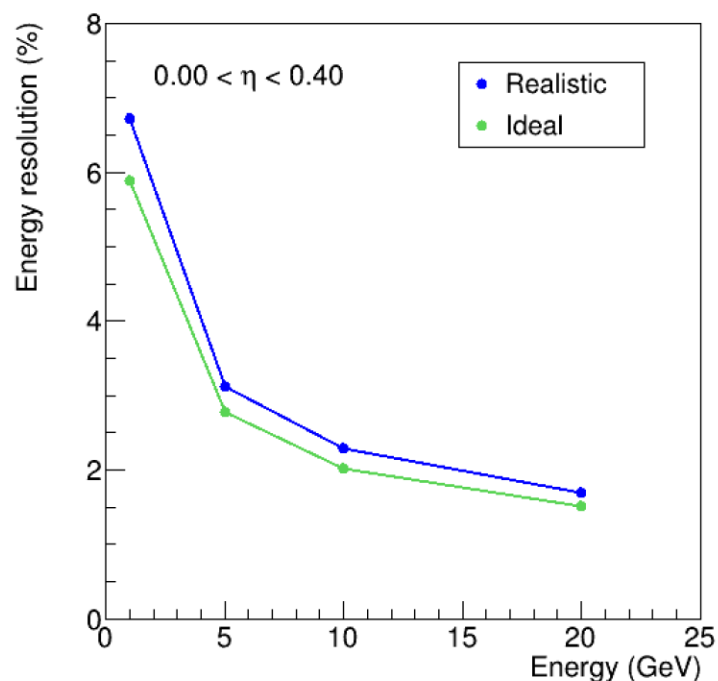


# Energy and position resolution plots

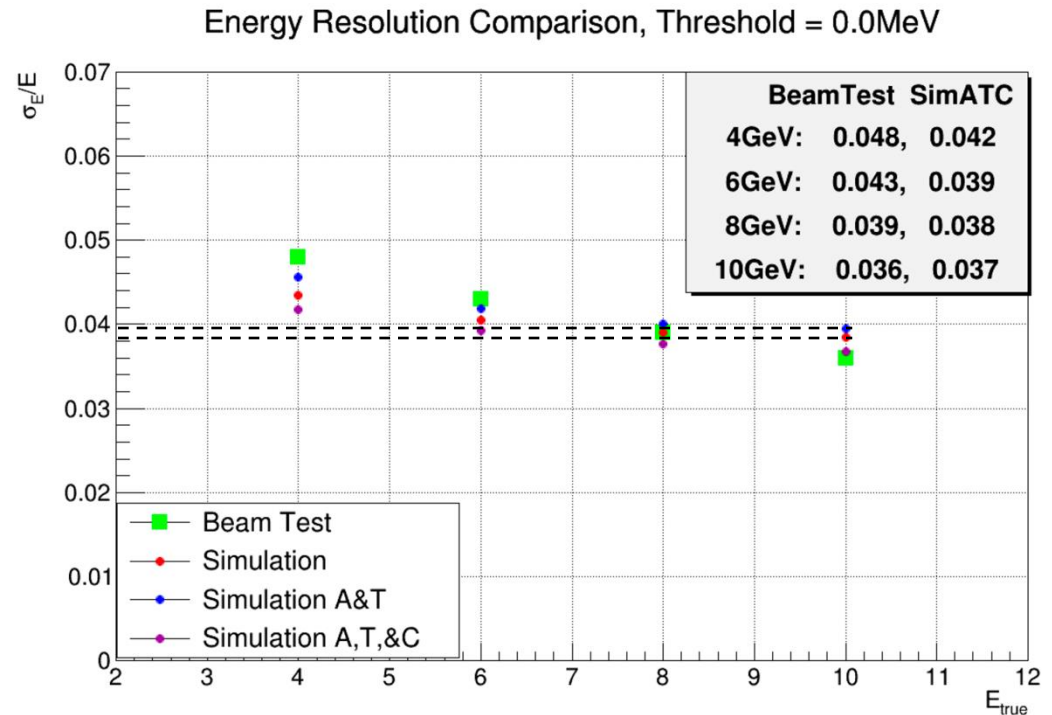
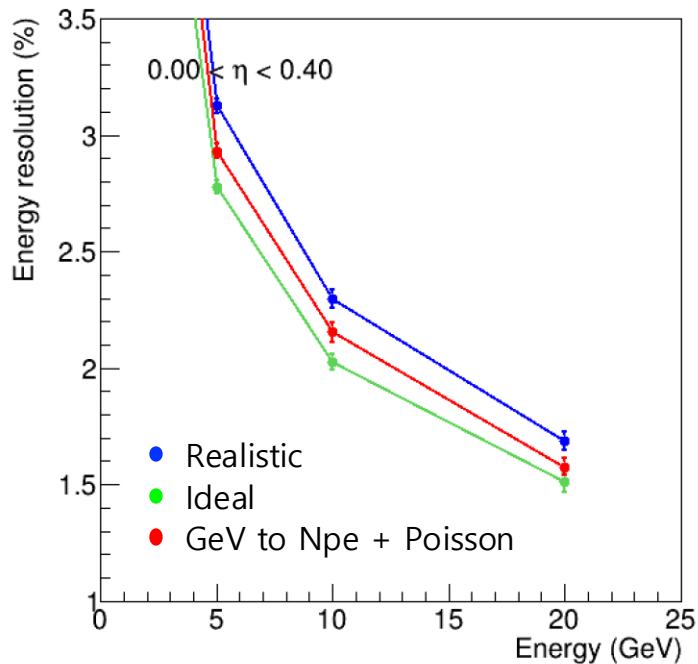
Sep 3 (Tue)  
Minho Kim

# Comparison between the ideal and realistic cases



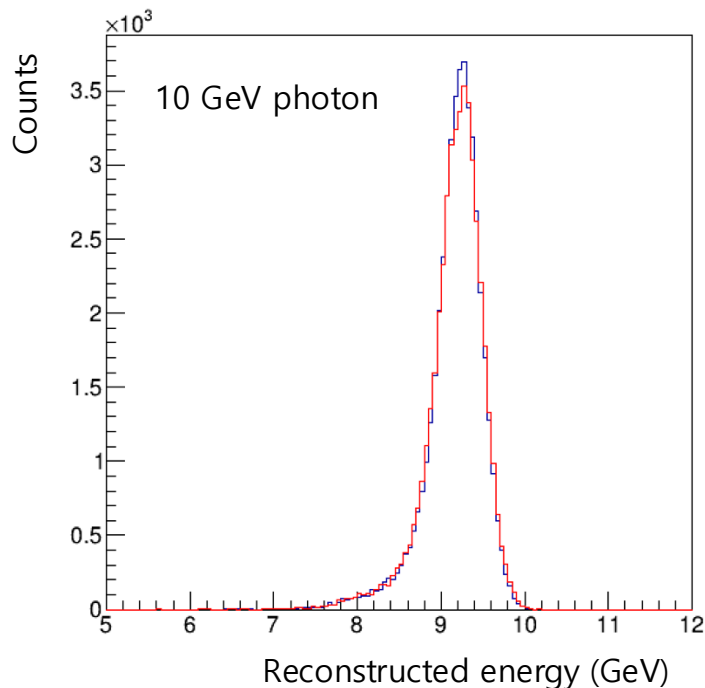
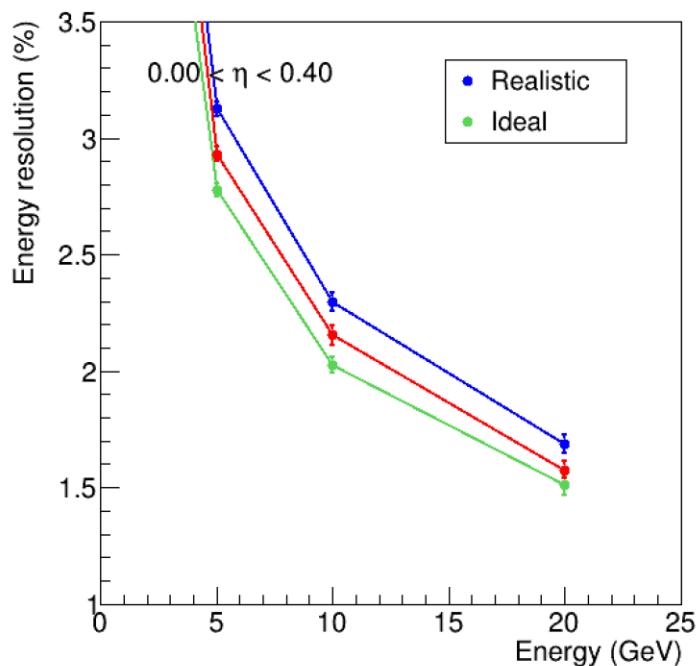
- ~0.3% and ~0.2% were observed for 10 GeV and 20 GeV photons, respectively, not 0.5%.
- How much each realistic factor worsens the resolution needs to be studied.

# How much each factor worsens the resolution



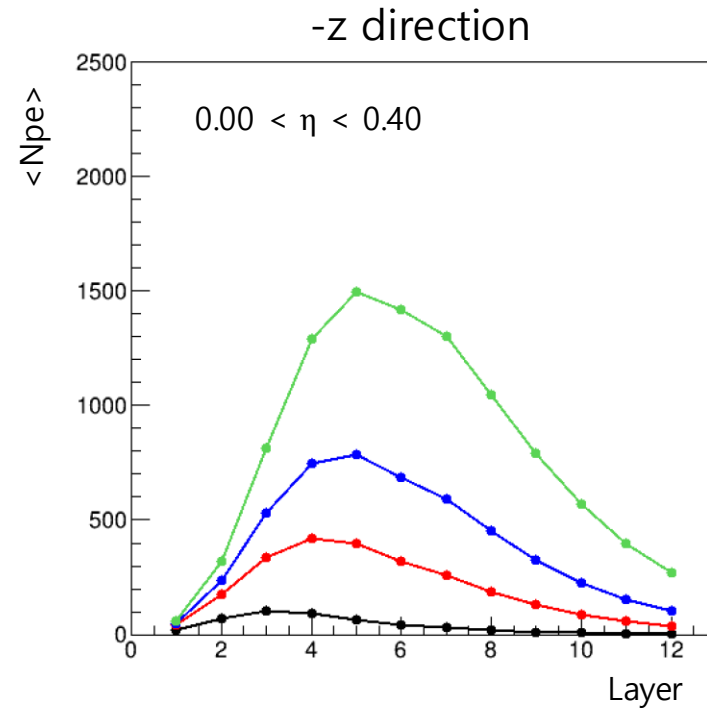
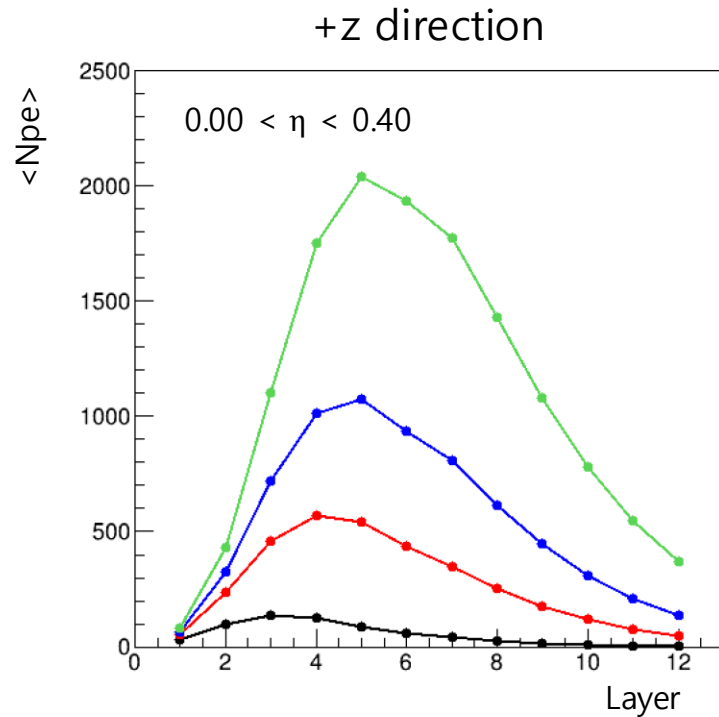
- Effect of "GeV to Npe + Poisson smearing" is comparable with Jared's results.
- As the beam energy increases, the effect of the Poisson smearing decreases because the Npe increases.

# How much each factor worsens the resolution



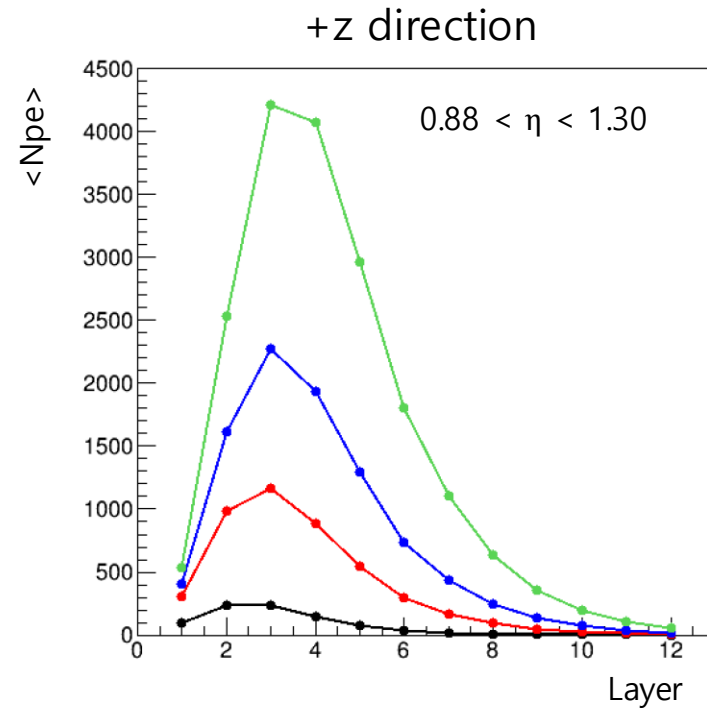
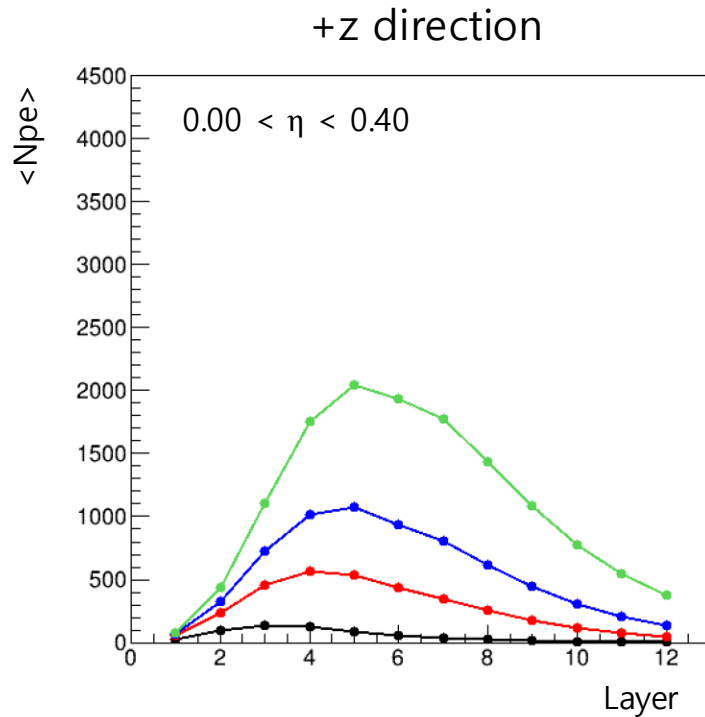
- Effect of "GeV to Npe + Poisson smearing" is comparable with Jared's results.
- As the beam energy increases, the effect of the Poisson smearing decreases because the Npe increases.
- The corrected energies from both sides were almost the same.

# Npe statistics



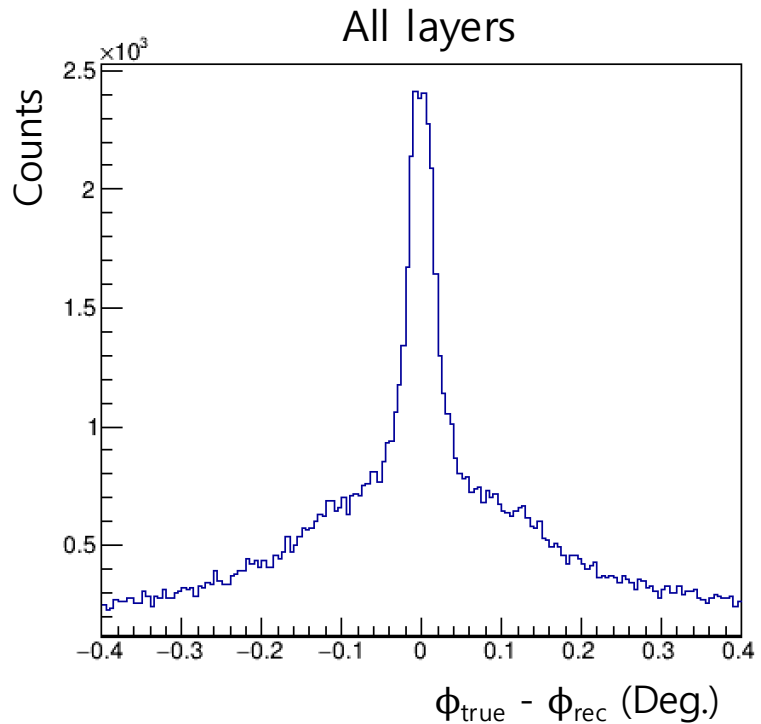
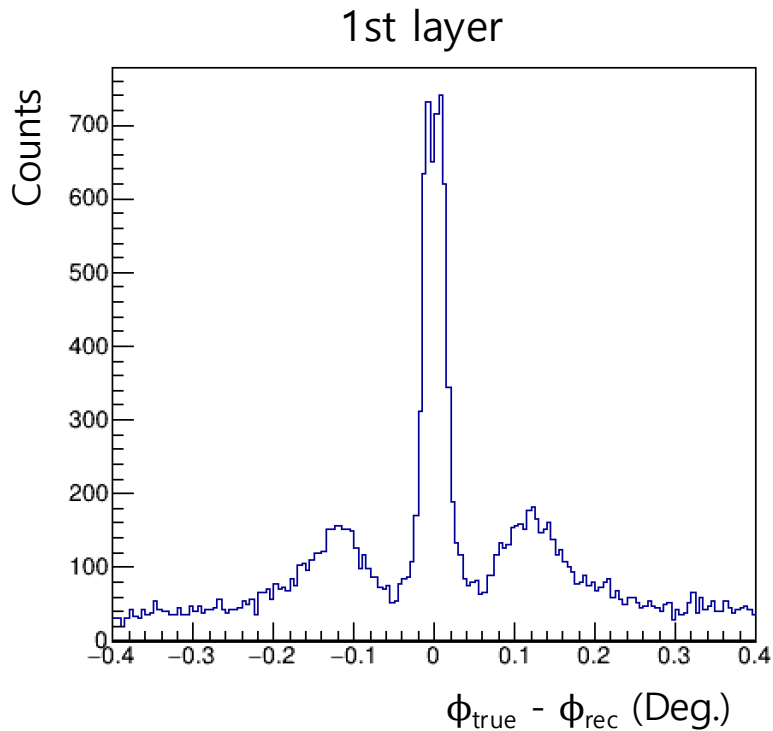
- Because the incident positions are closer to the detector end in the +z direction, we can see more  $\langle N_{pe} \rangle$  in the +z direction.
- The shower maximum position moves to the deeper layer as the beam energy increases.

# Npe statistics



- Because the incident particles experience more radiation length in the larger  $\eta$  region, more  $\langle N_{pe} \rangle$  is observed in the shallow layers and the shower maximum positions also move to forward.

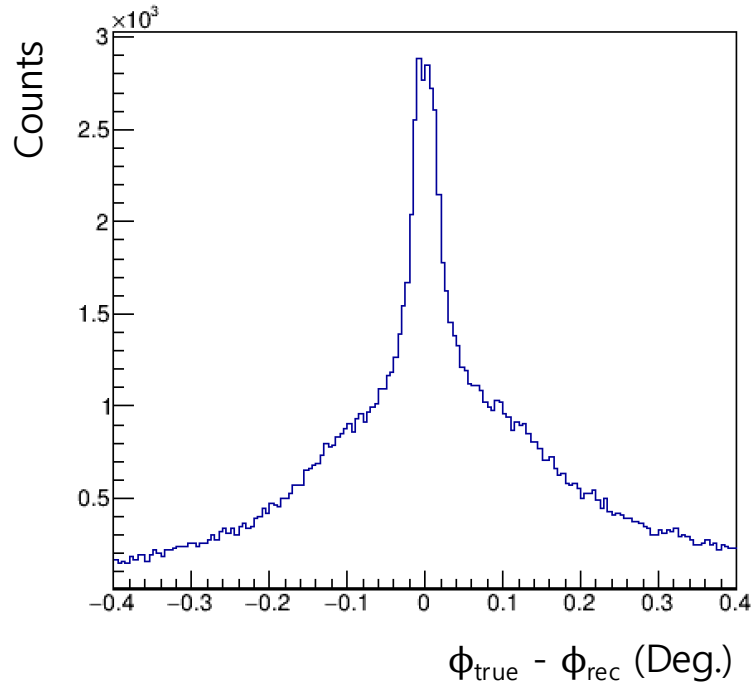
# Position reconstruction



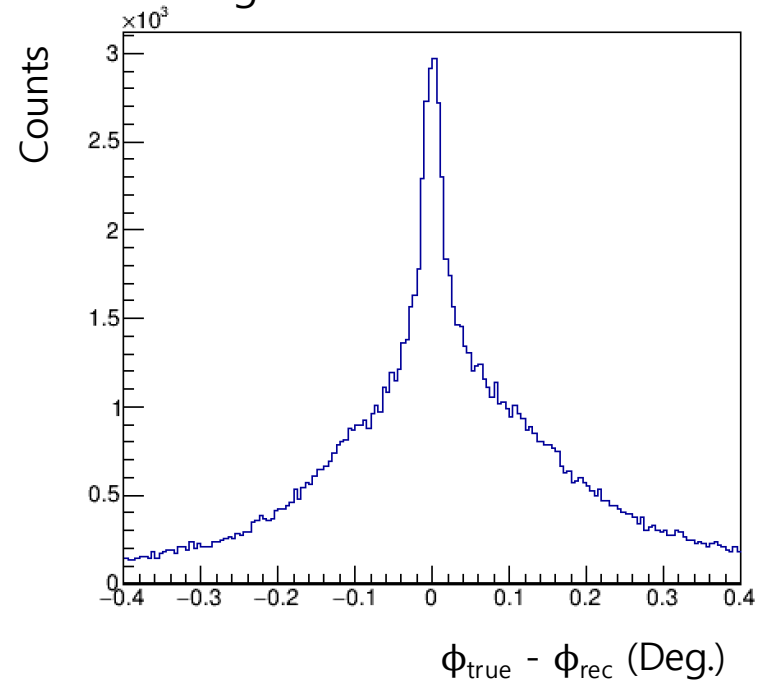
- The position was reconstructed by a maximum energy deposit hit on the imaging layer where the EM shower started.
- It seems like the previous  $\phi$  difference distribution had a bias because the  $\phi$  was reconstructed only by the first layer.

# Position reconstruction

Minimum distance to Clus.



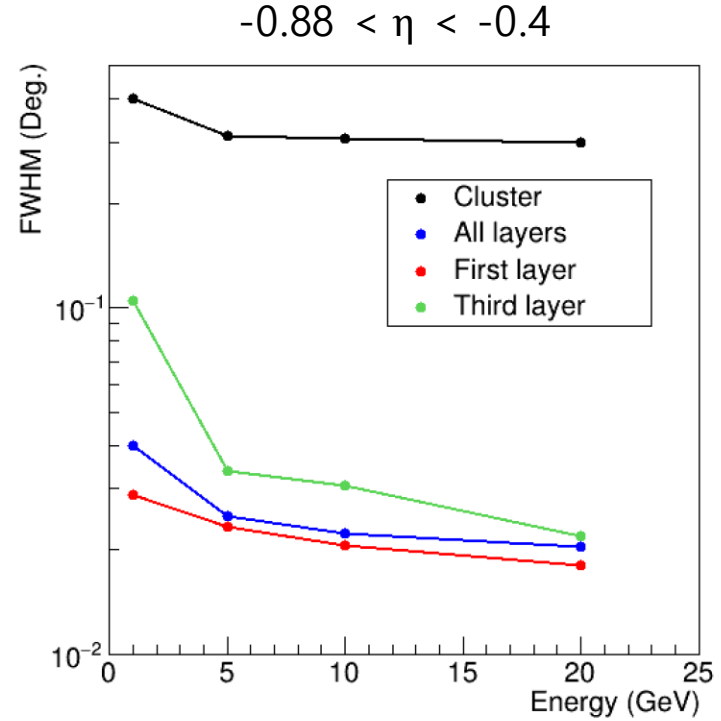
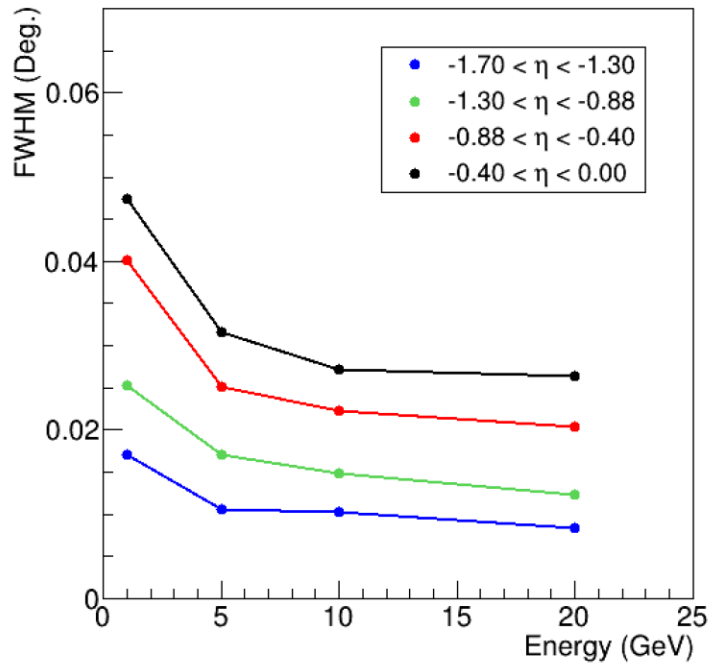
Weighted Ave. around Clus.



- Other position reconstruction methods also showed similar performances from the FWHM's point of view.

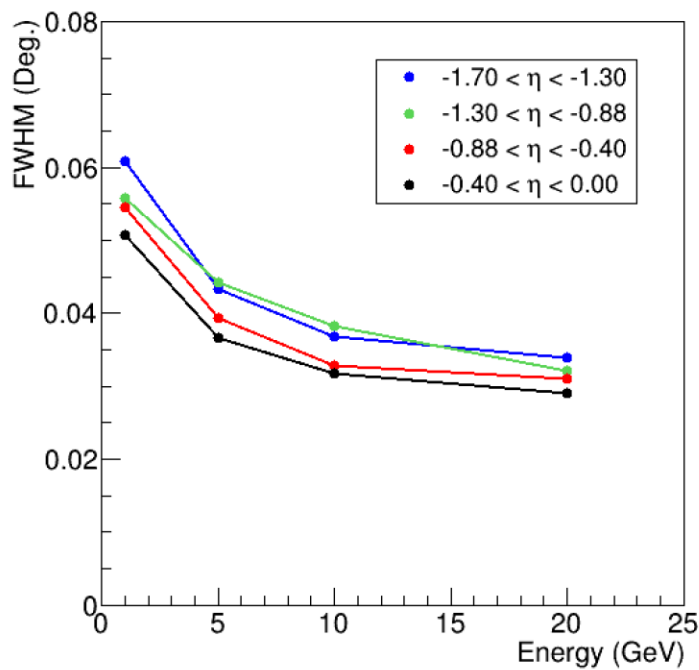


# $\theta$ resolution plots



- The larger  $|\eta|$  shows better resolution because the shower fluctuation is projected onto the z-axis.
- The hit level method shows one order of better resolution than the cluster one.

# $\phi$ resolution plots



- In general, worse resolution was observed as  $|\eta|$  increased. This might be because more shower particles were generated and they were smeared by magnetic field.

▪

# TODO

- Slides and plots for energy and position resolutions will be prepared for BIC review.
- Going to study the case two showers overlap in BIC.