v0.8 v1 Samples

<mark>2/20/25</mark>



v0.8 v0 samples - the problem

- In the E>50 GeV slices, events with O(1000) reco PFOs
- Also, some unexplained reconstructed electrons and charged pions
- Reclustering failures



2/20/2025



v0.8 v1 samples – first look

- No high-multi events!!!
 Electrons also gone from reco PFOs, charged pions down to O(1)
 - 50-250 GeV on Left, 250-1000 Gev on right



Better stats - still low



- Reco E of matched photons (left), reco E of all photon-ID'd PFOs (right)
- This matching was performed without a dR condition
- Stats still not great in the 900-1000 GeV range
- Enough to start the resolution studies



Resolution studies (endcap)

- Ran resolution studies out of the box for the endcap region
- Resolution looking pretty bad compared to previous samples
- Motivates a return to dR matching
- Still worried abt low stats, E>900GeV







Endcap reso, dR matching

- No real difference after reinstating dR matching (fit params the same)
- Not enough stats for the last two energy bins
- Resolution very poor for E < 500 GeV





Barrel region

• BIB sample not displaying as much resolution degradation from endcap to barrel region as expected





Transition region

- Pretty similar to the resolution in the paper
- Fits for all regions could probably be optimized some more... the a=0 value is a bit concerning
- These plots aren't ideal; motivated a comparison to the resolution with the v0 sample, high-multiplicity events manually excluded





Endcap region (v0)

- On the one hand, BIB resolution sitting much closer to no BIB
- Insufficient stats E > 800 GeV
 - Ignore data points above 800





Barrel region (v0)

- Again, BIB reso similar to no-BIB
- High uncertainty and fluctuation due to low stats throughout sample
- Does not fit functional form super well





Transition region (v0)

- BIB resolution actually better than no-BIB for the majority of bins
 - Concerning shouldn't be the case
- Again, low stats for E>800 GeV





Conclusions

- The v0.8 v1 samples do not suffer catastrophic clustering failures, photon multiplicity is reasonable
- However, issues with resolution persist this sample produces resolution curves that are significantly worse than those in the paper
- Stats are still low in high-energy bins
- While resolution curves for the v0 samples with high-multi events manually removed are closer in value to the no-BIB curves, the curves themselves are not good quality

Backup – Gaussians (endcap), no dR cut







Backup - Gaussians (endcap), with dR minimization





Backup – Gaussians (barrel)



Backup - Gaussians (transition region)







Backup – Gaussians (endcap region) (v0)





- E reso, 750.0-

Entries

Mean

Std Dev

Constant

Mean

-0.2 -0.15

Sigma 0.00671

-0.1



Backup – Gaussians (barrel region) (v0)

Sigma 0.01354 ± 0.00241

-0.4 -0.35 -0.3 -0.25 -0.2 -0.15 -0.1 -0.05

Sigma 0.01762 ± 0.00212

-0.1 -0.05 0

12

-04

-0.35 -0.3 -0.25

-0.2 -0.15



Backup – Gaussians (transition region) (v0)



E reso, 30.0 E reso, 30.0	E reso, 50.0-E-100.0 120 100 100 100 100 100 100 10	E reso, 100.0-cE-150.0 Enres 448 Man -0.2807 Sol De Constant 121.5 r.7 Man -0.2807 Sol De Constant 121.5 r.7	E reso, 150.0-E-200.0 90 Errires 244 70 70 60 70 60 70 60 70 70 70 70 70 70 70 70 70 7	E reso, 200.0 E reso, 200.0 E reso, 200.0 Entreso, 200.0 Entreso, 200.0 Extreso,	E reso, 250.0-E-300.0 35 30 30 30 50 50 50 50 50 50 50 50 50 5	E reso, 300.0 E reso, 300.0 Ereso, 300.0 	E reso, 350.0-E-400.0 20 20 20 20 10 10 10 10 10 10 10 10 10 1
E reso, 400.0 <e<450.0 E reso, 400.0<e<450.0 Tereso, 400.0<e<450.0 E reso, 400.0 E reso, 4</e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 </e<450.0 	E reso, 450.0 E reso, 450.0	E reso, 500.0 <e<550.0 E reso, 500.0<e<550.0 E mine title Stat Dev 0.00503 Stat D</e<550.0 </e<550.0 	E reso, 550.0 E reso, 550.0	E reso, 600.0 E reso, 600.0 	E reso, 650.0 E reso, 650.0	E reso, 700.0-E-750.0 E reso, 700.0-E-750.0	
E reso, 750.0 	E reso, 800.0-E-850.0 18 18 18 18 12 12 10 12 10 12 12 10 12 12 12 14 14 15 14 15 16 17 16 17 16 17 17 18 18 18 19 19 19 19 19 19 19 19 19 19		-0.5 -0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5				