Atmospheric NuTau Resolution and Containment

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Simulation

For the simulation we considered a 10 kt mass detector module
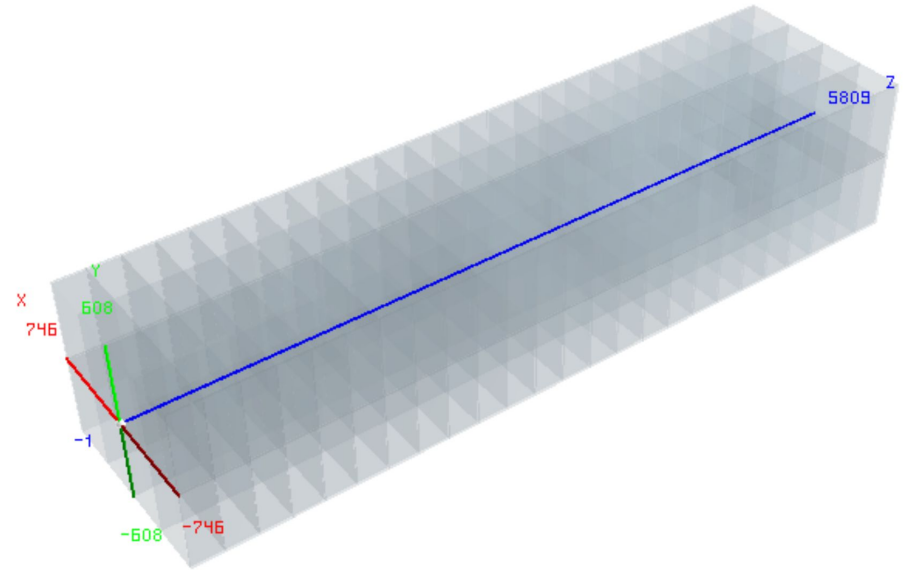
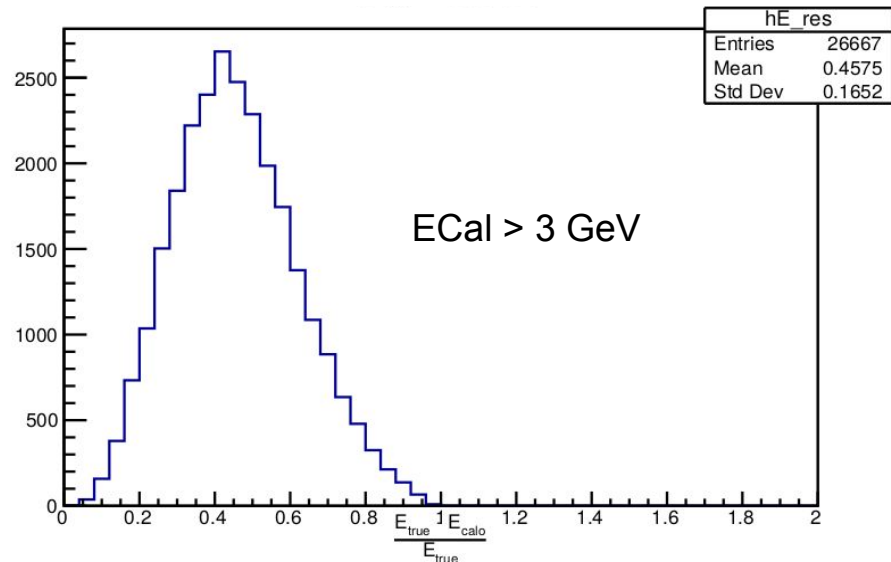Coordinates of the full volume :

    x: [-746, 746]
    y: [-608, 608]
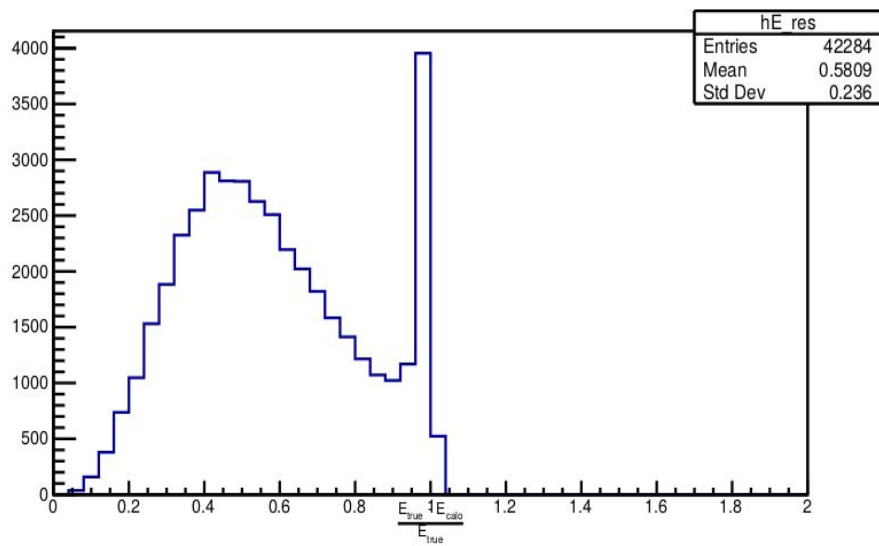   z: [0 , 5809]

A sample of CC-only tau events.

dune10kt_v1

Energy Resolution

hE_res	
Entries	42284
Mean	0.5809
Std Dev	0.236

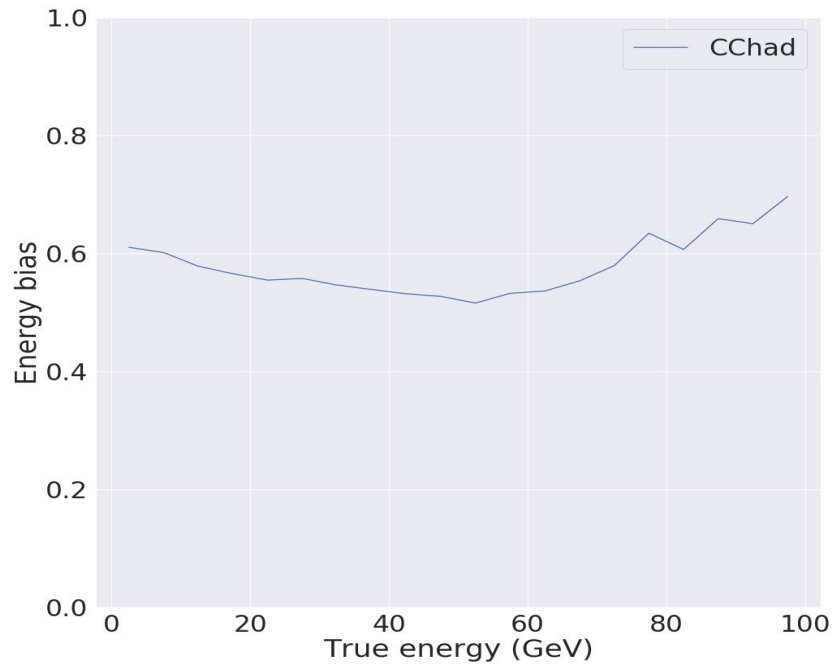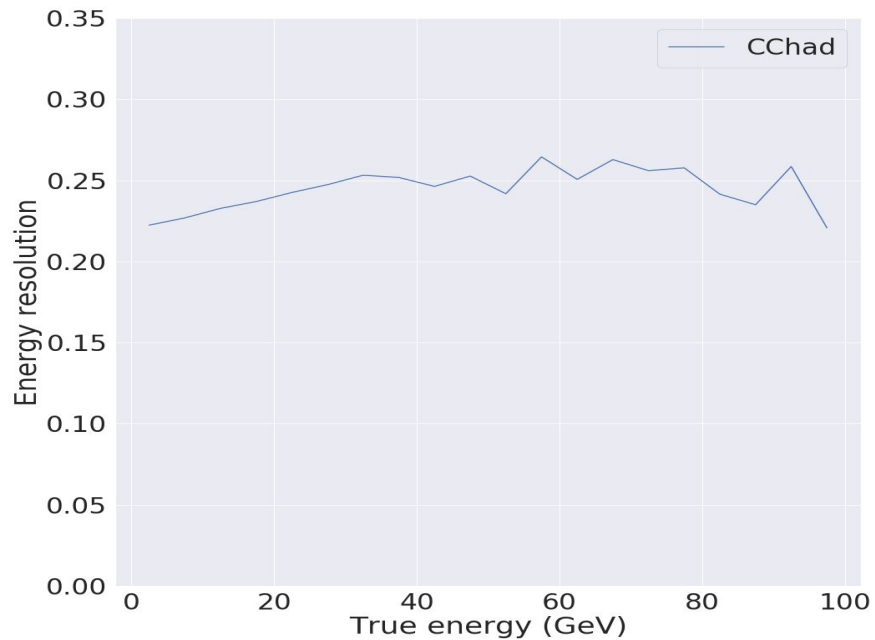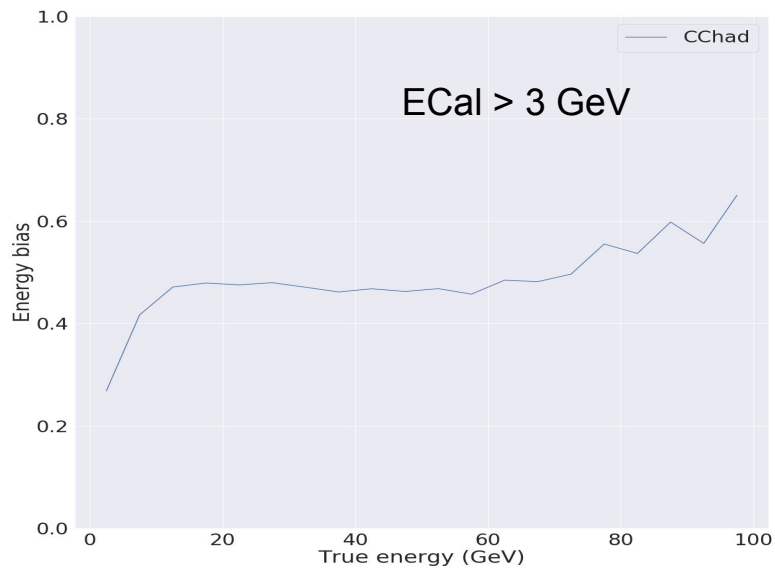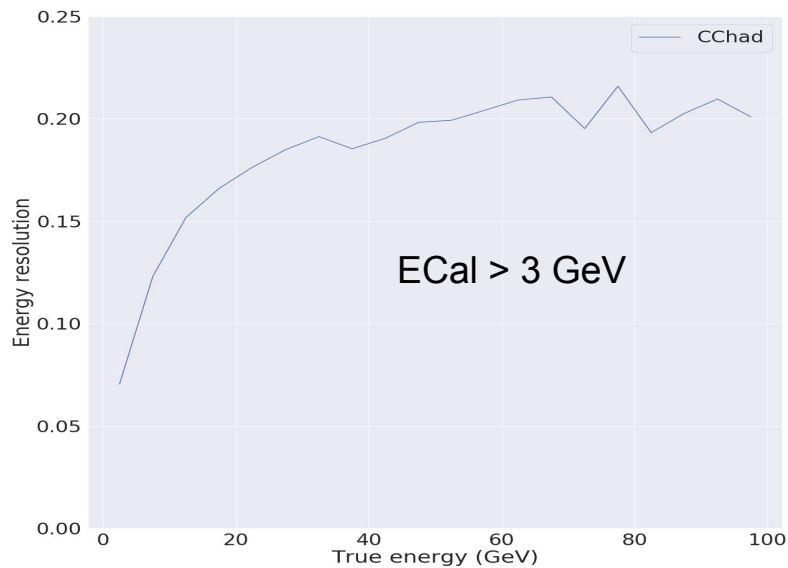| hE_res	
Entries	26667
Mean	0.4575
Std Dev	0.1652

ECal > 3 GeV

Cutting events with calorimetric energy less than 3GeV improves the energy resolution
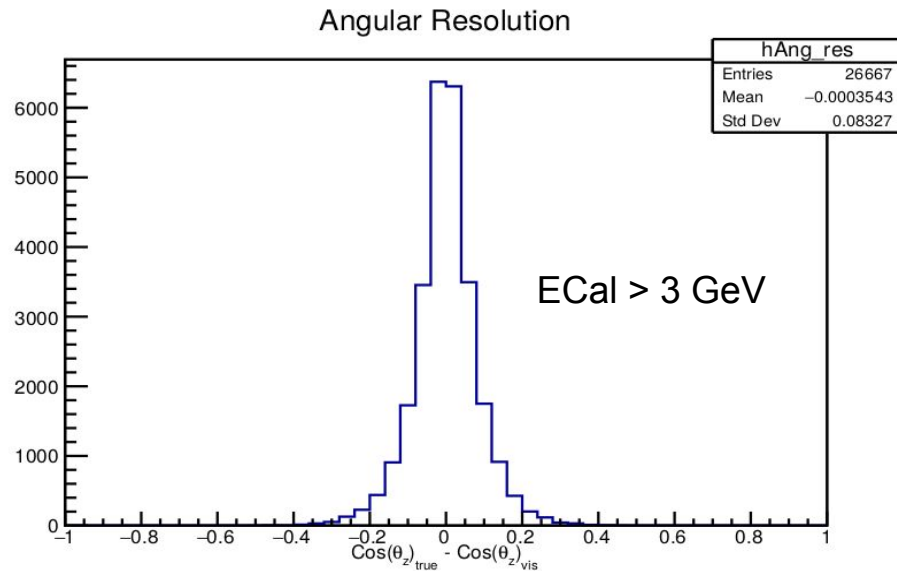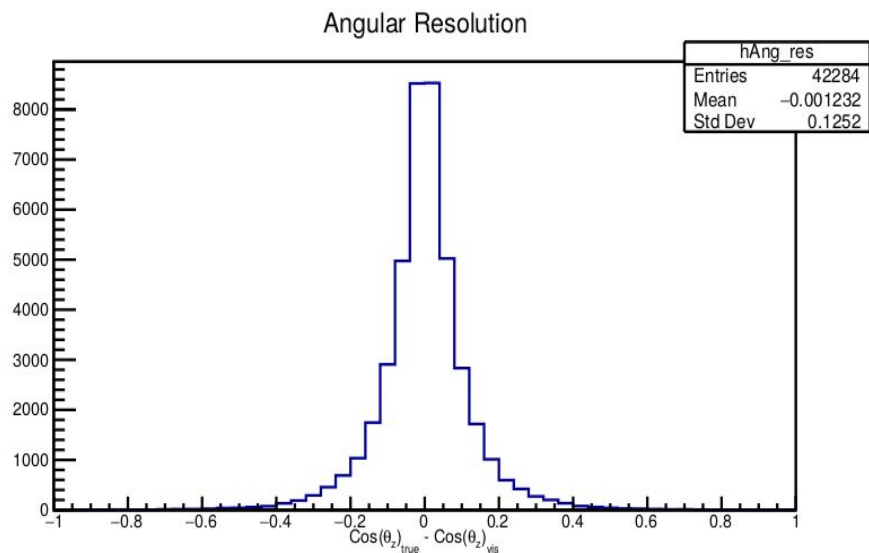
Energy resolution and energy bias as a function of true energy

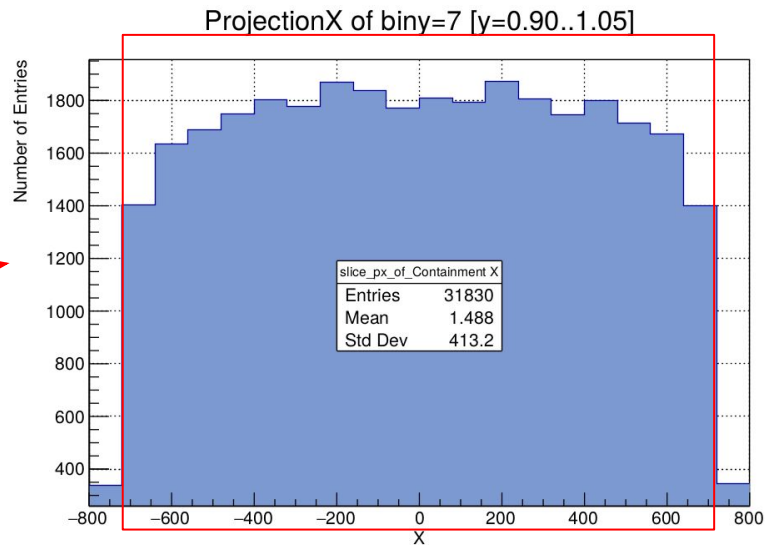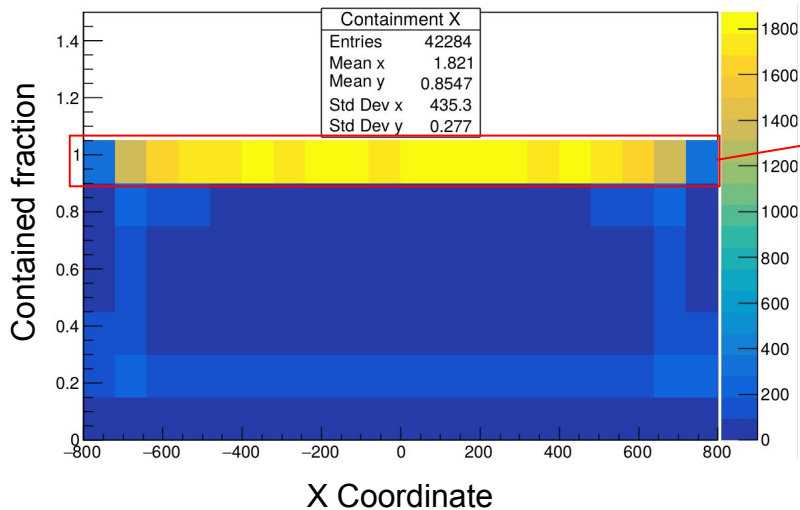# Energy resolution and energy bias as a function of true energy

Angular Resolution

ECal > 3 GeV

Cutting events with calorimetric energy less than 3GeV improves the angular resolution
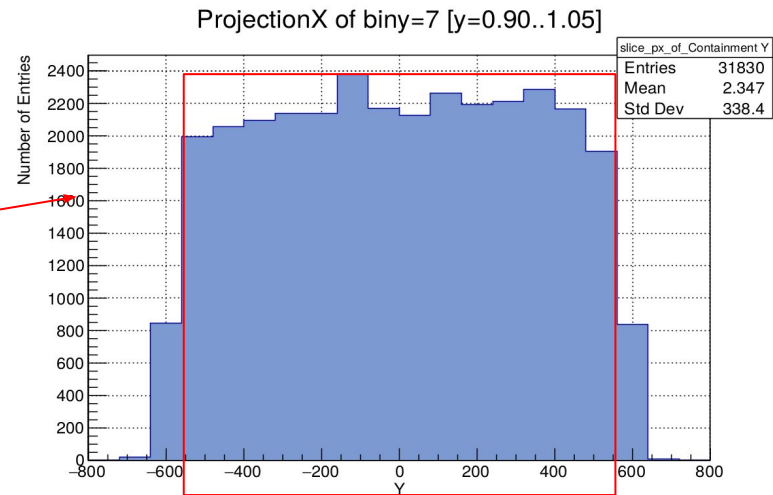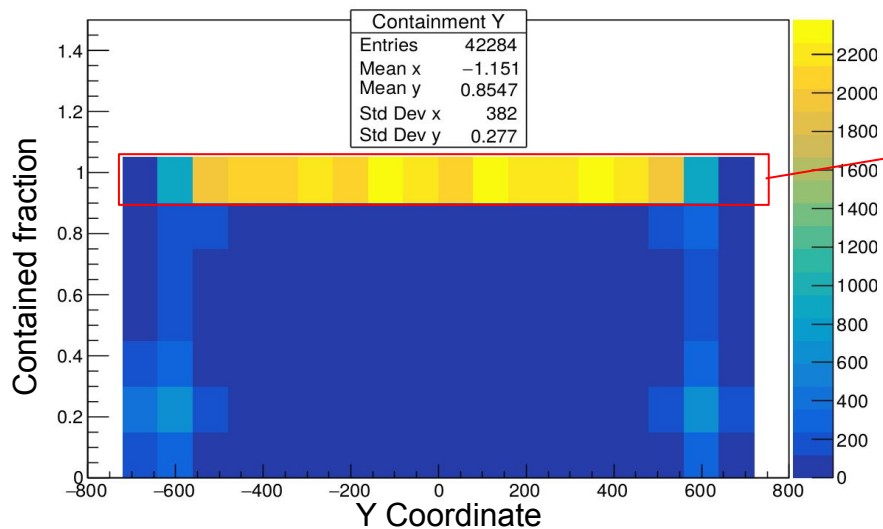
Containment X

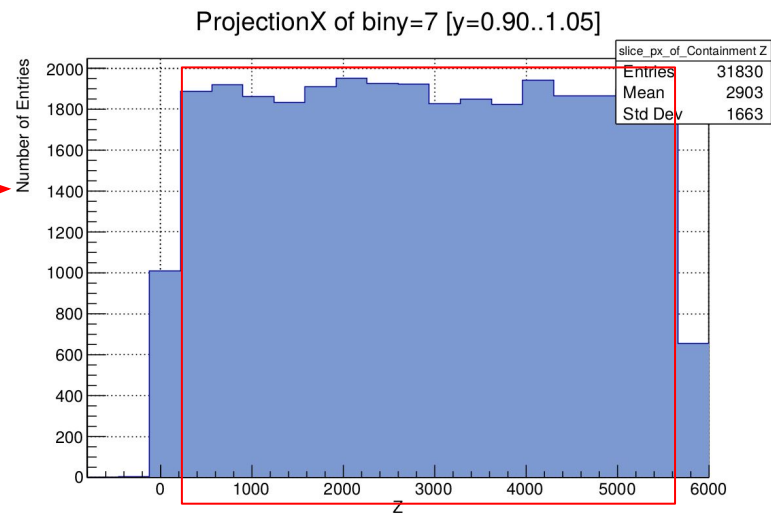~75% of the total events have a contained fraction between [0.9-1]
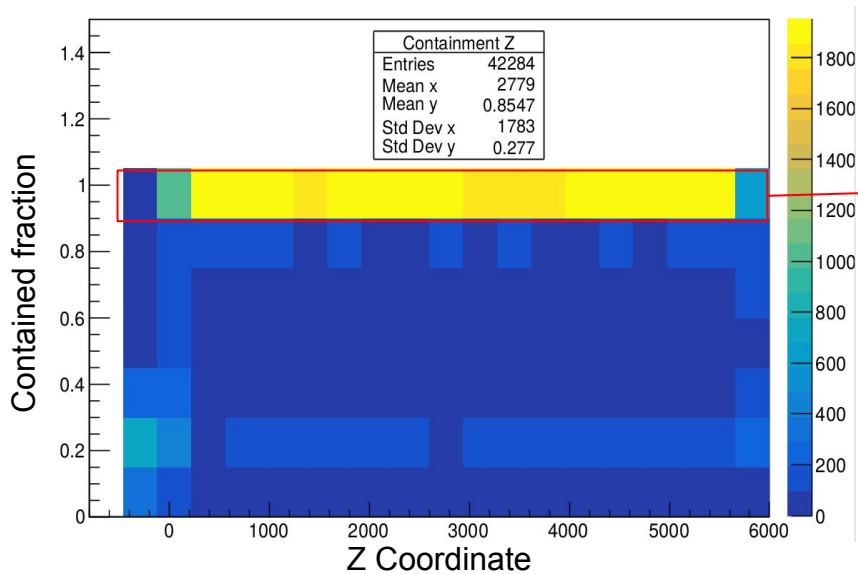
We can define a possible cut for the X coordinate: [-720, 720] cm

Containment Y

Similar for the Y coordinate: [-560, 560] cm

Containment Z

Similar for the Z coordinate: [220,5660] cm

Summary

- ❖ Atmospheric NuTau resolution and containment is being studied using a CC-only event sample
- ❖ Taking events with calorimetric energy greater than 3GeV improves the energy resolution to ~16% and the angular resolution to ~12%
- ❖ Possible cuts on the x, y and z coordinates are proposed to define a fiducial volume
- ❖ Suggestions and Comments are more than welcome