

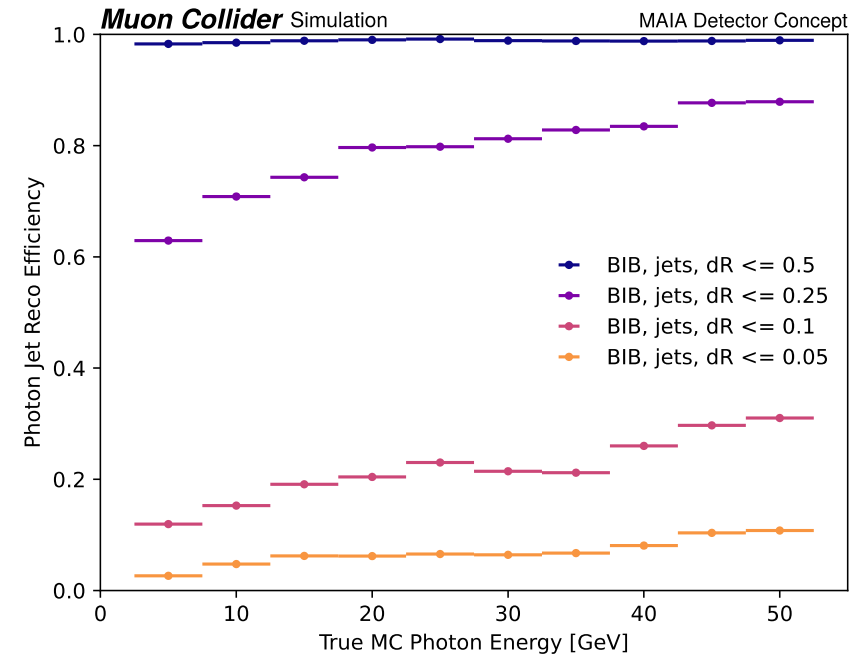
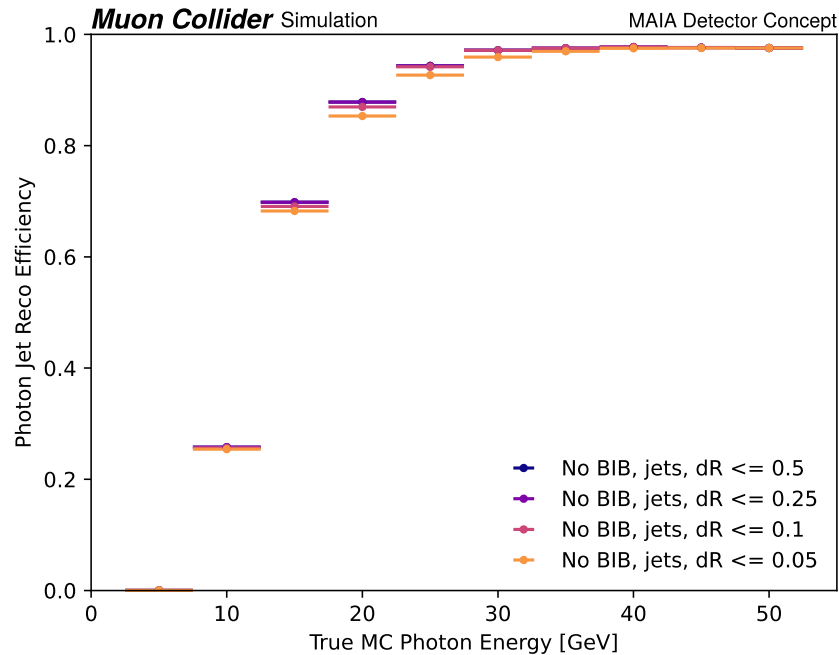
# ***Photon Resolution Updates***

25 September 2024



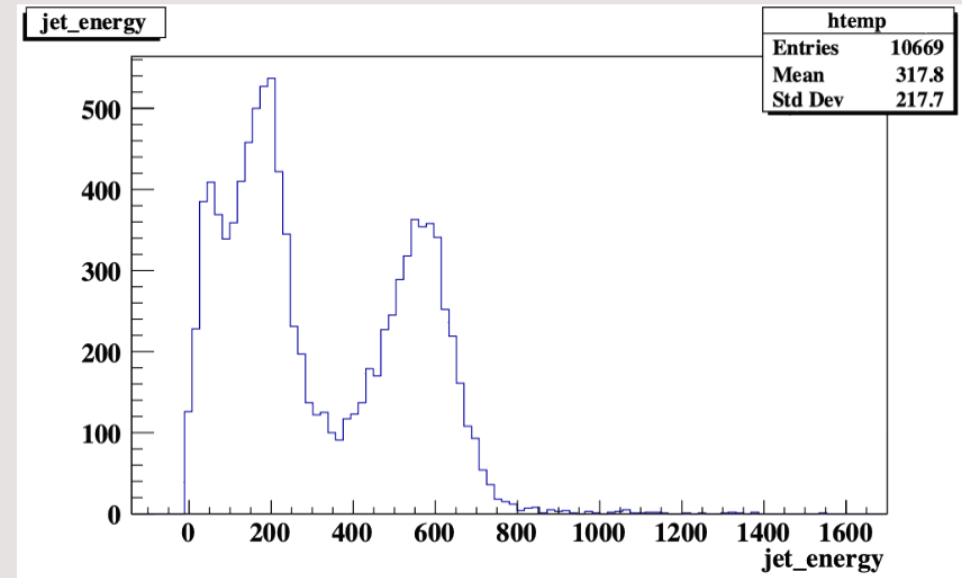
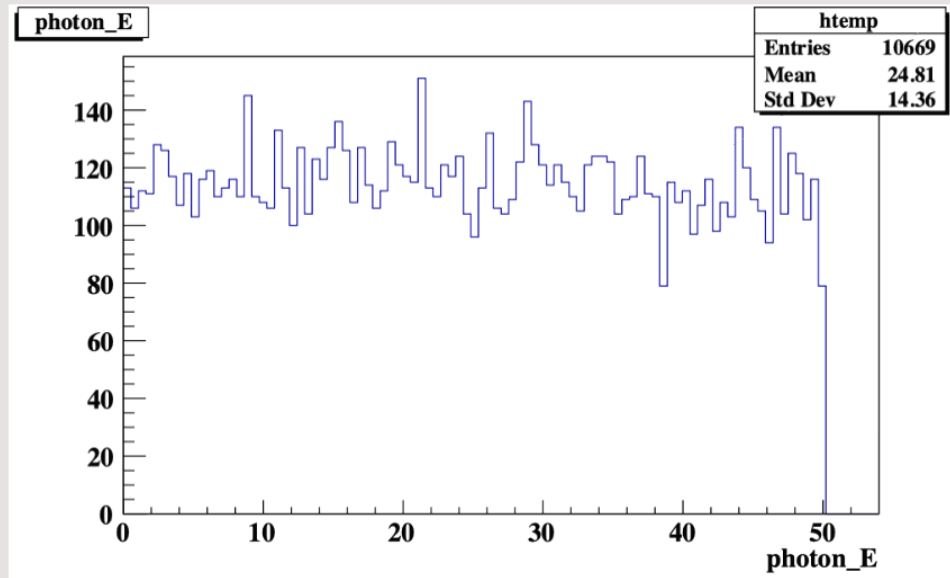
# PhotonGun Samples with BIB-Overlay: Efficiency

- Last week, looked at photon reconstruction efficiency (with jets as our reco objects) for both clean and BIB samples, varying dR matching condition



## Reco jet energy spectrum (BlB)

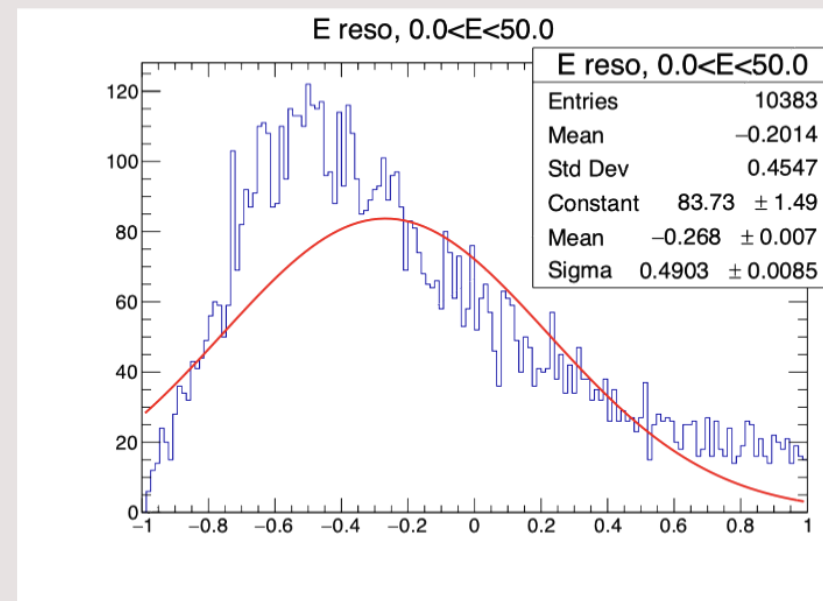
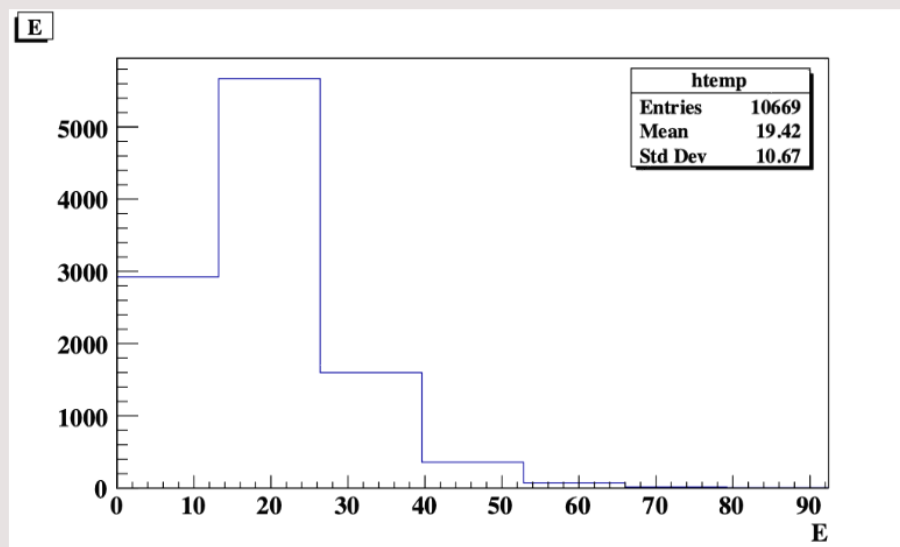
- Since tightening dR cut kills efficiency so quickly, started off with only  $dR = 0.5$  and  $dR = 0.25$
- For these samples, the reco energy spectrum was very concerning:



- Still tried to apply calibration and study resolution; could not fit a Gaussian, as it instead resembles an exponential or Poisson distribution with a significant tail out to  $\sim 10^2$

# A return to PFOs?

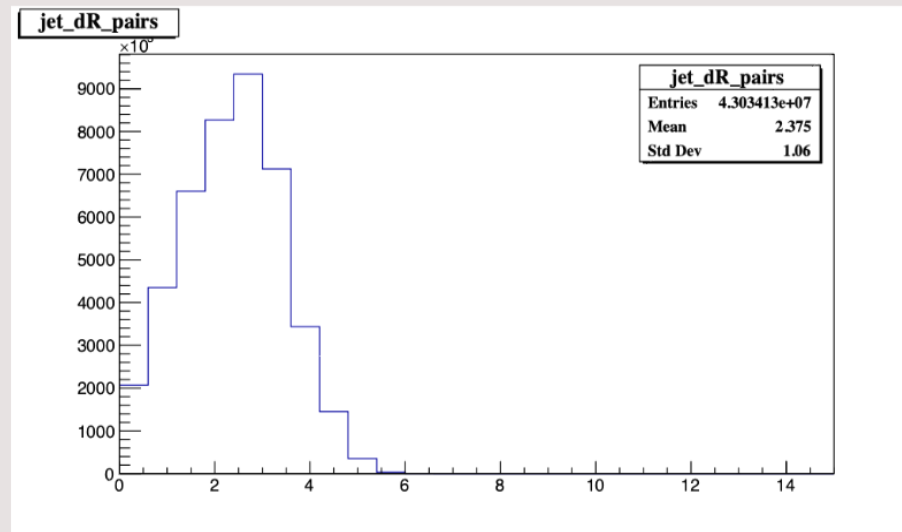
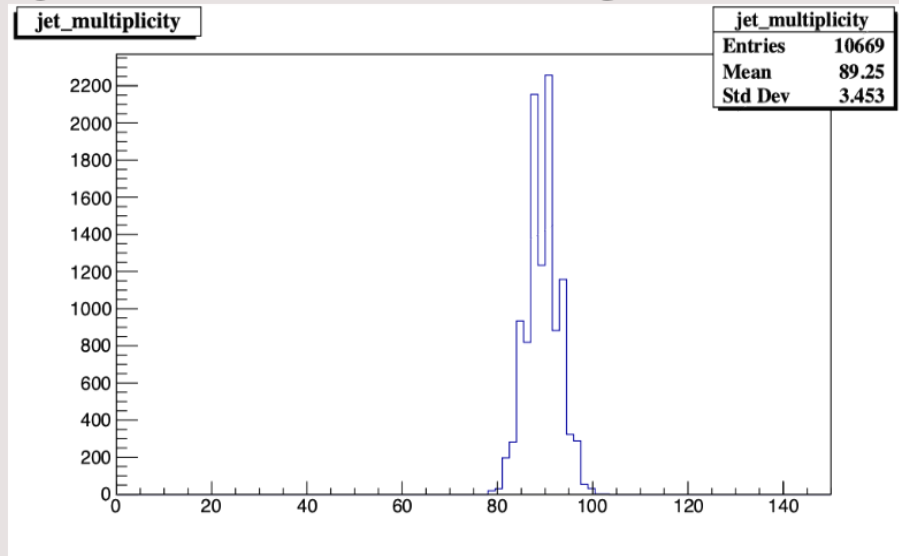
- Desperation drove me back to PFOs as a reco object
- Looked at the energy spectrum and resolution for PFOs in the BIB sample:



- Peak closer to 0 after calib, but still clearly not Gaussian, and the tail remains
- Ultimately, not enough to motivate a return to PFOs (especially since non-BIB part of the study done with jets)

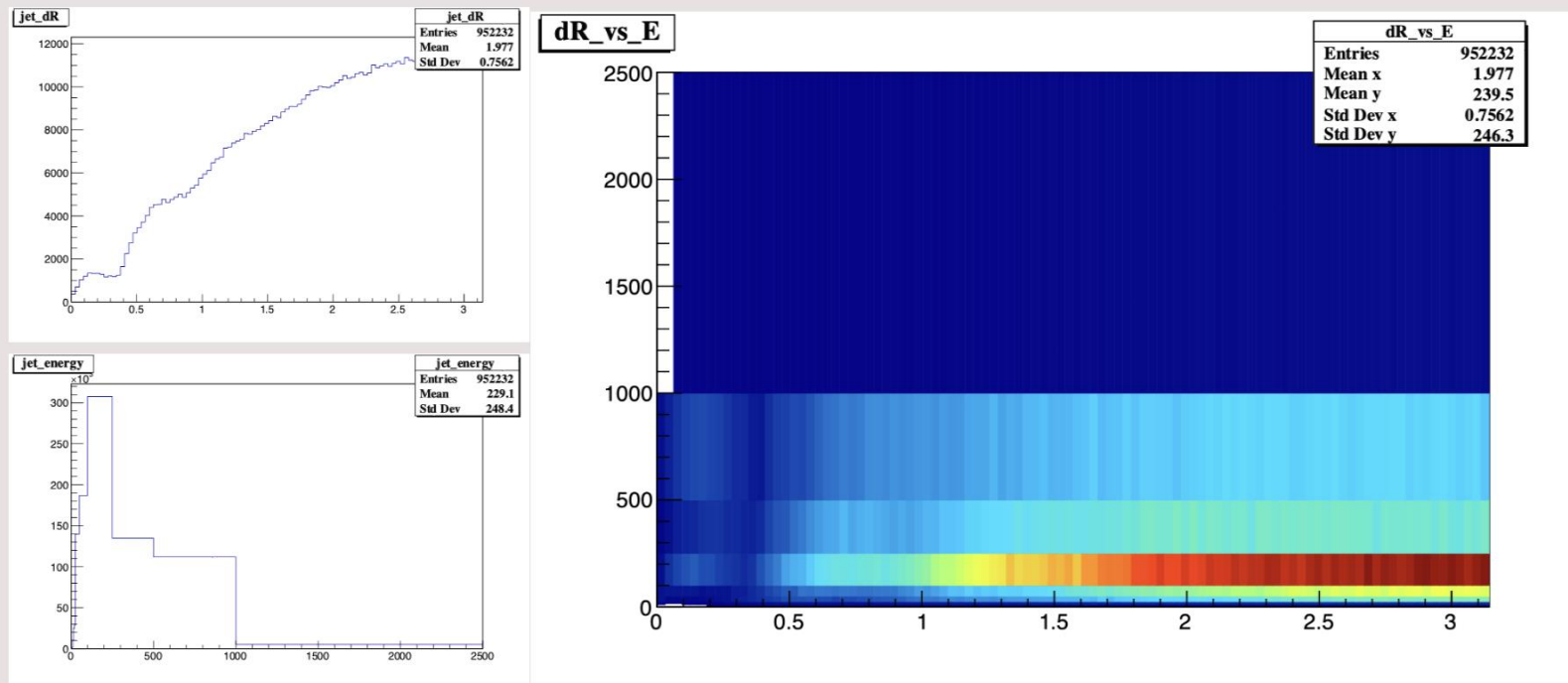
# A closer look at jet distribution

- Took a look at jet multiplicity and the dR of jet pairs
- The jet multiplicity is a bit disturbing
- Discussed briefly with Isobel, we believe this stems from some of our fundamental clustering issues in Pandora
- The jet pair dR doesn't suggest any significant problem resolving between two jets based on dR matching



# ***dR vs Energy***

- Also looked at jet dR, jet energy, and dR vs energy
- We cut at 0.5 for dR; we can see here that most of the jets in the appropriate energy range (0-50GeV) are at high dR



## ***Future work/questions***

- Do we realistically see a path forward with jets for the BIB studies?
- If not... do we need to go back to the drawing board for the ECAL calibration with PFOs?
- Also, important to keep in mind the low energy of this slice in particular... jets not generally a good reco object for low-energy ranges