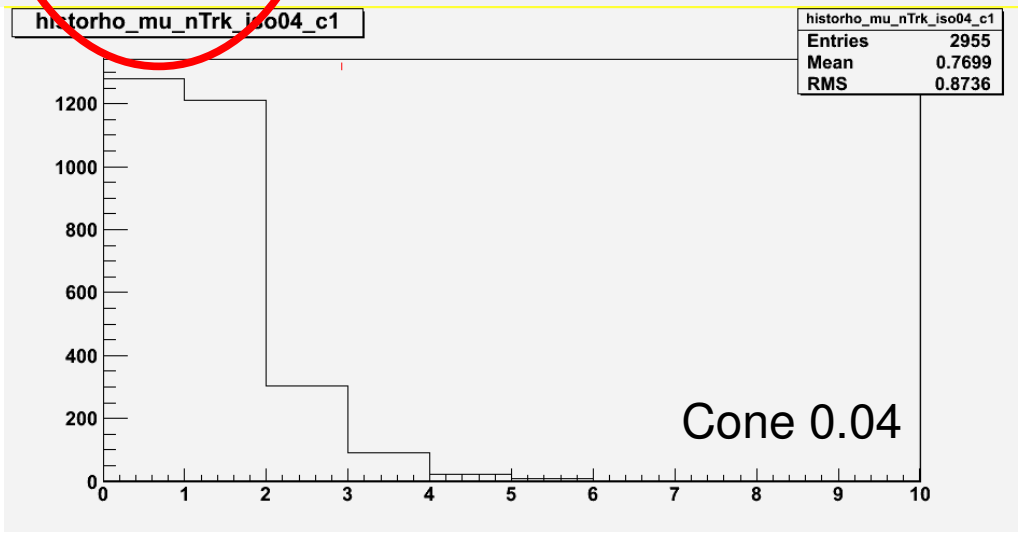


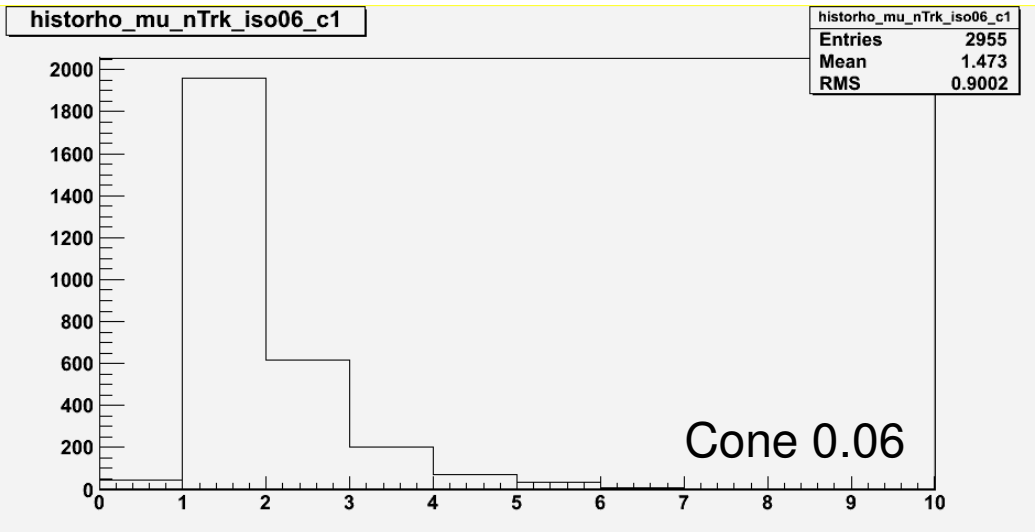
ΔR2m vs M2m Distribution

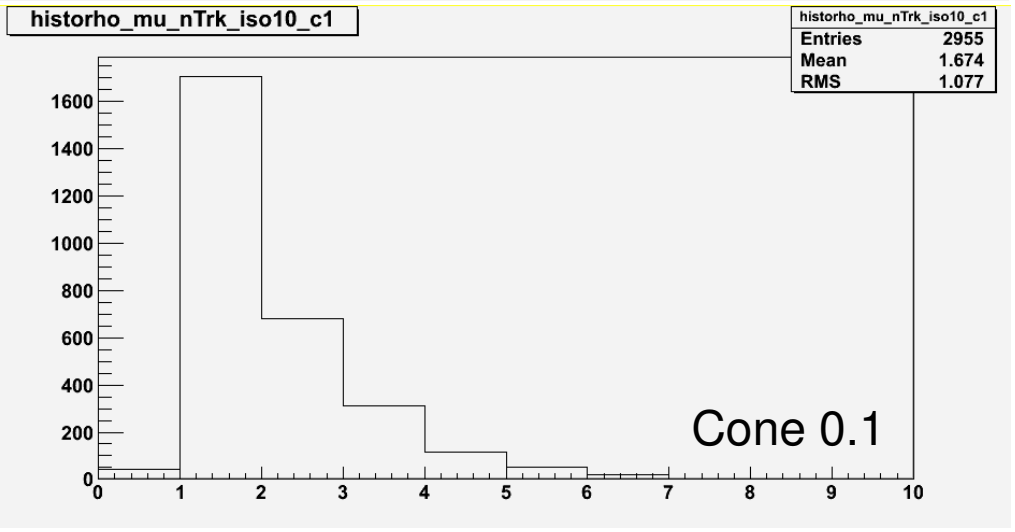


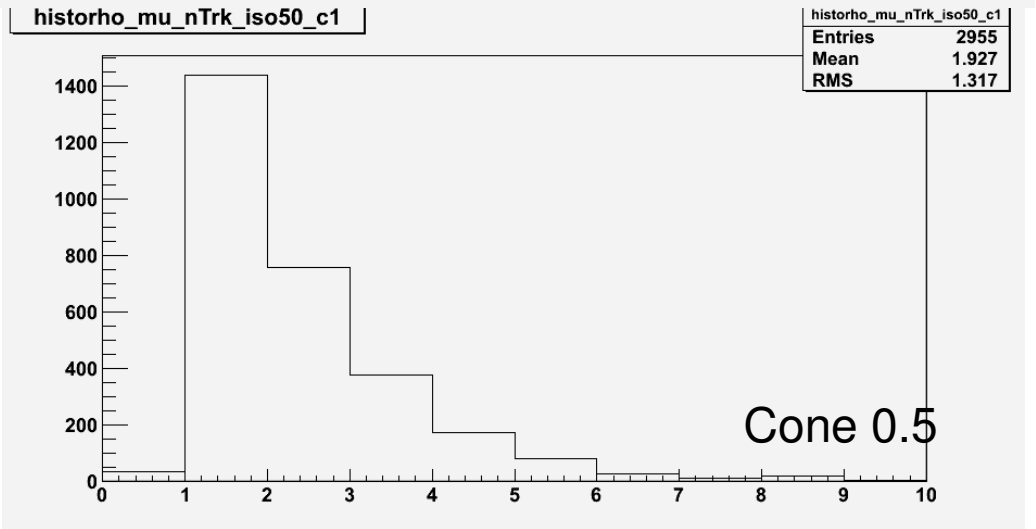
nTrk Distribution for ω/ρ



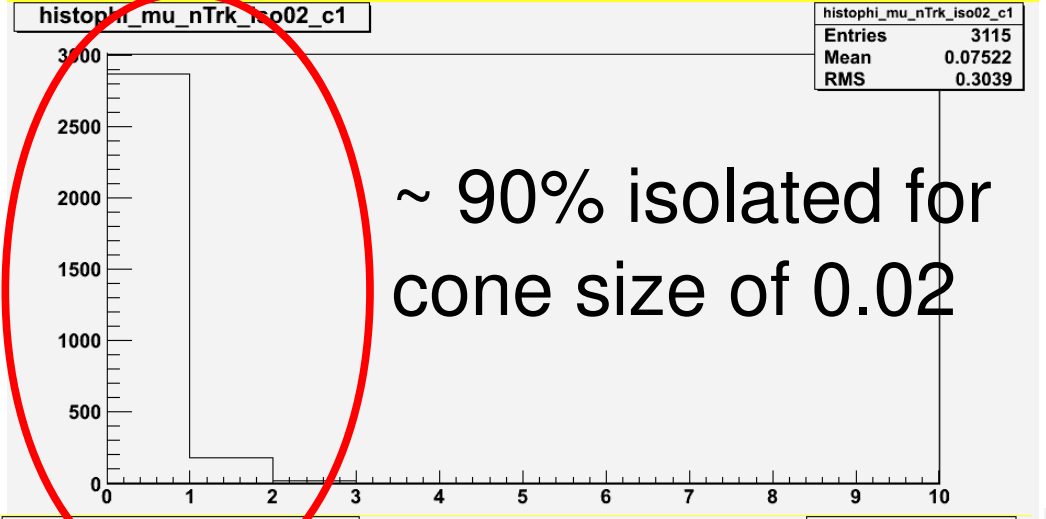




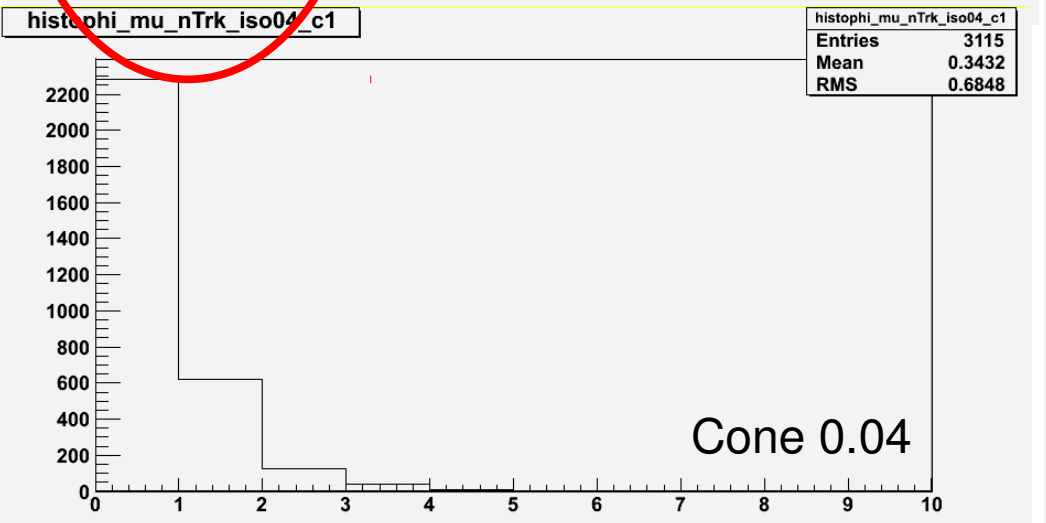


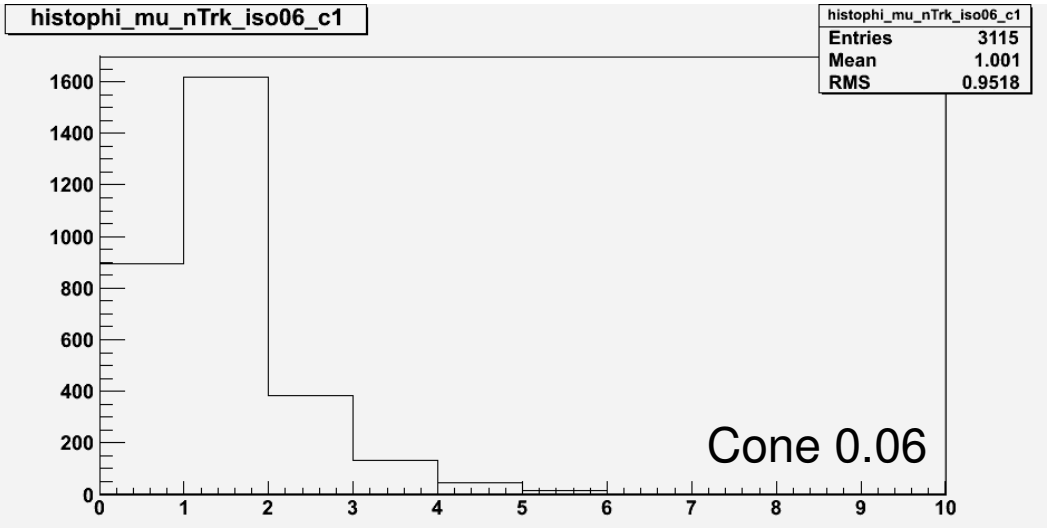


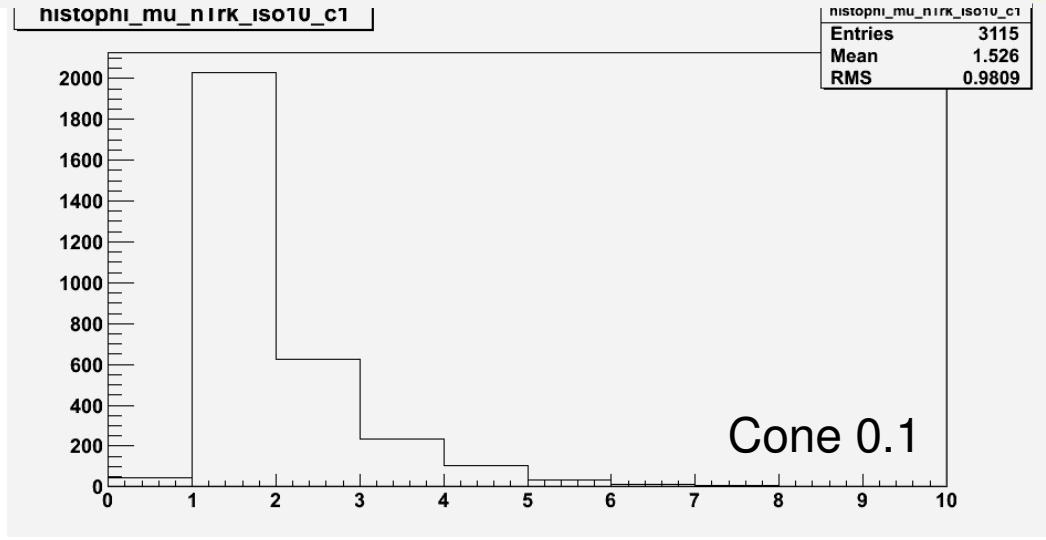
nTrk Distribution for Φ

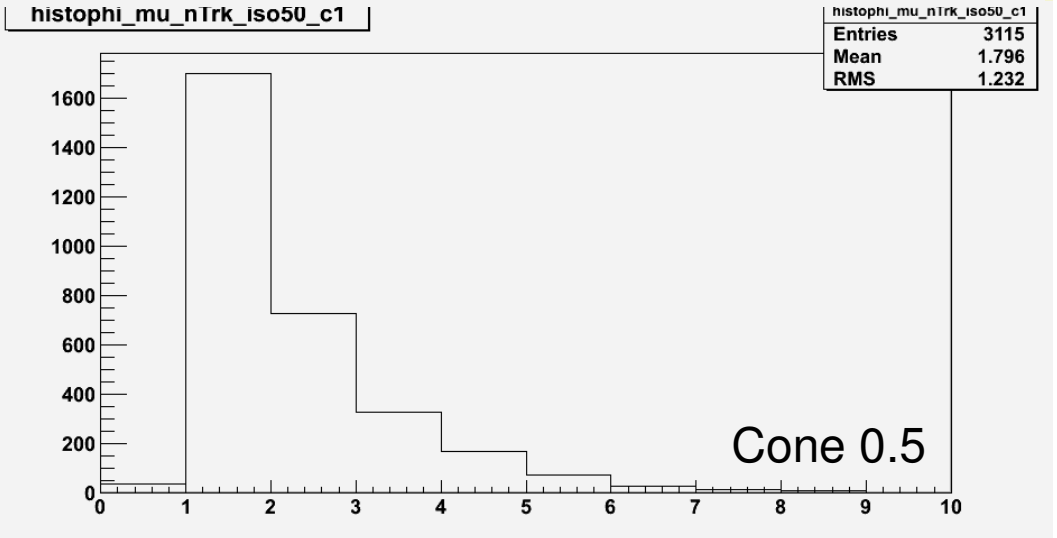


~ 90% isolated for cone size of 0.02

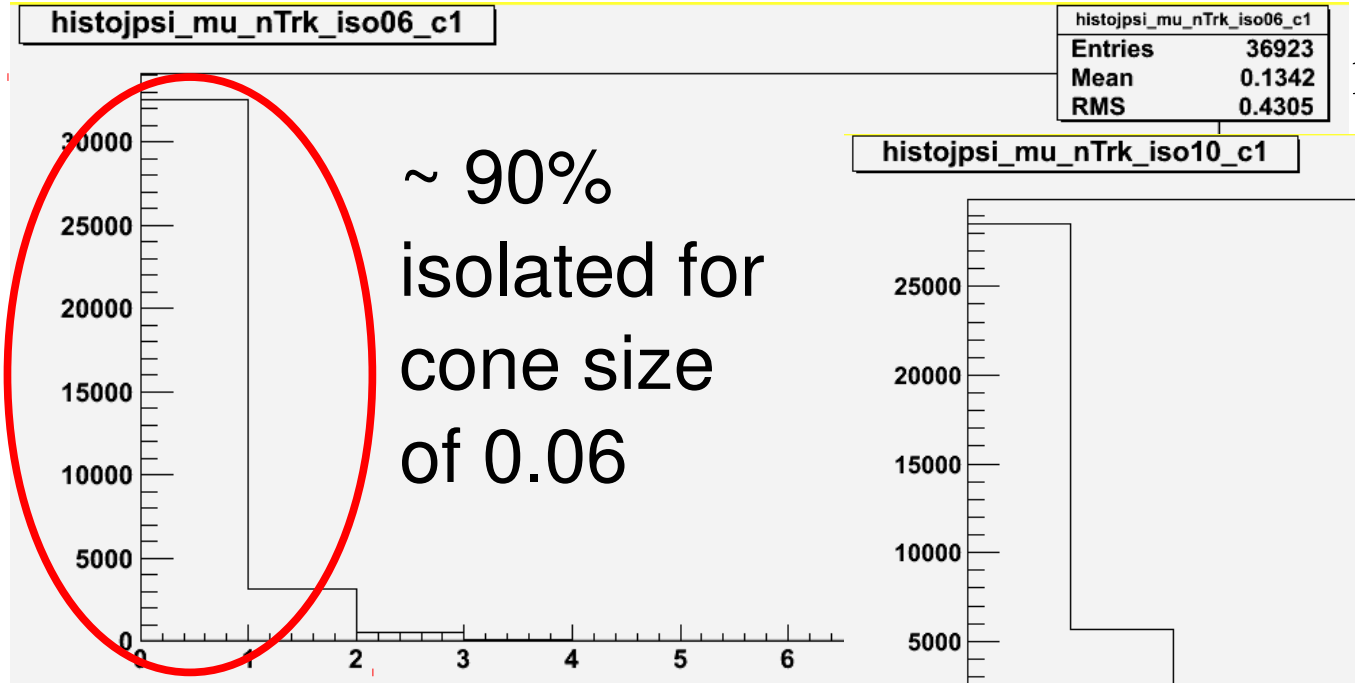


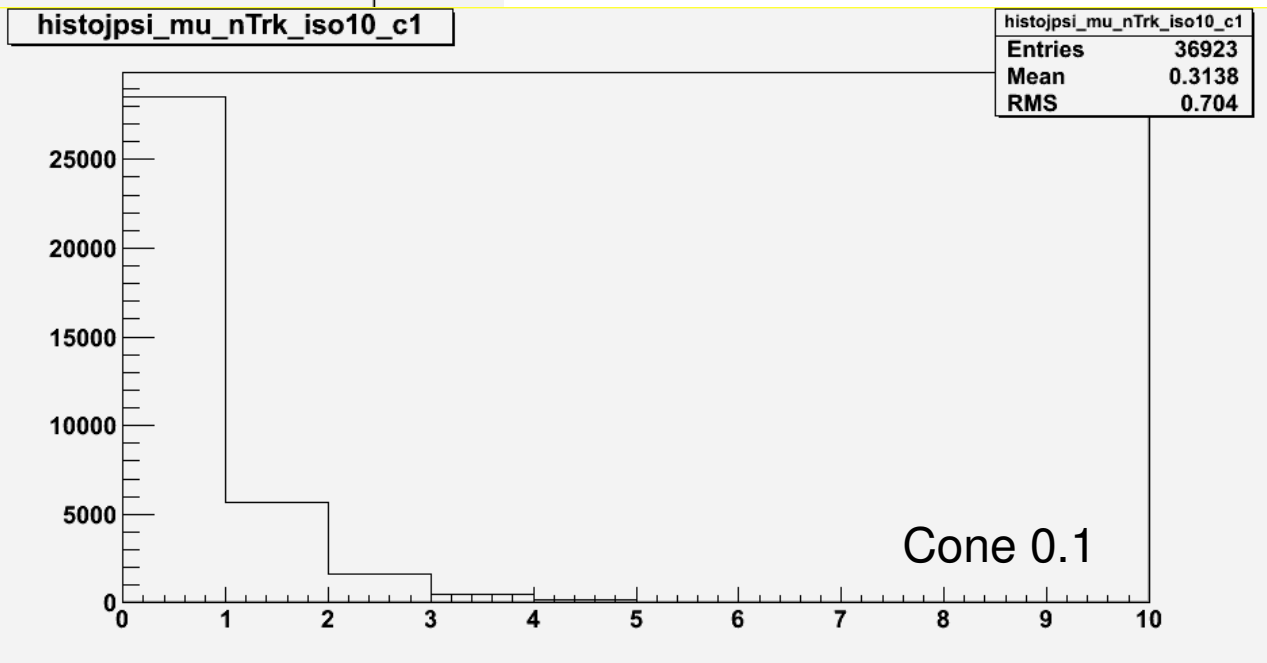


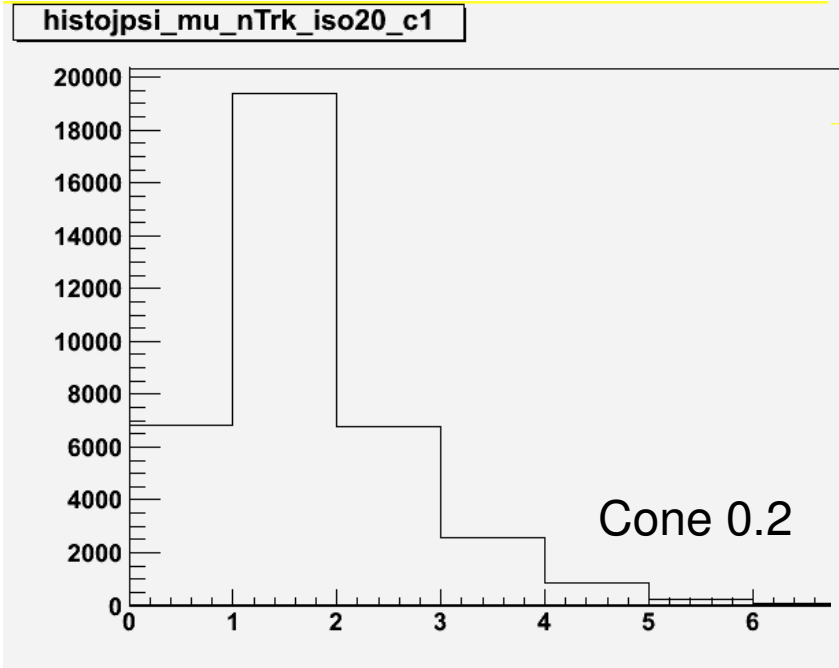


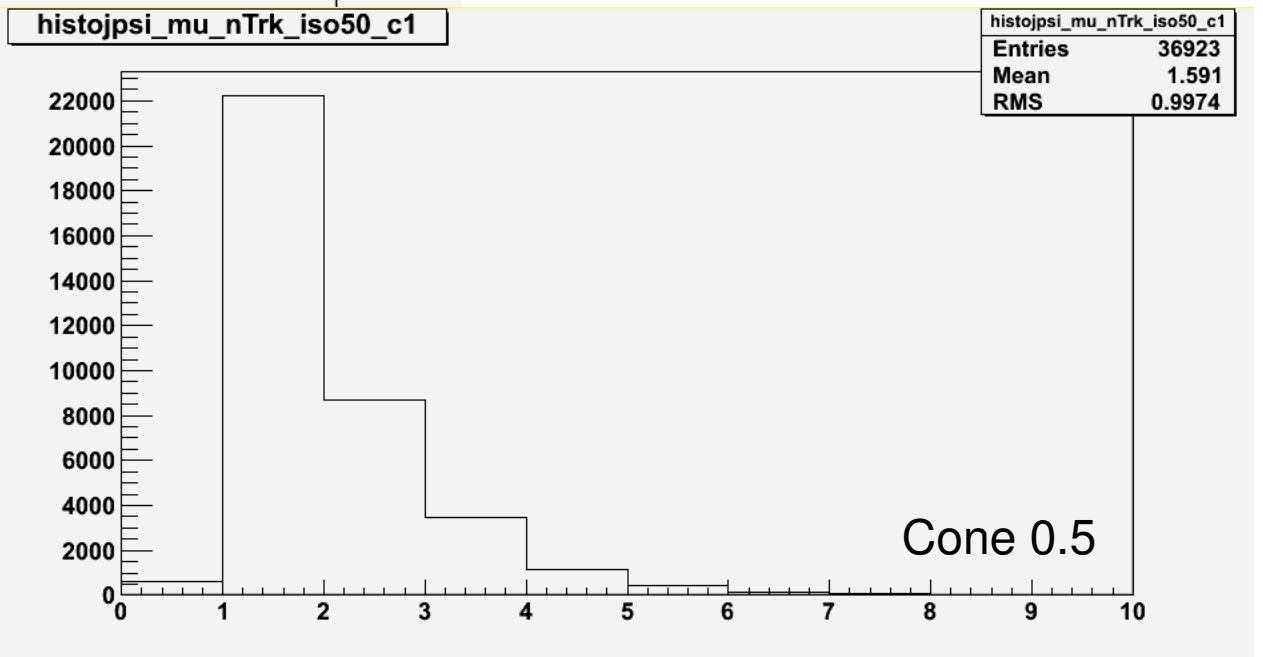


nTrk Distribution for J/Ψ

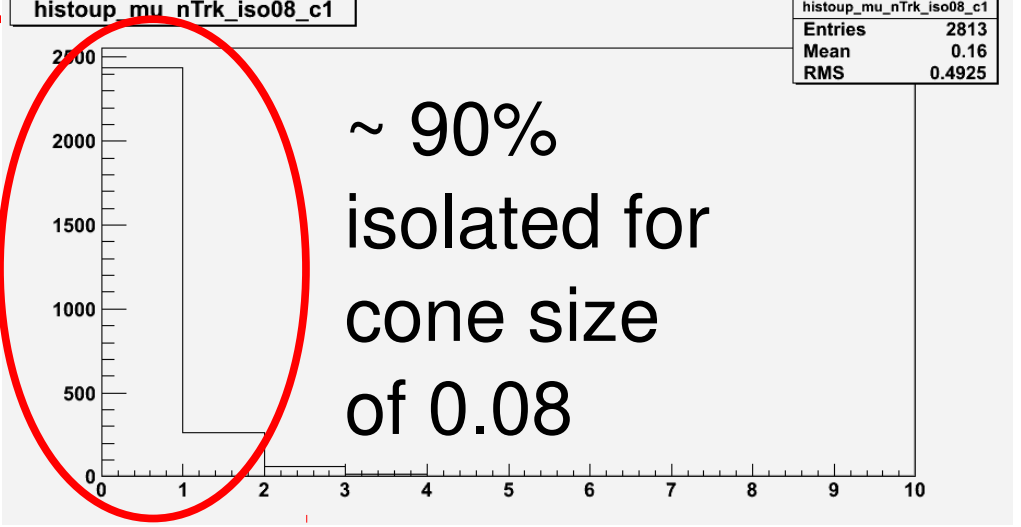


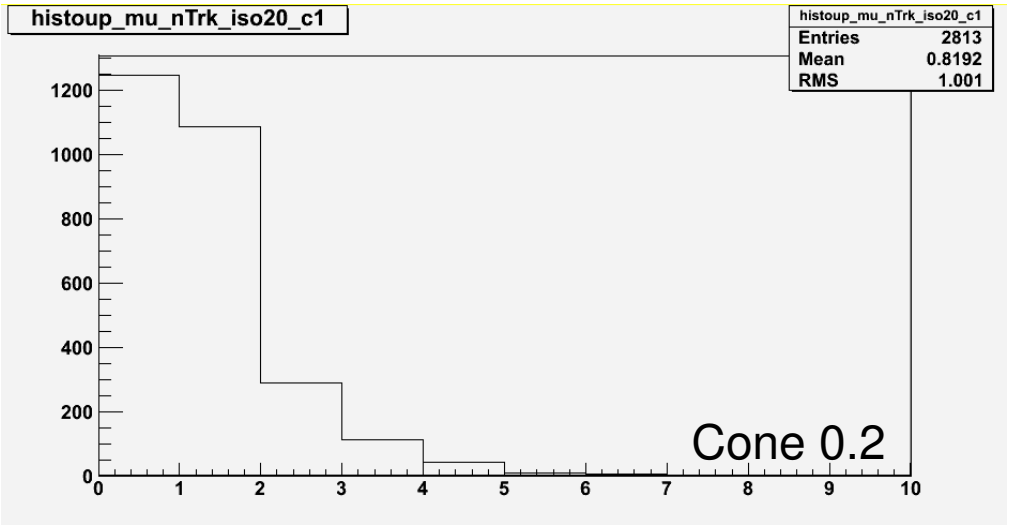


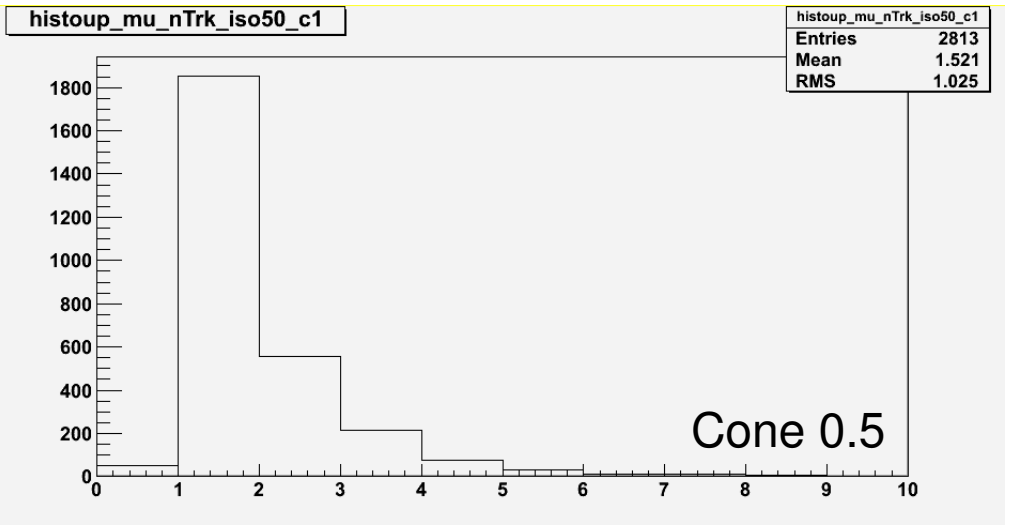


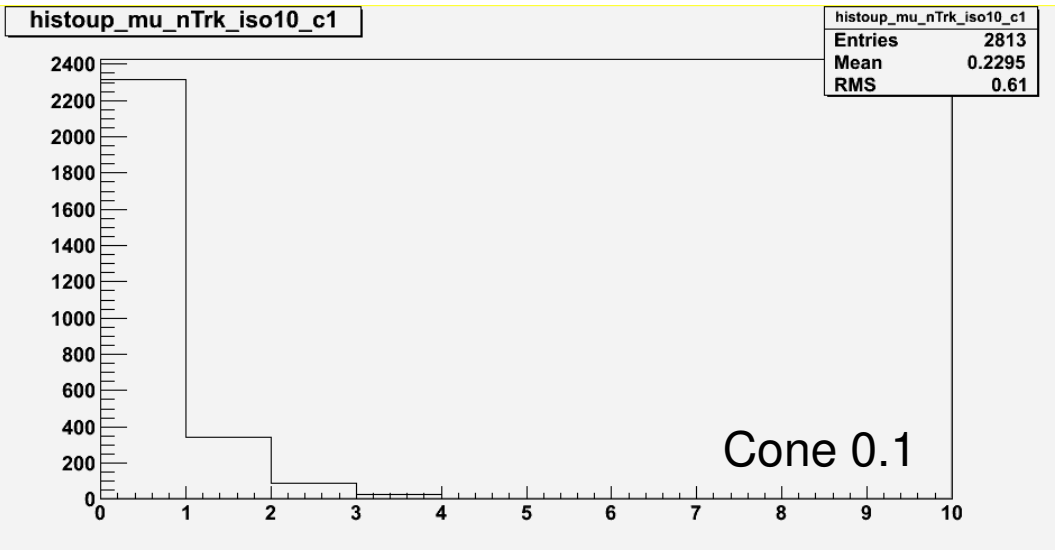


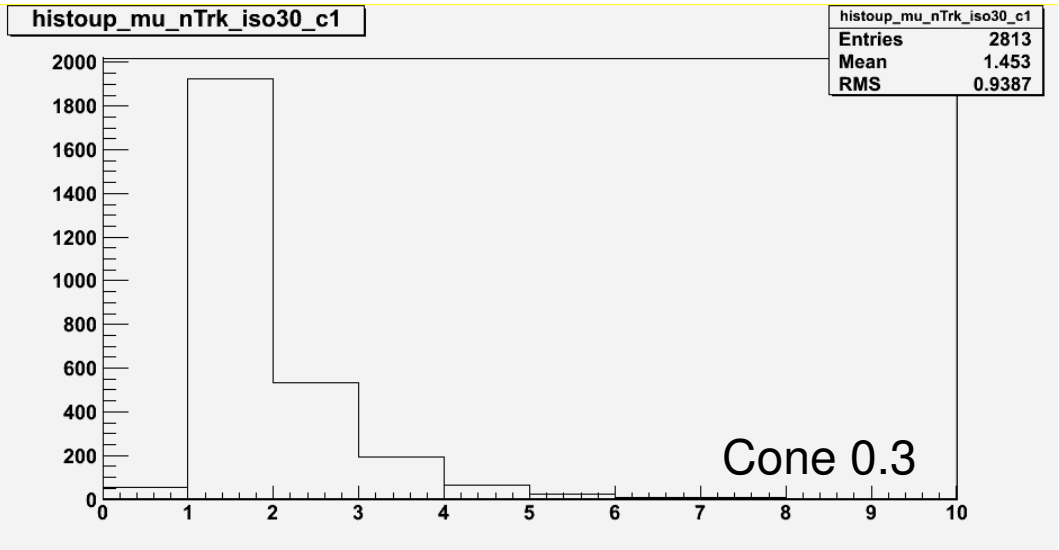
nTrk Distribution for Upsilon

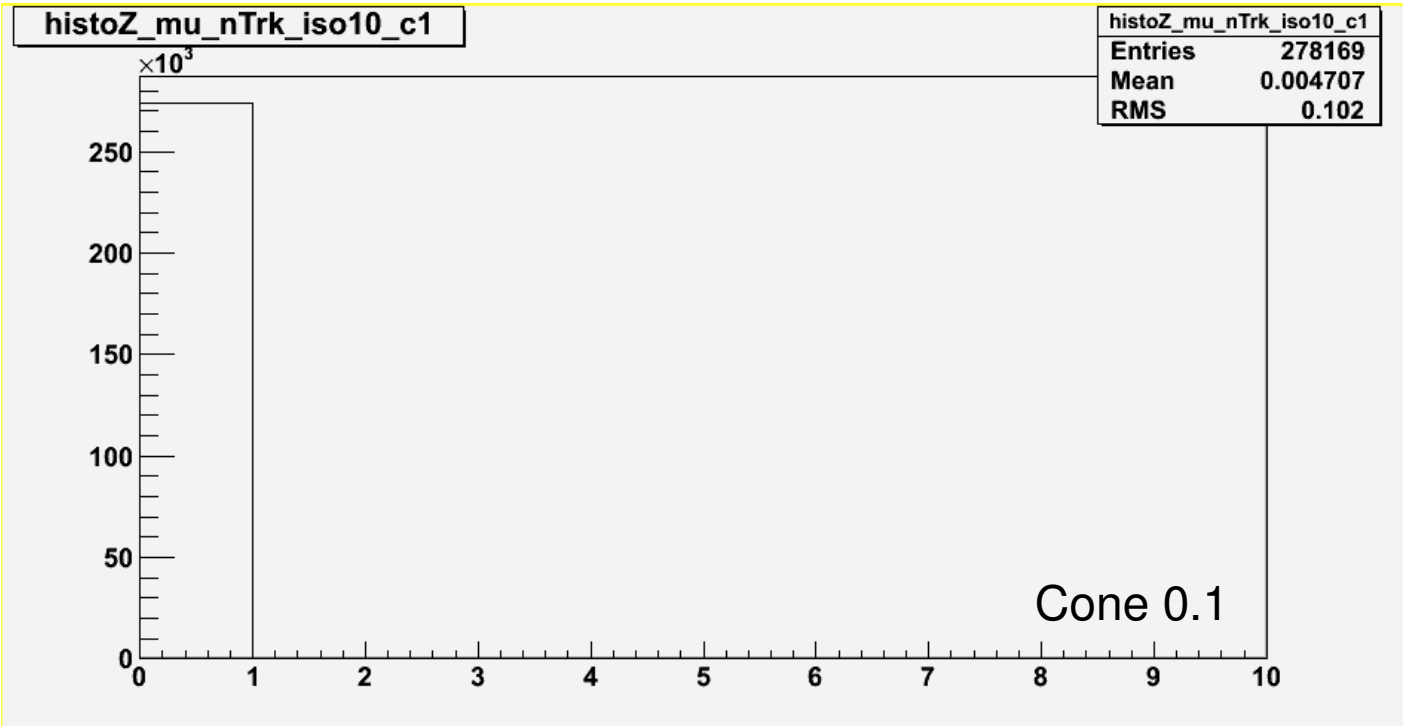




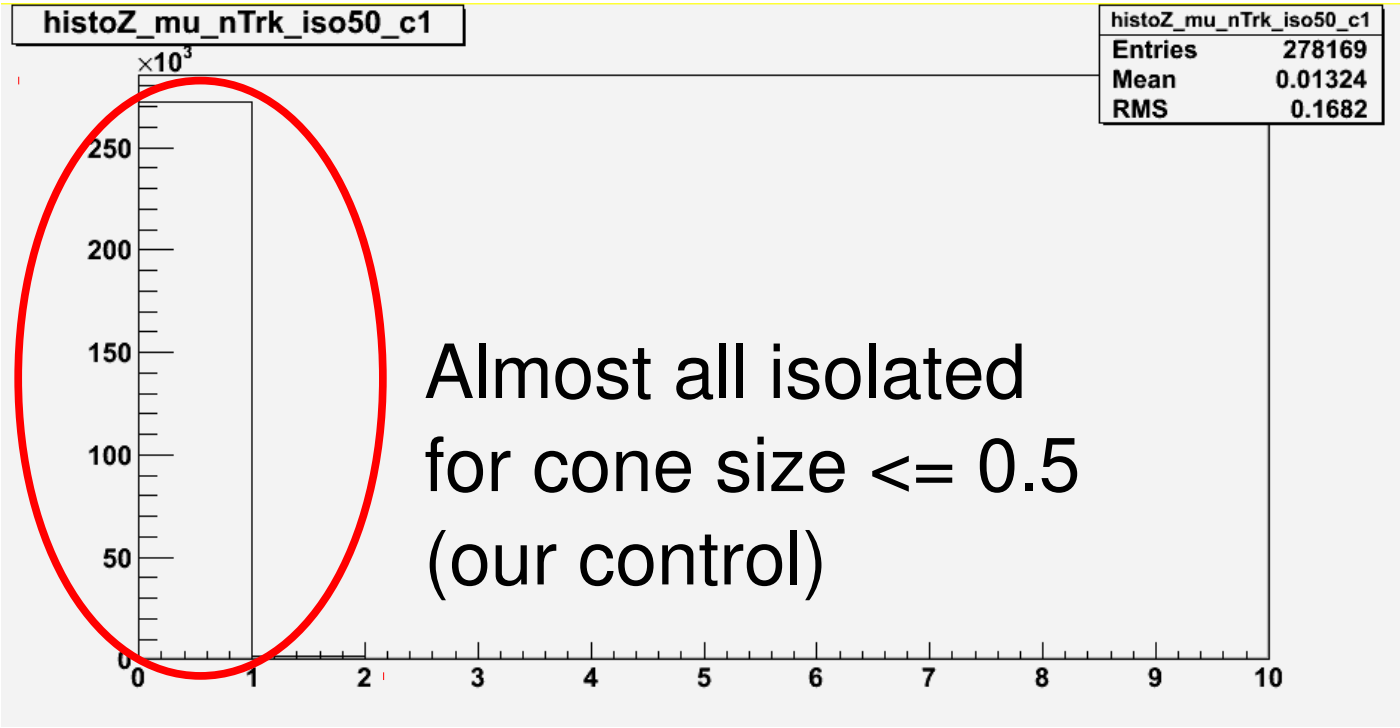


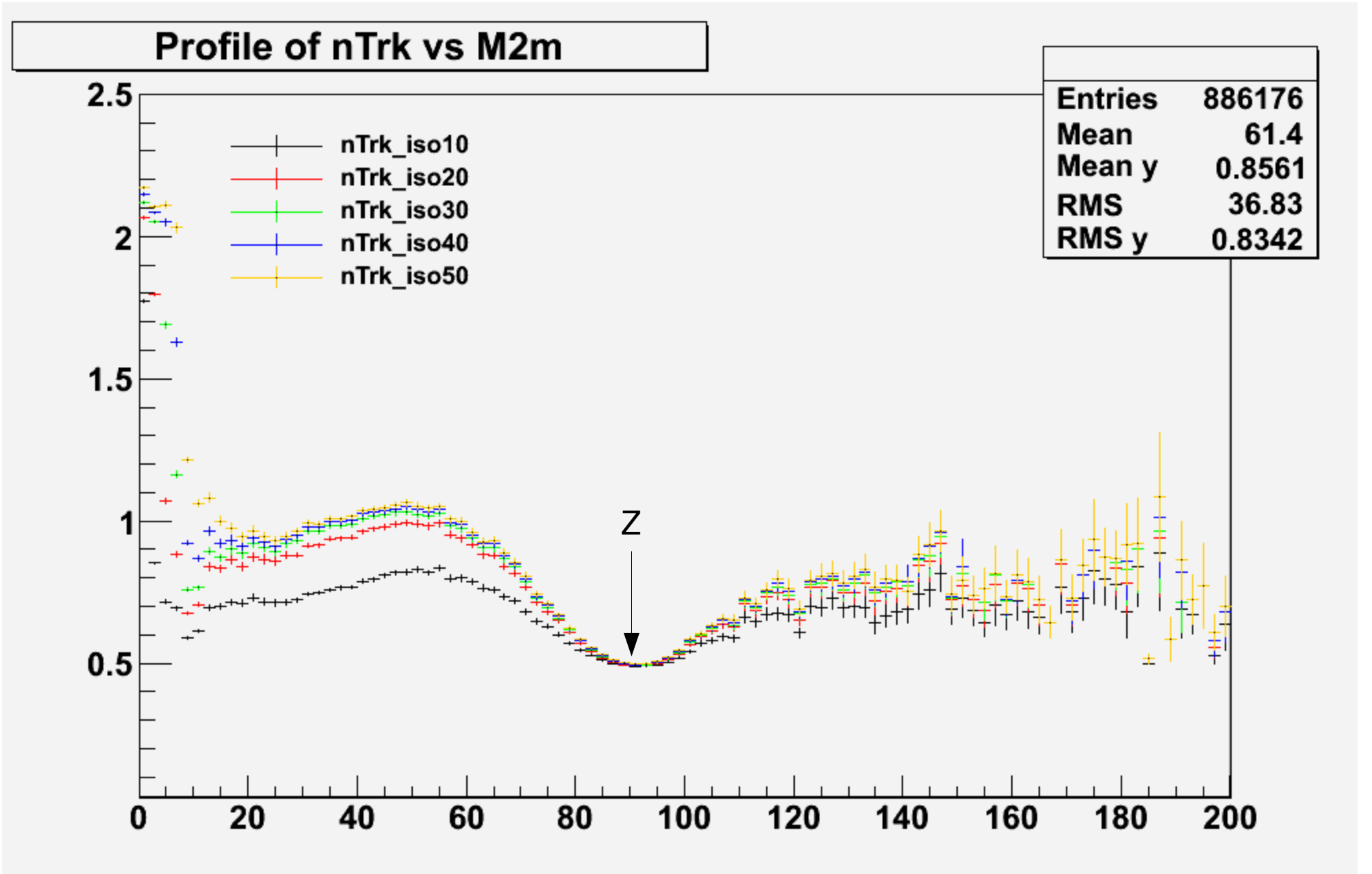






nTrk Distribution for Z

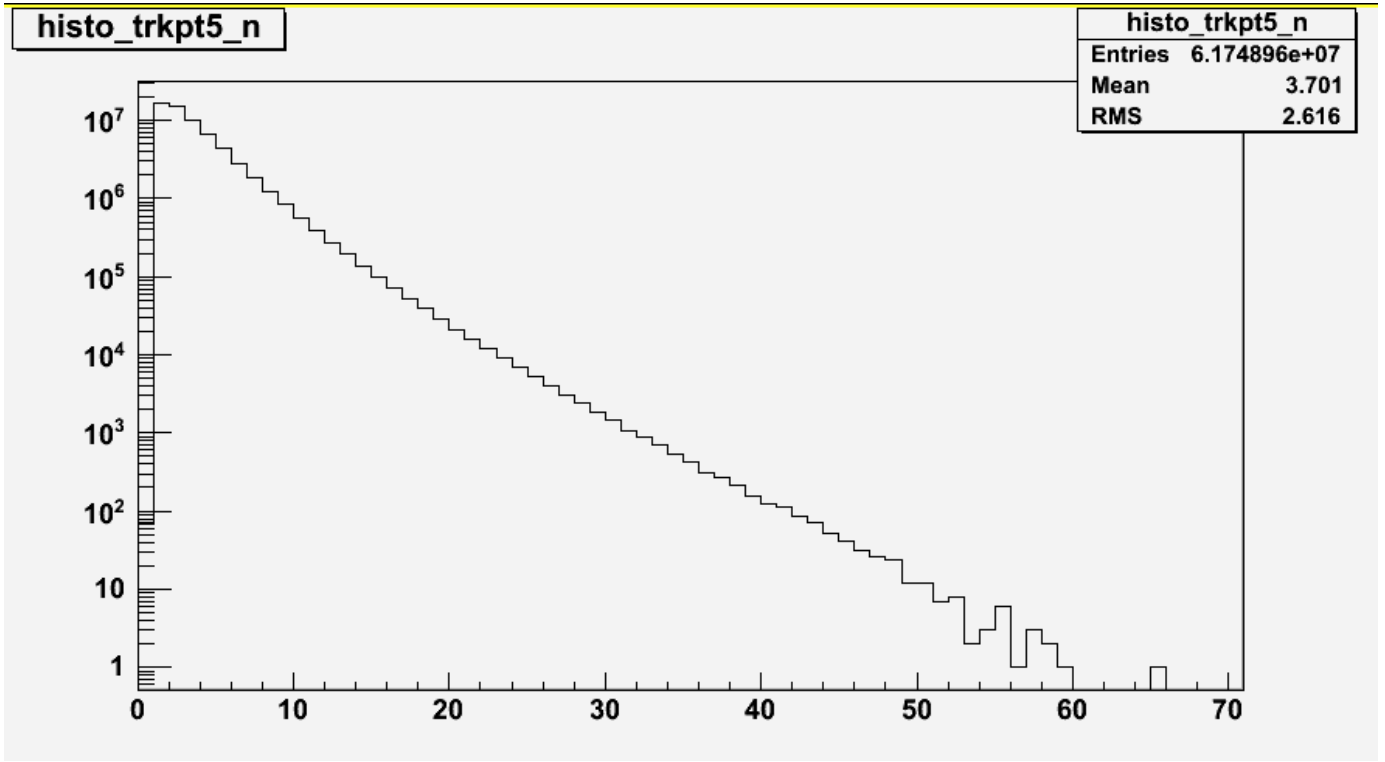


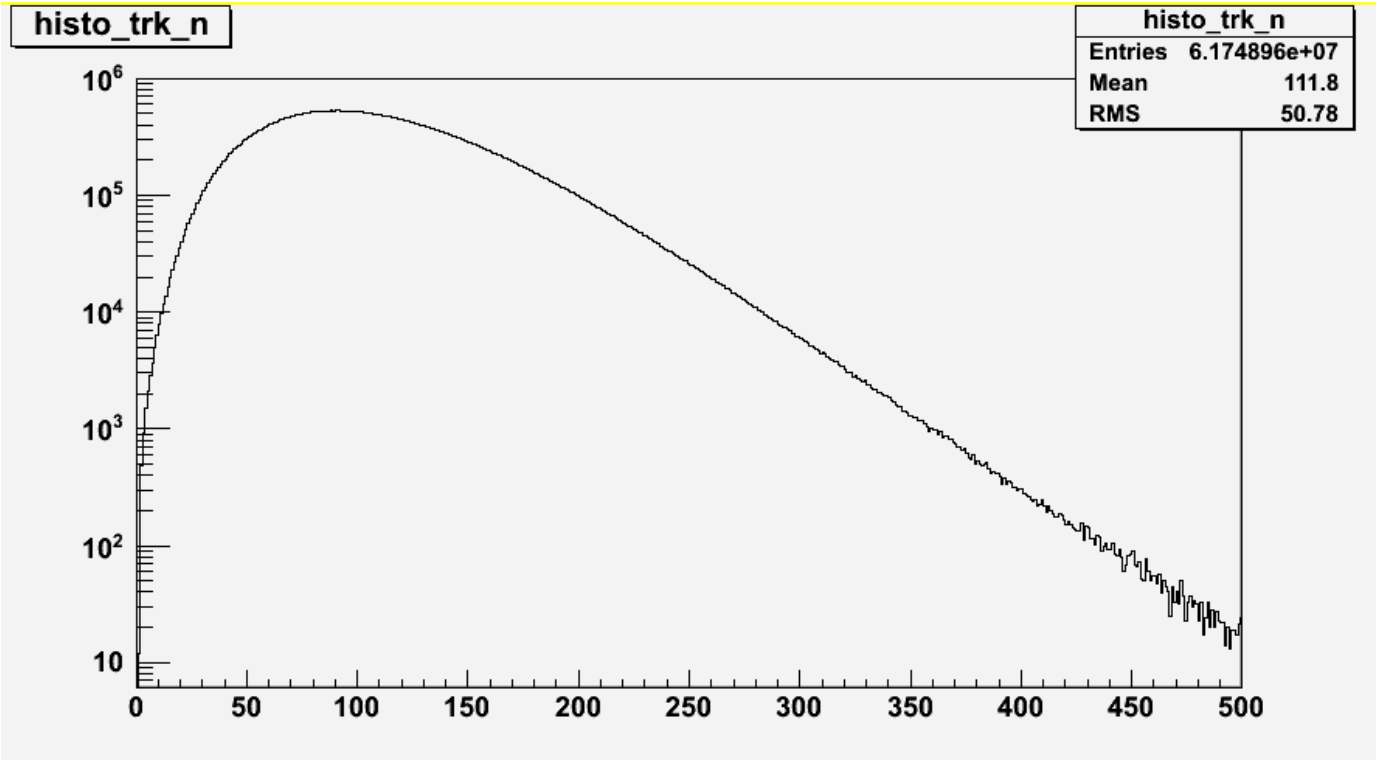

Profile of nTrk vs M2m
Entries 886176
Mean 61.4
Mean y 0.8561
RMS 36.83
RMS y 0.8342
nTrk_iso10
nTrk_iso20
nTrk_iso30
nTrk_iso40
nTrk_iso50
Z
2.5
2
1.5
1
0.5
0
20
40
60
80
100
120
140
160
180
200

For trkpt5

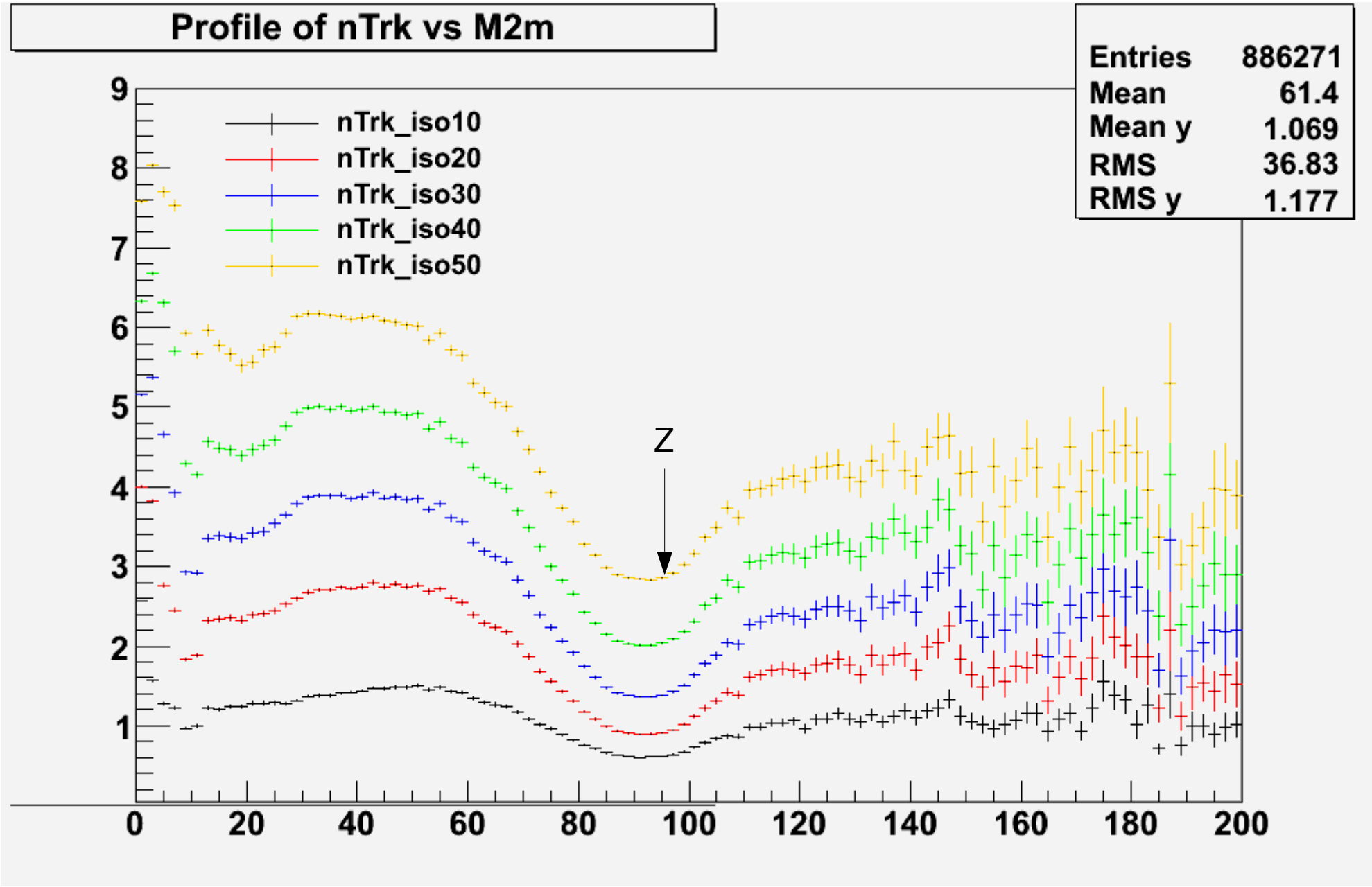
Many of the low energy tracks were removed by the 5 GeV cut in trkpt5.

We will switch to trk for later analysis.





Preliminary Results for trk



Work to be done

Analyze annular distribution of trk.

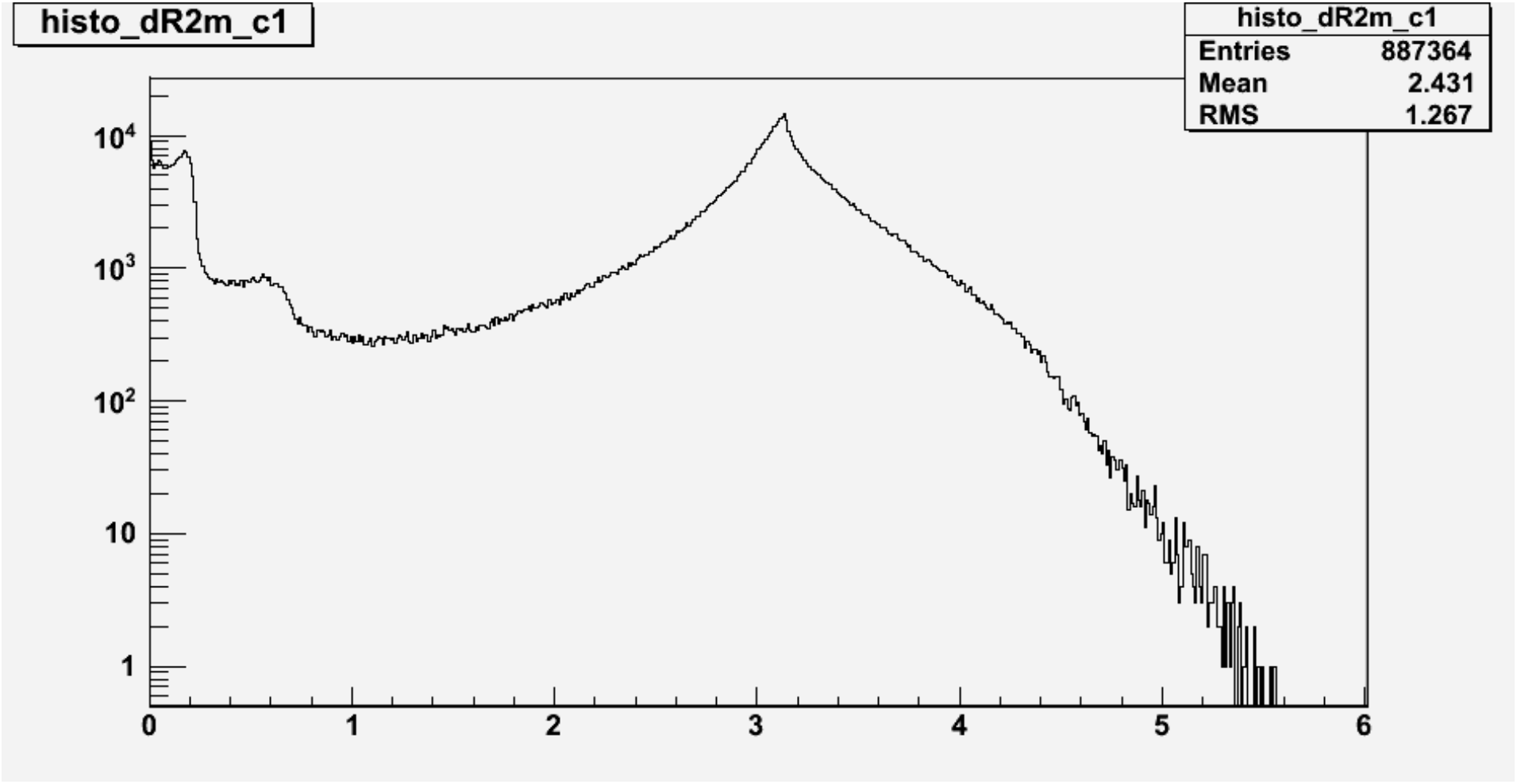
Look at energy deposition in calorimeter to take into account track from neutral particles.

Look at jets. (jet_AntiKt4)

Analyze MuGirl and MuTagIMO algorithms and figure out which one(s) is(are) causing the mis-reconstruction at low mass limit.

Backup Slides

ΔR2m Distribution



Pt2m Distribution