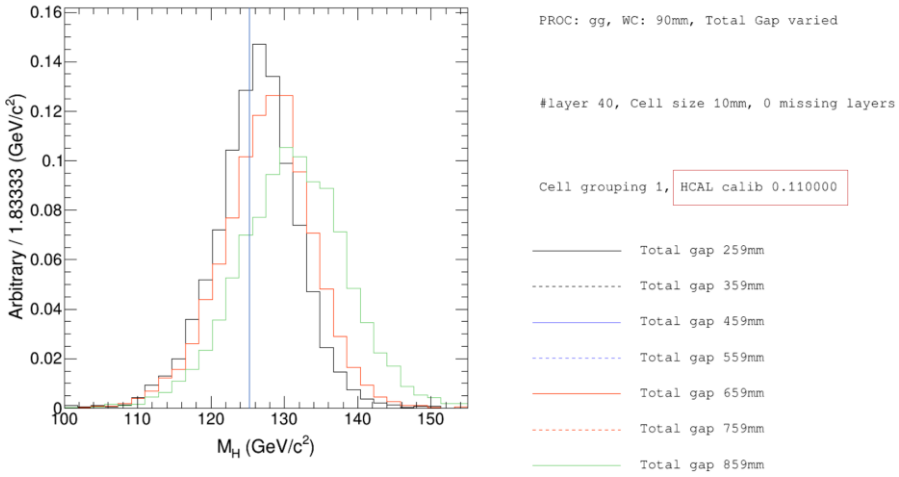
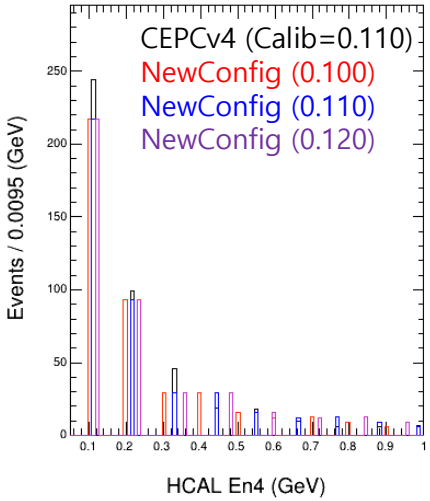
The story so far…

- Previously in calculation of the BMR of the ECAL-coil-HCAL configuration…
  - BMR was calculated from a simple Gaussian fit
- While working on the reproduction I found out…
  - The shape of the ARBOR mass is not symmetric
  - The maxima of the mass shifts higher as the gap between the CALs widen
- I was adviced to…
  - Reset the HCAL calibration using the K_L^0
- So today I want to show…
  - My try on the calibration reset using the K_L^0
  - A bit of comparison with the $H\nu\nu$ sample

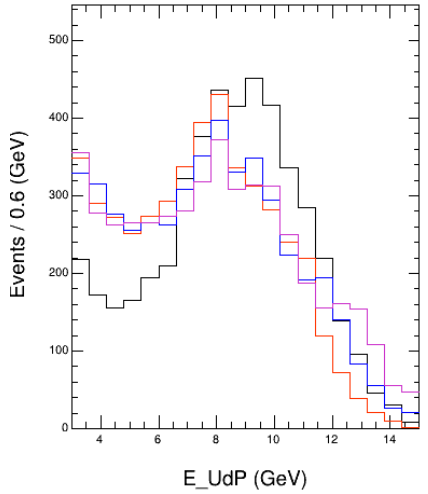


K_L^0 10GeV uniform direction: $W_{coil} = 90mm$; no additional gap



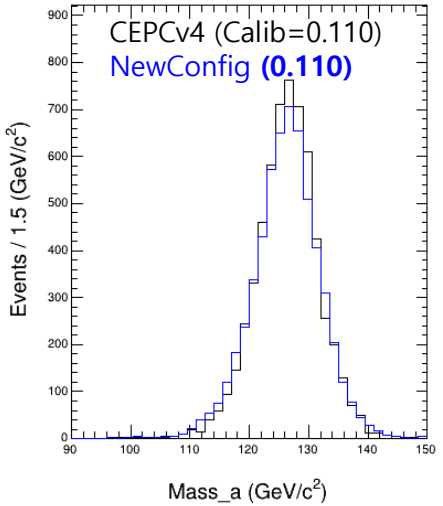

```
/generator/generator particleGun
/gun/directionSmearingMode uniform
/gun/thetaSmearing 360 deg
/gun/phiSmearing 360 deg
/gun/position 0 0 0 mm
/gun/energy  10 GeV
/gun/momentumSmearing 0.0 GeV
/gun/particle kaon0L
/run/beamOn 200
exit
```

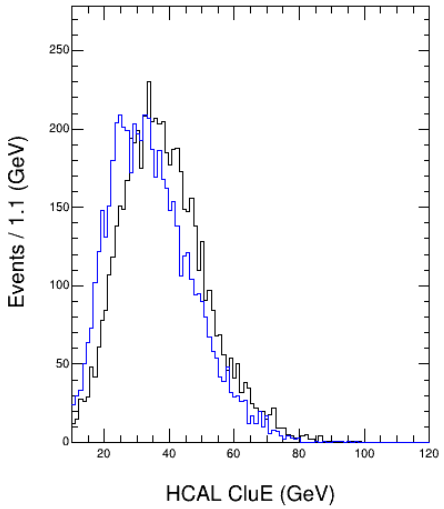
Description of the Kaon ptcl gun



- OK, I see that the calibration is scaling the HCAL energy.
- I thought ARBOR UdP energy [3>GeV, !(photon || Ks || n || charged)] should be the main variable as the calibration guide.
- However, it seems like the HCAL calibration doesn't matter.
- Other notes: Loss of E due to interaction with the coil?
  - Just assigning a picked number to make the shapes match sounds artificial to me.
  - If it is a temporary measure to compensate for the interaction, I get it.
  - It not being directly related to the detector's reading should be considered in the future.

$H\nu\bar{\nu}$: $W_{coil} = 90mm$; no additional gap: $|\cos\theta_{JET}| < 0.85$





- Thinnest coil among considerations in the BMR study with no extra gaps
- M(ARBOR) with default ‘seems to’ match well with the reference
- However tends to have slight tail on the left-end of the peak

- Differences noticeable with HCAL energies (identical @ ECAL)

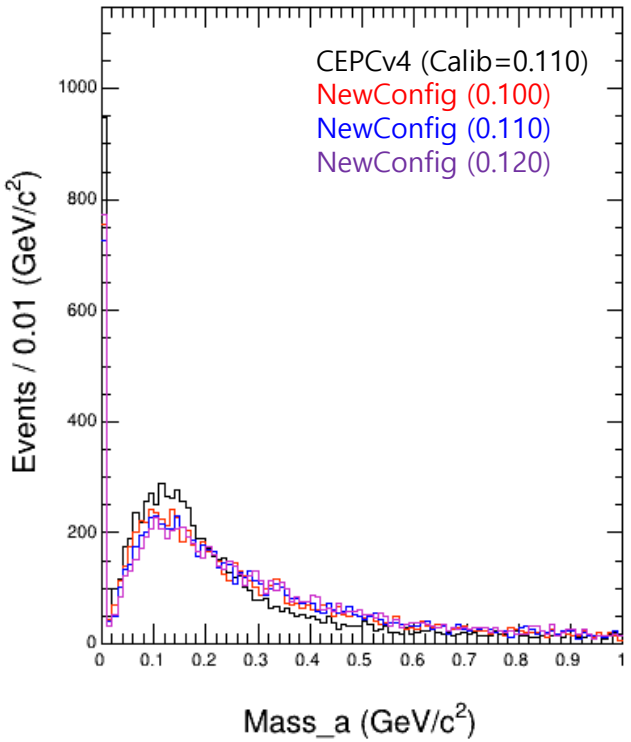
Summary

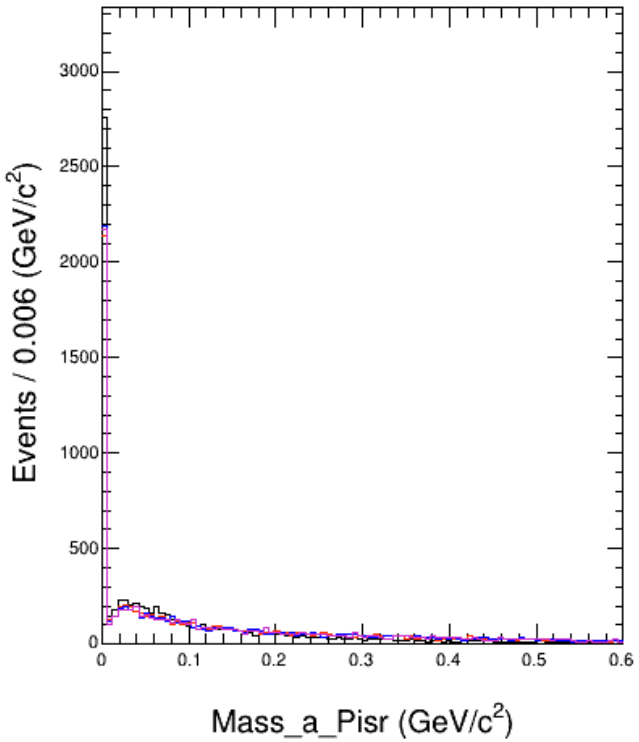
- Been a good chance to read over the CEPC SW codes for me.
- I will try adjusting the HCAL calibration for the Higgs samples and see what happens.
  - Q: from this morning, IHEP computing seems stuck. Is it OK for you?
- Anyway to see what happens to the energy @ coil?

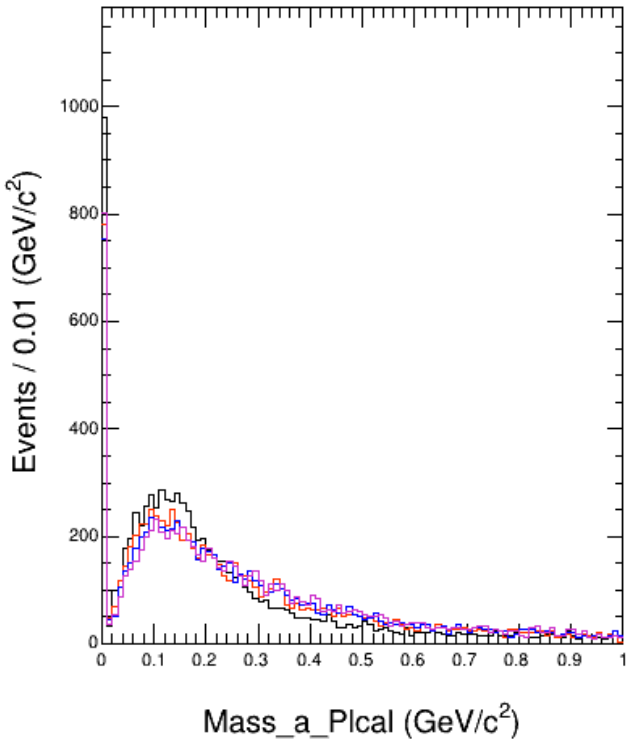
- Firm plans for now
  - Reproduce plots and investigate for other configurations (varying empty gaps, coil width)

BACKUP

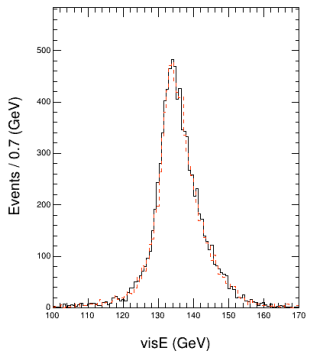
KL comp. some other vars

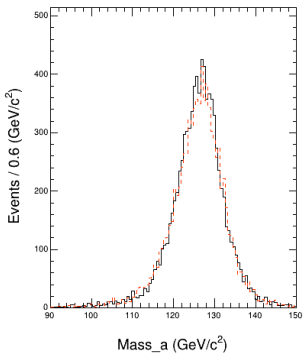


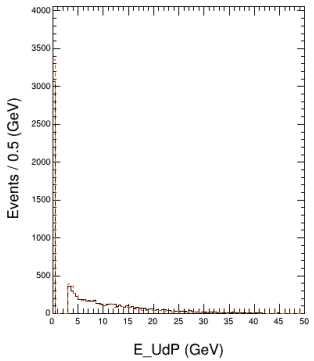


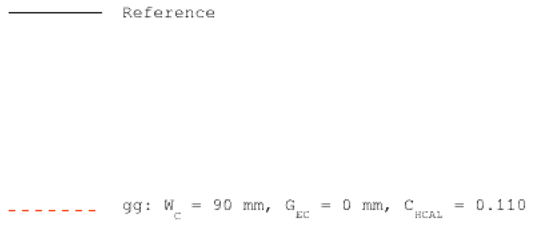


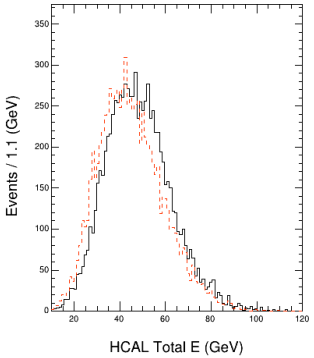
gg($H\nu\bar{\nu}$): REF vs. Cal_HCAL 0.110

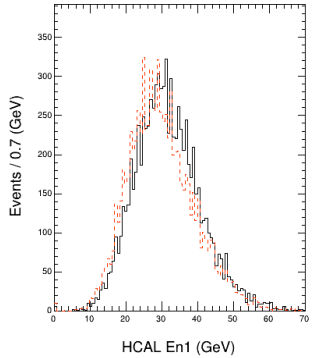


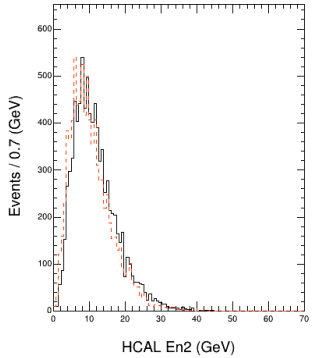


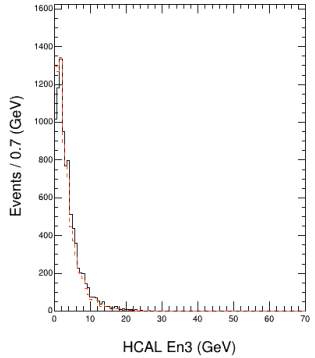


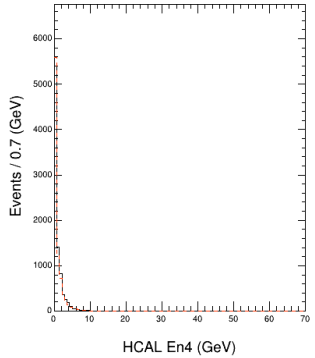


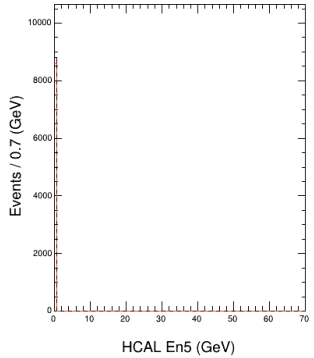


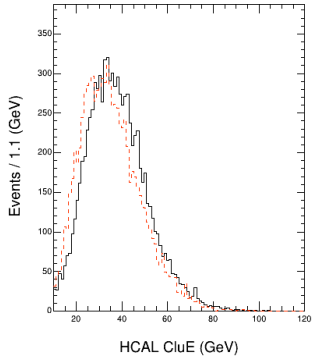




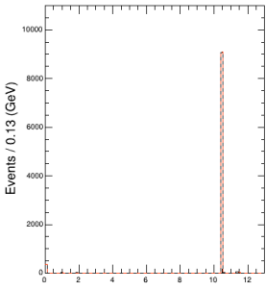


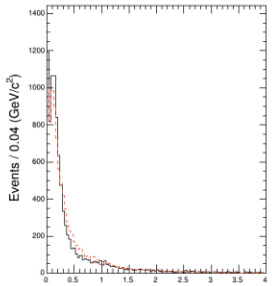


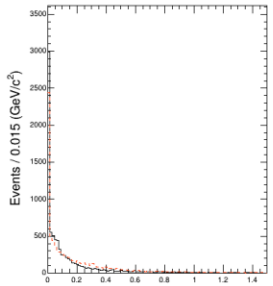


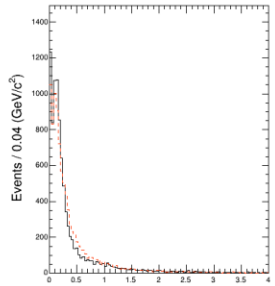


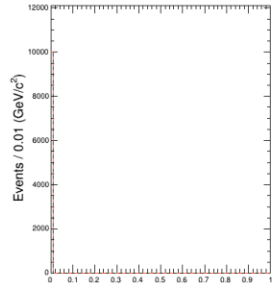
BACKUP BACKUP

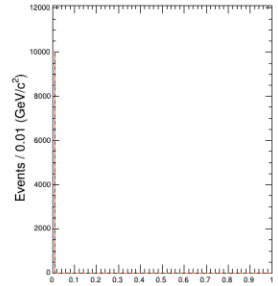

Events / 0.13 (GeV)
visE (GeV)

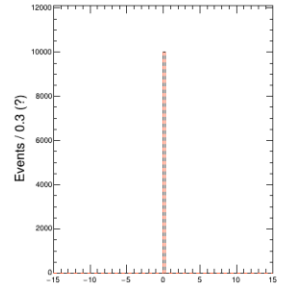

Events / 0.04 (GeV/c²)
Mass_a (GeV/c²)

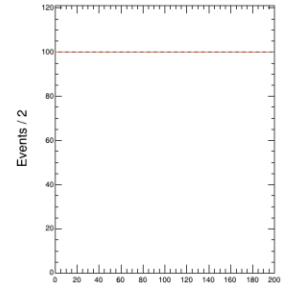

Events / 0.015 (GeV/c²)
Mass_a_Pisr (GeV/c²)

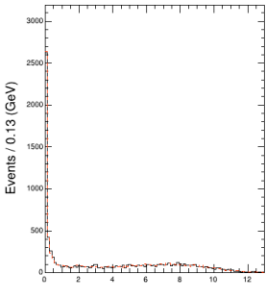

Events / 0.04 (GeV/c²)
Mass_a_Plcal (GeV/c²)

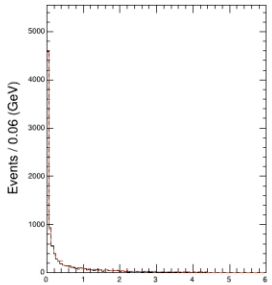

Events / 0.01 (GeV/c²)
Mass_p (GeV/c²)


Events / 0.01 (GeV/c²)
Mass_p_Pisr (GeV/c²)


Events / 0.3 (?)
TotalP_a (?)


Events / 2
Event


Events / 0.13 (GeV)
ECAL Total E (GeV)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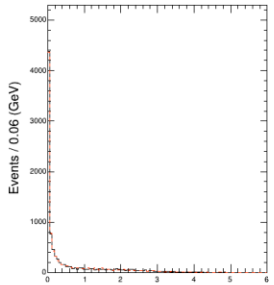
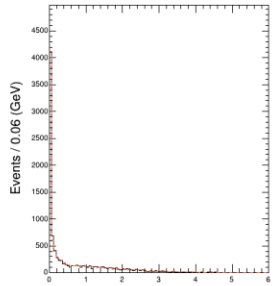
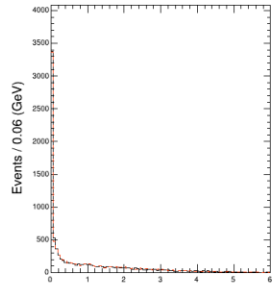
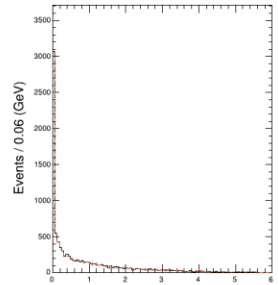
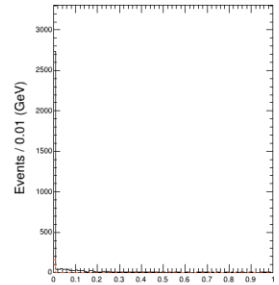
ECAL En1 (GeV)

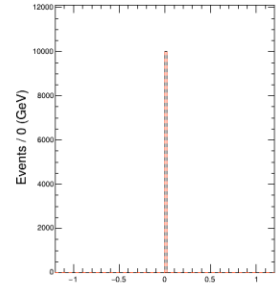

Events / 0.06 (GeV)
ECAL En2 (GeV)

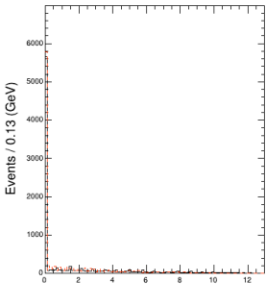

Events / 0.06 (GeV)
ECAL En3 (GeV)

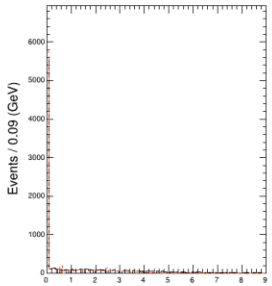

Events / 0.06 (GeV)
ECAL En4 (GeV)

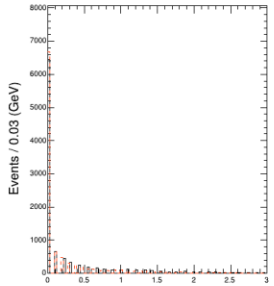

Events / 0.06 (GeV)
ECAL En5 (GeV)

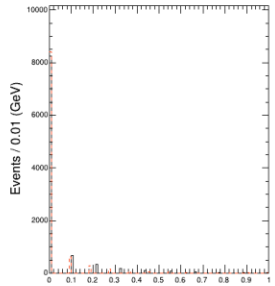

Events / 0.01 (GeV)
ECAL CluE (GeV)

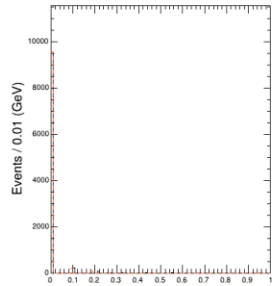

Events / 0 (GeV)
ECAL CluE_p (GeV)

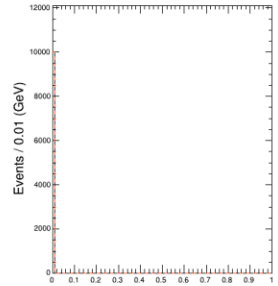

Events / 0.13 (GeV)
HCAL Total E (GeV)

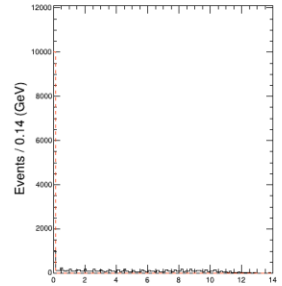

Events / 0.09 (GeV)
HCAL En1 (GeV)

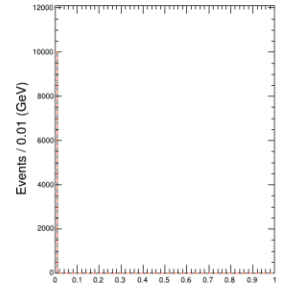

Events / 0.03 (GeV)
HCAL En2 (GeV)

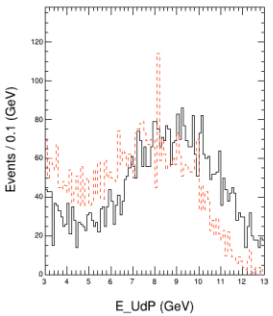

Events / 0.01 (GeV)
HCAL En3 (GeV)


Events / 0.01 (GeV)
HCAL En4 (GeV)

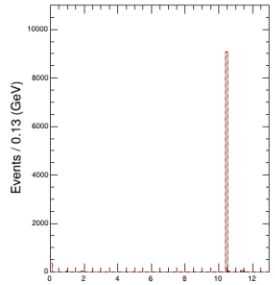

Events / 0.01 (GeV)
HCAL En5 (GeV)

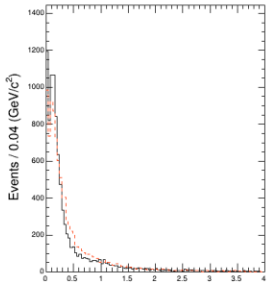

Events / 0.14 (GeV)
HCAL CluE (GeV)

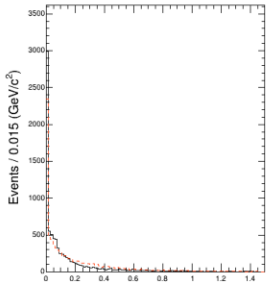

Events / 0.01 (GeV)
HCAL CluE_p (GeV)

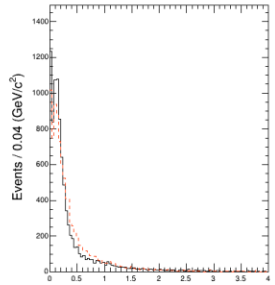

Events / 0.1 (GeV)
E_UdP (GeV)

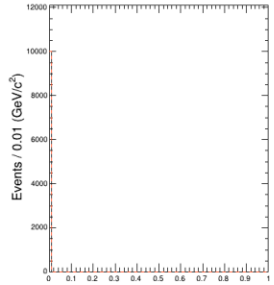

Reference

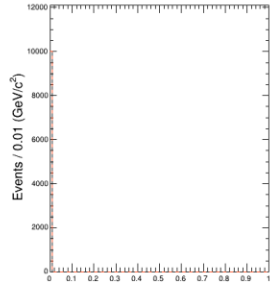

Events / 0.13 (GeV)
visE (GeV)

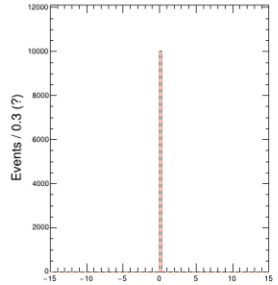

Events / 0.04 (GeV/c²)
Mass_a (GeV/c²)

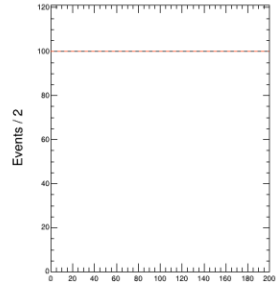

Events / 0.015 (GeV/c²)
Mass_a_Pisr (GeV/c²)

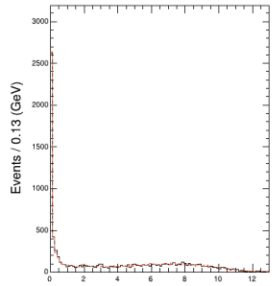

Events / 0.04 (GeV/c²)
Mass_a_Plcal (GeV/c²)

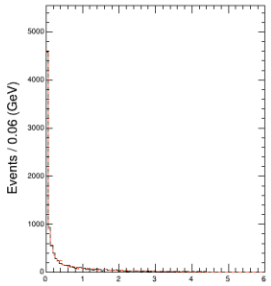

Events / 0.01 (GeV/c²)
Mass_p (GeV/c²)

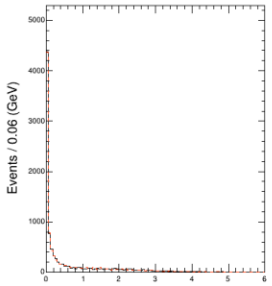

Events / 0.01 (GeV/c²)
Mass_p_Pisr (GeV/c²)

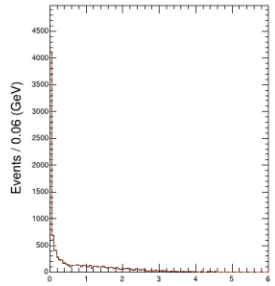

Events / 0.3 (?)
TotalP_a (?)

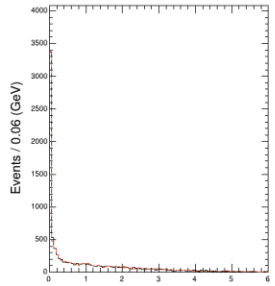

Events / 2
Event

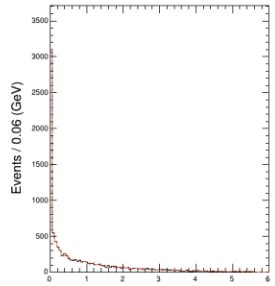

Events / 0.13 (GeV)
ECAL Total E (GeV)

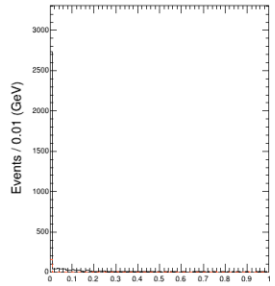

Events / 0.06 (GeV)
ECAL En1 (GeV)

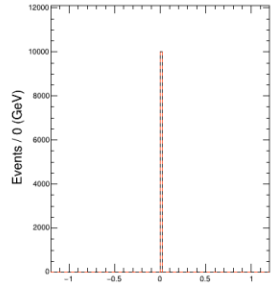

Events / 0.06 (GeV)
ECAL En2 (GeV)

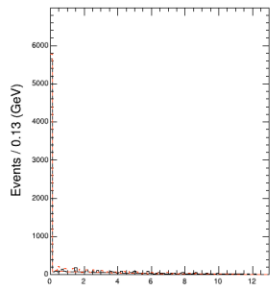

Events / 0.06 (GeV)
ECAL En3 (GeV)

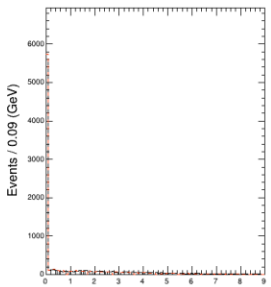

Events / 0.06 (GeV)
ECAL En4 (GeV)

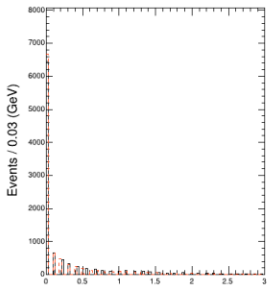

Events / 0.06 (GeV)
ECAL En5 (GeV)

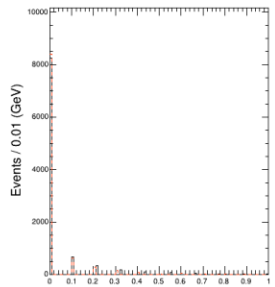

Events / 0.01 (GeV)
ECAL CluE (GeV)

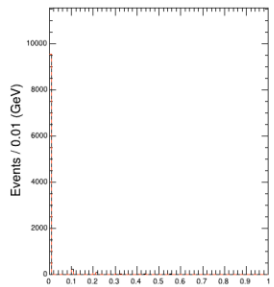

Events / 0 (GeV)
ECAL CluE_p (GeV)

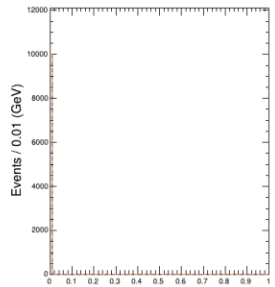

Events / 0.13 (GeV)
HCAL Total E (GeV)

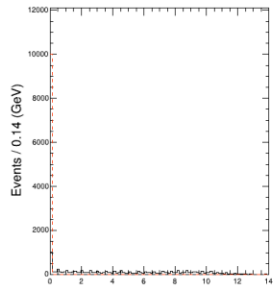

Events / 0.09 (GeV)
HCAL En1 (GeV)

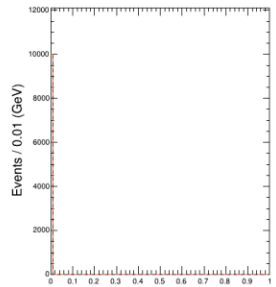

Events / 0.03 (GeV)
HCAL En2 (GeV)

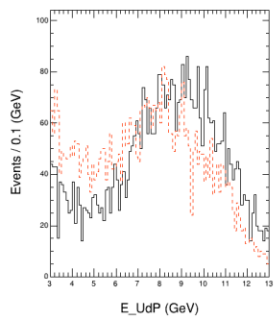

Events / 0.01 (GeV)
HCAL En3 (GeV)


Events / 0.01 (GeV)
HCAL En4 (GeV)

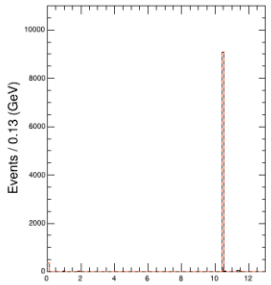

Events / 0.01 (GeV)
HCAL En5 (GeV)

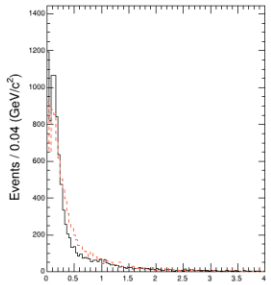

Events / 0.14 (GeV)
HCAL CluE (GeV)

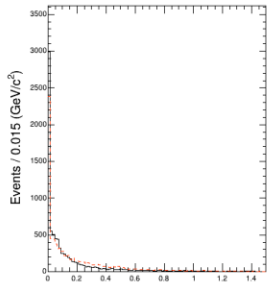

Events / 0.01 (GeV)
HCAL CluE_p (GeV)

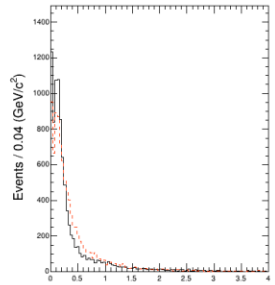

Events / 0.1 (GeV)
E_UdP (GeV)

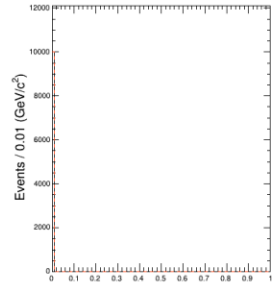

Reference

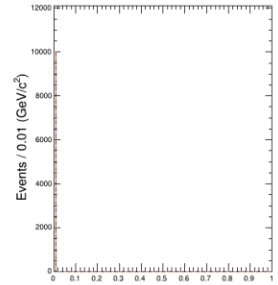

Events / 0.13 (GeV)
visE (GeV)

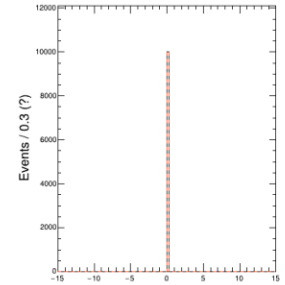

Events / 0.04 (GeV/c²)
Mass_a (GeV/c²)

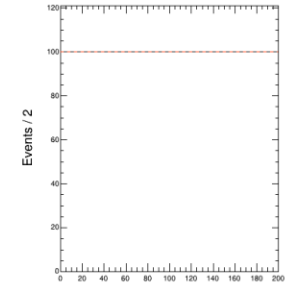

Events / 0.015 (GeV/c²)
Mass_a_Pisr (GeV/c²)

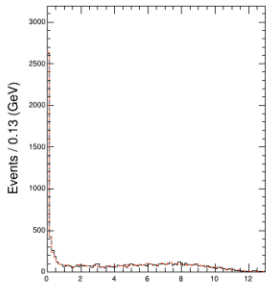

Events / 0.04 (GeV/c²)
Mass_a_Plcal (GeV/c²)

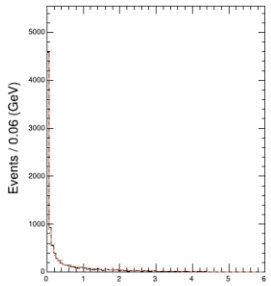

Events / 0.01 (GeV/c²)
Mass_p (GeV/c²)

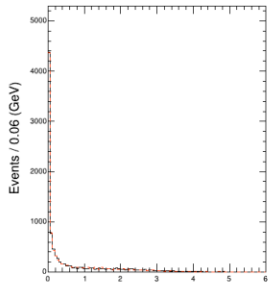

Events / 0.01 (GeV/c²)
Mass_p_Pisr (GeV/c²)

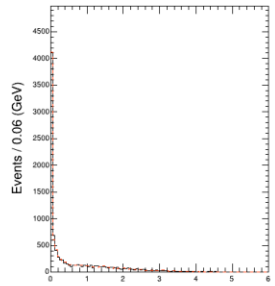

Events / 0.3 (?)
TotalP_a (?)

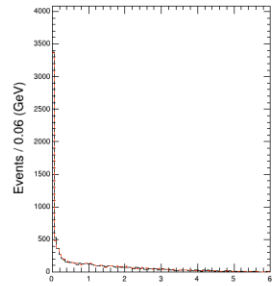

Events / 2
Event

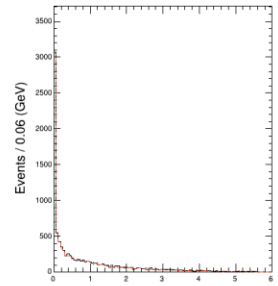

Events / 0.13 (GeV)
ECAL Total E (GeV)

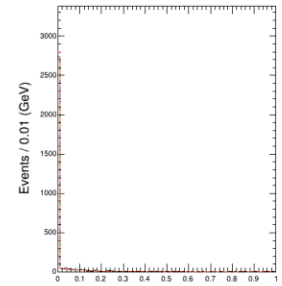

Events / 0.06 (GeV)
ECAL En1 (GeV)

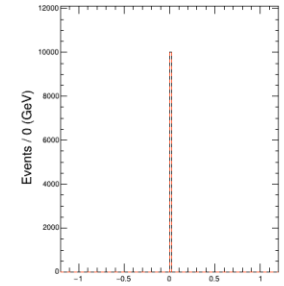

Events / 0.06 (GeV)
ECAL En2 (GeV)

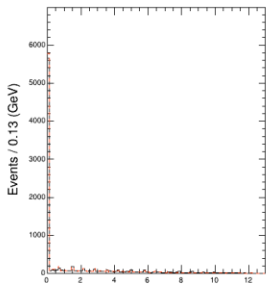

Events / 0.06 (GeV)
ECAL En3 (GeV)

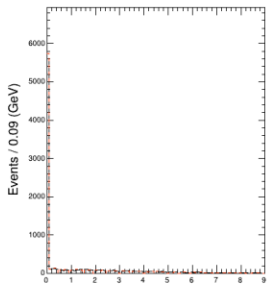

Events / 0.06 (GeV)
ECAL En4 (GeV)

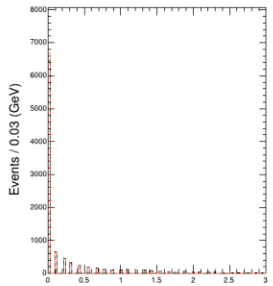

Events / 0.06 (GeV)
ECAL En5 (GeV)

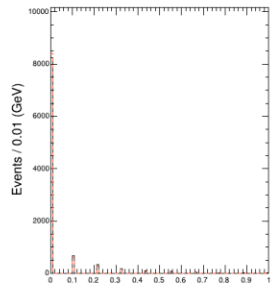

Events / 0.01 (GeV)
ECAL CluE (GeV)

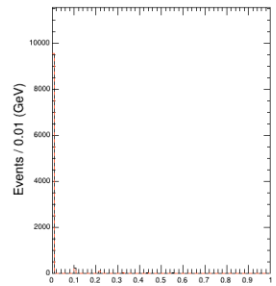

Events / 0 (GeV)
ECAL CluE_p (GeV)

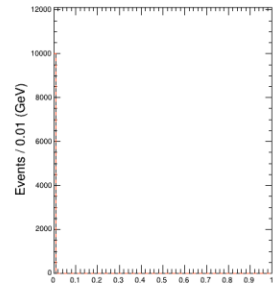

Events / 0.13 (GeV)
HCAL Total E (GeV)

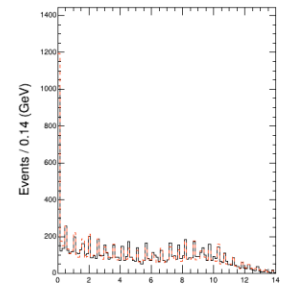

Events / 0.09 (GeV)
HCAL En1 (GeV)

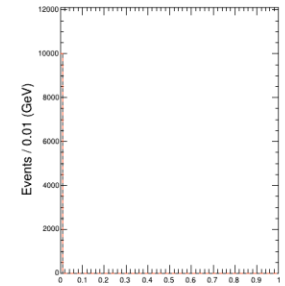

Events / 0.03 (GeV)
HCAL En2 (GeV)

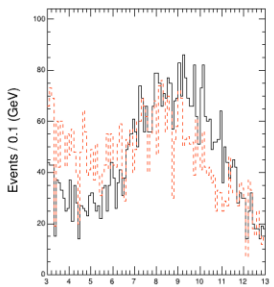

Events / 0.01 (GeV)
HCAL En3 (GeV)


Events / 0.01 (GeV)
HCAL En4 (GeV)

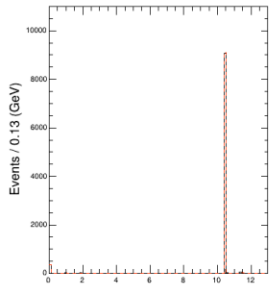

Events / 0.01 (GeV)
HCAL En5 (GeV)

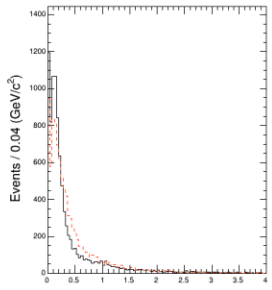

Events / 0.14 (GeV)
HCAL CluE (GeV)

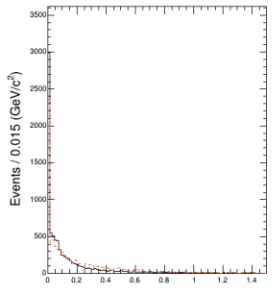

Events / 0.01 (GeV)
HCAL CluE_p (GeV)

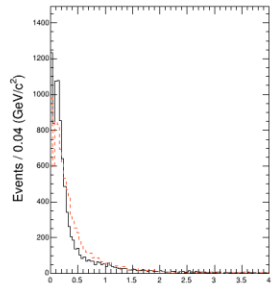

Events / 0.1 (GeV)
E_UdP (GeV)

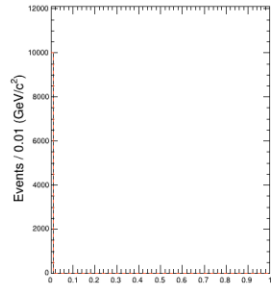

Reference

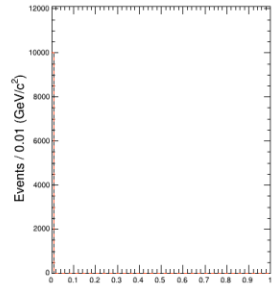

Events / 0.13 (GeV)
visE (GeV)

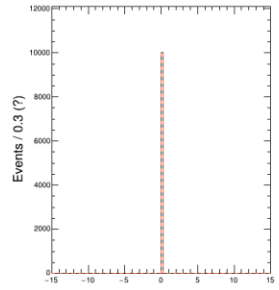

Events / 0.04 (GeV/c²)
Mass_a (GeV/c²)

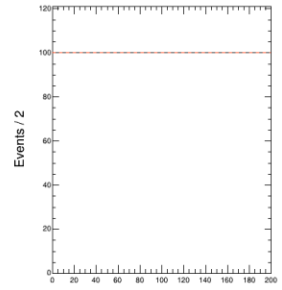

Events / 0.015 (GeV/c²)
Mass_a_Pisr (GeV/c²)

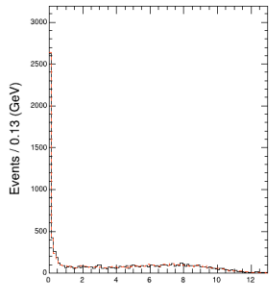

Events / 0.04 (GeV/c²)
Mass_a_Plcal (GeV/c²)

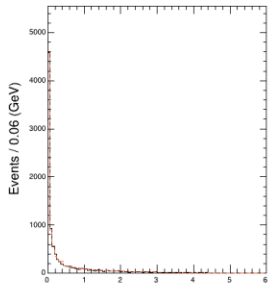

Events / 0.01 (GeV/c²)
Mass_p (GeV/c²)

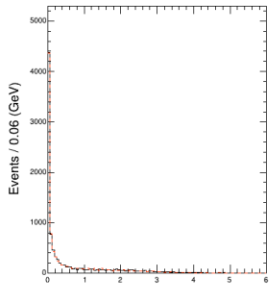

Events / 0.01 (GeV/c²)
Mass_p_Pisr (GeV/c²)

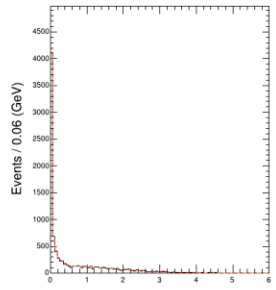

Events / 0.3 (?)
TotalP_a (?)

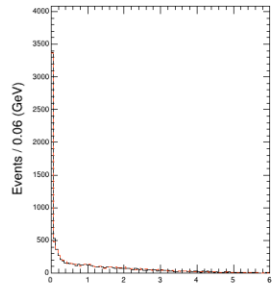

Events / 2
Event

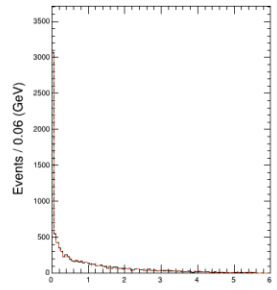

Events / 0.13 (GeV)
ECAL Total E (GeV)

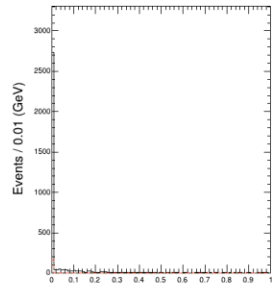

Events / 0.06 (GeV)
ECAL En1 (GeV)

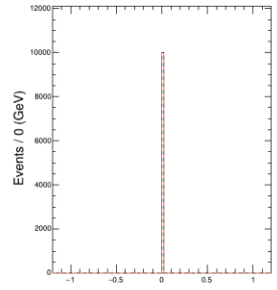

Events / 0.06 (GeV)
ECAL En2 (GeV)

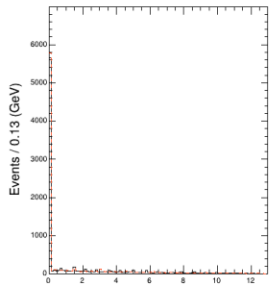

Events / 0.06 (GeV)
ECAL En3 (GeV)

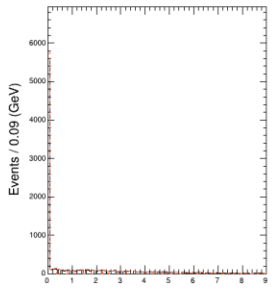

Events / 0.06 (GeV)
ECAL En4 (GeV)

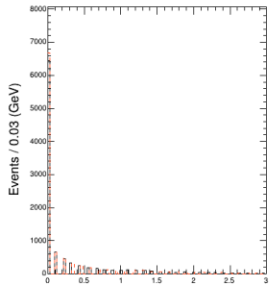

Events / 0.06 (GeV)
ECAL En5 (GeV)

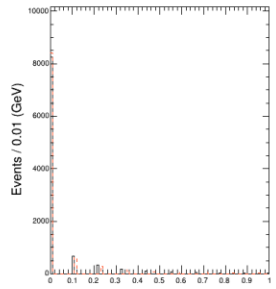

Events / 0.01 (GeV)
ECAL CluE (GeV)

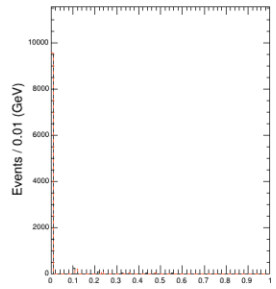

Events / 0 (GeV)
ECAL CluE_p (GeV)

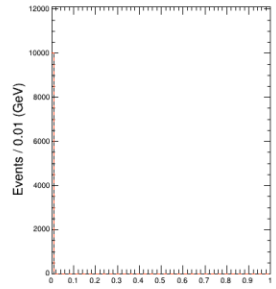

Events / 0.13 (GeV)
HCAL Total E (GeV)

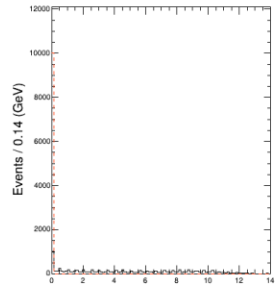

Events / 0.09 (GeV)
HCAL En1 (GeV)

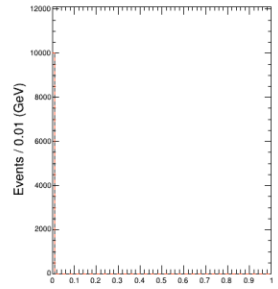

Events / 0.03 (GeV)
HCAL En2 (GeV)

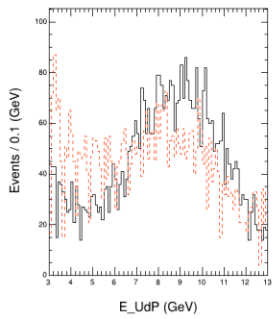

Events / 0.01 (GeV)
HCAL En3 (GeV)

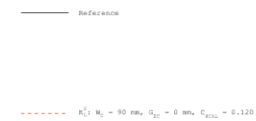

Events / 0.01 (GeV)
HCAL En4 (GeV)

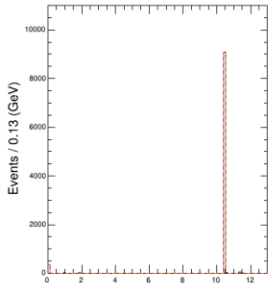

Events / 0.01 (GeV)
HCAL En5 (GeV)

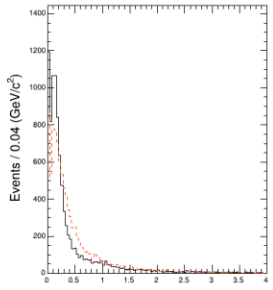

Events / 0.14 (GeV)
HCAL CluE (GeV)

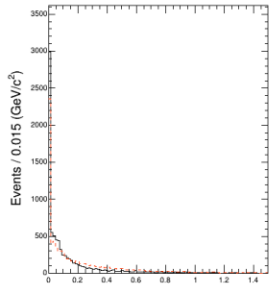

Events / 0.01 (GeV)
HCAL CluE_p (GeV)

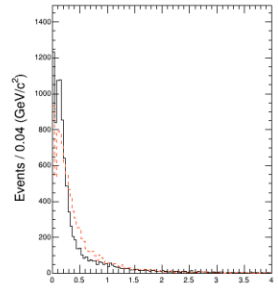

Events / 0.1 (GeV)
E_UdP (GeV)

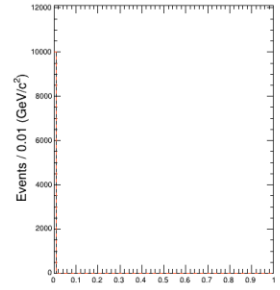

Reference

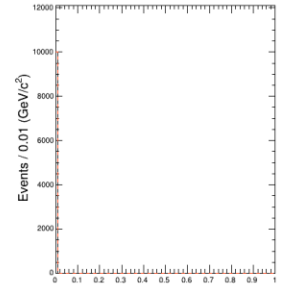

Events / 0.13 (GeV)
visE (GeV)

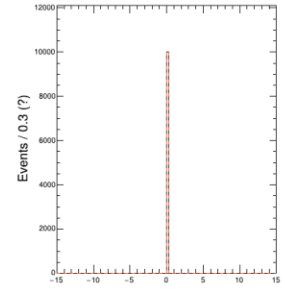

Events / 0.04 (GeV/c²)
Mass_a (GeV/c²)

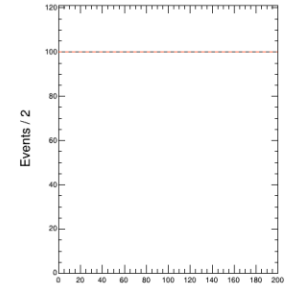

Events / 0.015 (GeV/c²)
Mass_a_Pisr (GeV/c²)

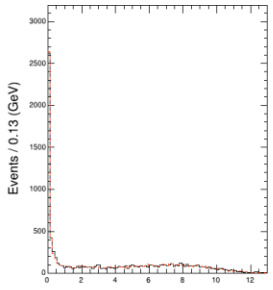

Events / 0.04 (GeV/c²)
Mass_a_Plcal (GeV/c²)

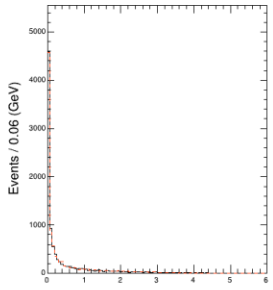

Events / 0.01 (GeV/c²)
Mass_p (GeV/c²)

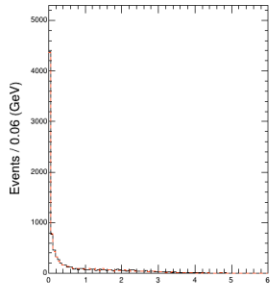

Events / 0.01 (GeV/c²)
Mass_p_Pisr (GeV/c²)

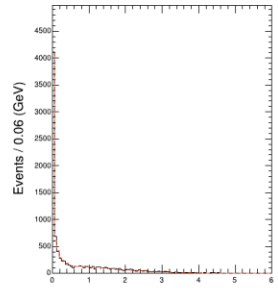

Events / 0.3 (?)
TotalP_a (?)

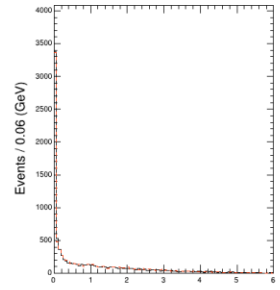

Events / 2
Event

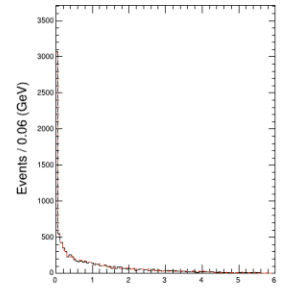

Events / 0.13 (GeV)
ECAL Total E (GeV)

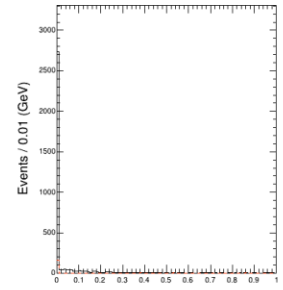

Events / 0.06 (GeV)
ECAL En1 (GeV)

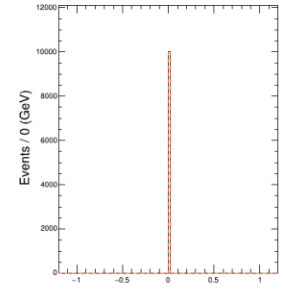

Events / 0.06 (GeV)
ECAL En2 (GeV)

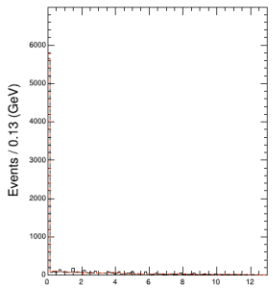

Events / 0.06 (GeV)
ECAL En3 (GeV)

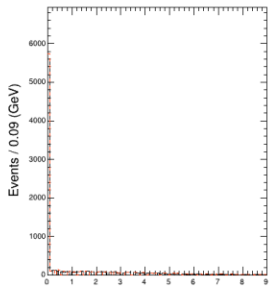

Events / 0.06 (GeV)
ECAL En4 (GeV)

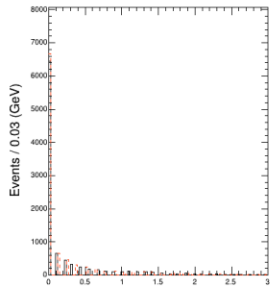

Events / 0.06 (GeV)
ECAL En5 (GeV)

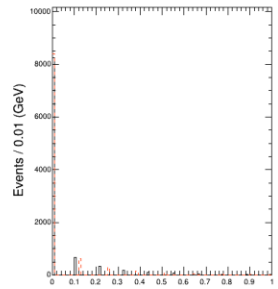

Events / 0.01 (GeV)
ECAL CluE (GeV)

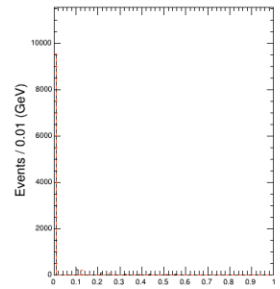

Events / 0 (GeV)
ECAL CluE_p (GeV)

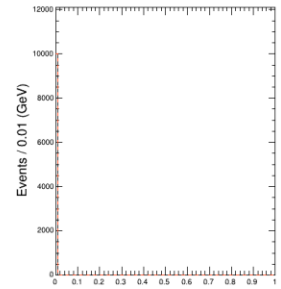

Events / 0.13 (GeV)
HCAL Total E (GeV)

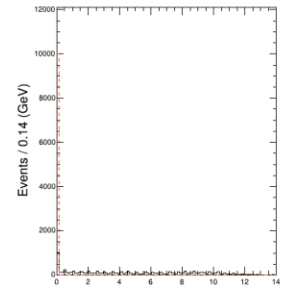

Events / 0.09 (GeV)
HCAL En1 (GeV)

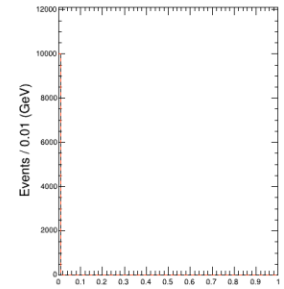

Events / 0.03 (GeV)
HCAL En2 (GeV)

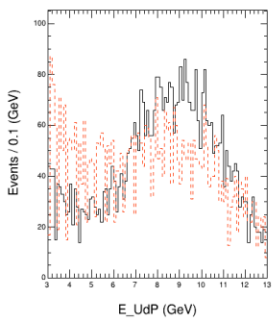

Events / 0.01 (GeV)
HCAL En3 (GeV)


Events / 0.01 (GeV)
HCAL En4 (GeV)


Events / 0.01 (GeV)
HCAL En5 (GeV)


Events / 0.14 (GeV)
HCAL CluE (GeV)


Events / 0.01 (GeV)
HCAL CluE_p (GeV)


Events / 0.1 (GeV)
E_UdP (GeV)


Reference