Track Projection implementation and testing

Barak Schmookler

Outline

- ❑ Track projection implementation and testing in *Juggler*
- ❑ Comparison with S3 calorimeter results
- ❑ Next steps

Track projection (propagation) implementation

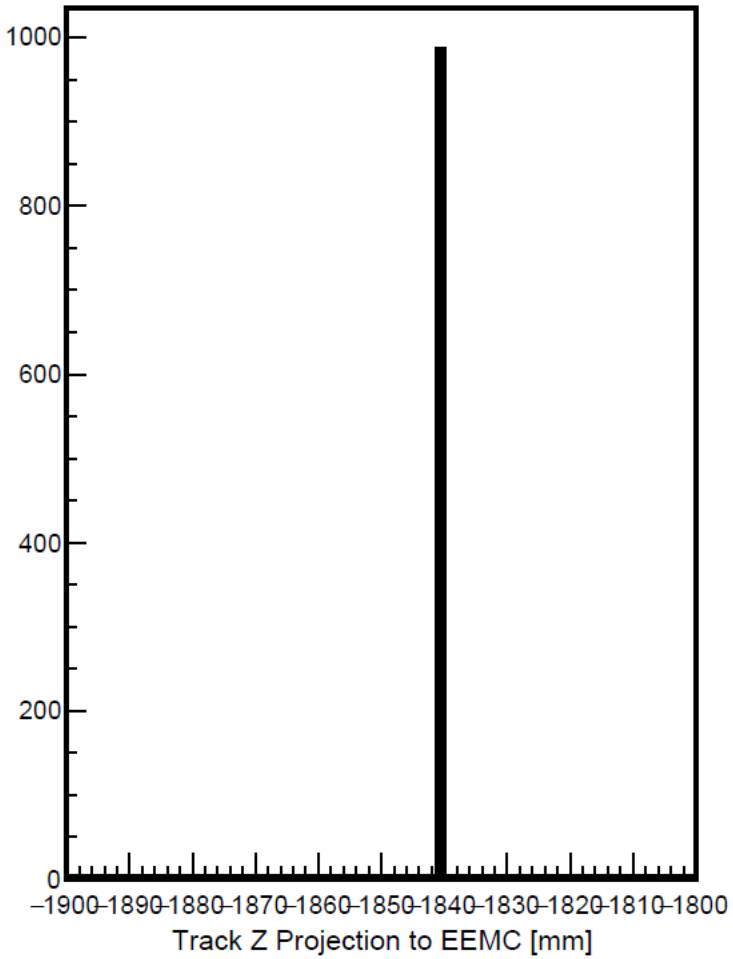
- We need to project the reconstructed tracks to other sub-detectors.
- A standalone code using *Juggler* output the ACTS::Propagator class was written by Wenqing Fan.
- This was then implemented into a new *Juggler* class by Barak Schmookler. Results shown on the next pages use this class.
- The class has now been ported to *EICrecon* by Dmitry Romanov, and is being generalized for projections to other detectors. This will hopefully go into the next simulation campaign.
- Additional work to associate projection to track (trajectory) in output ROOT is ongoing.

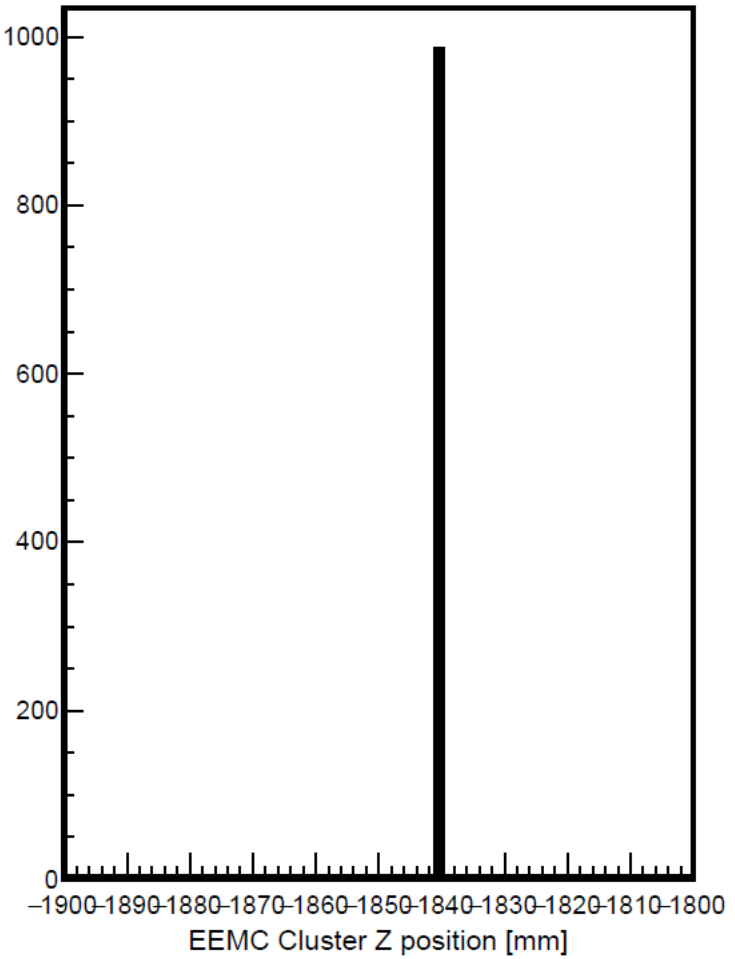
Track Projection test: EEMC

Single Electrons generated:

1 GeV < E < 20 GeV

160° < θ < 170°, 0° < ϕ < 360°





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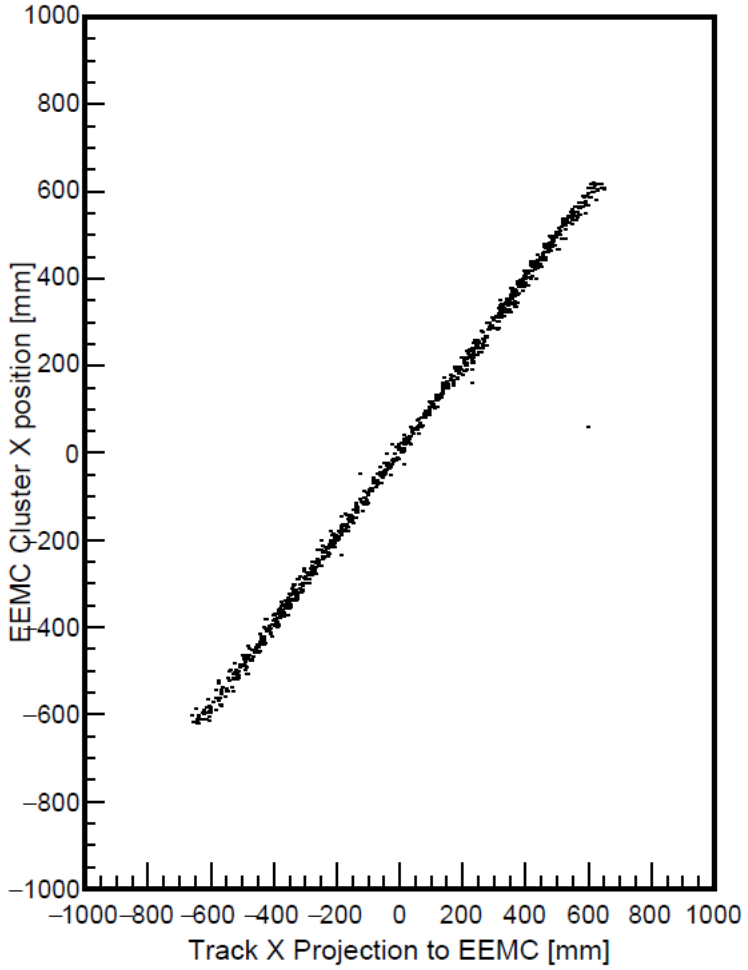

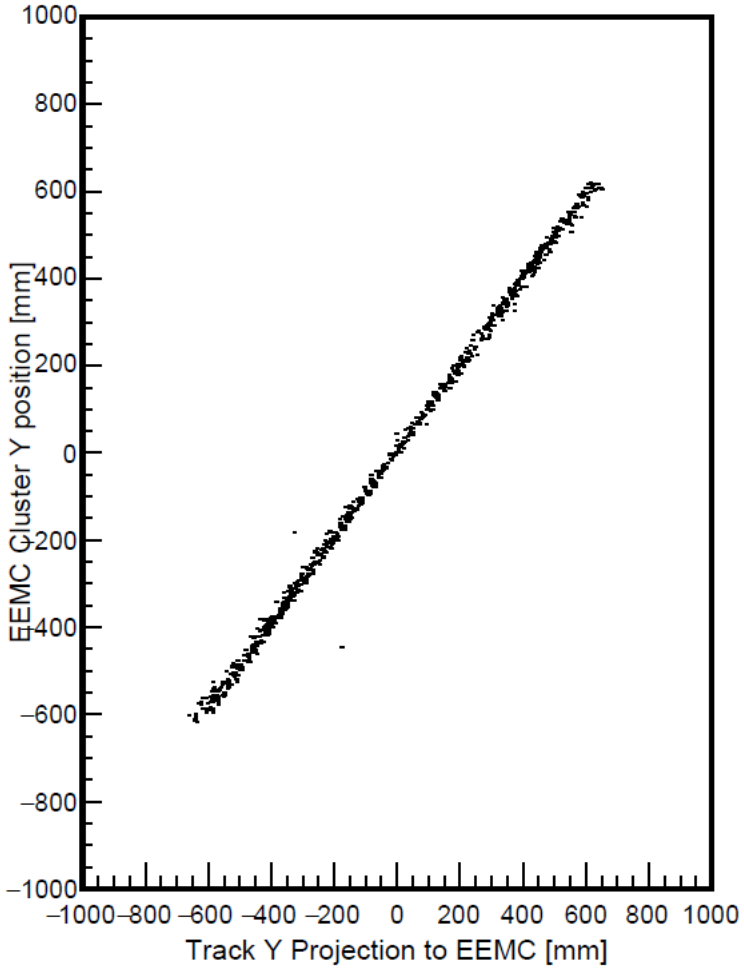

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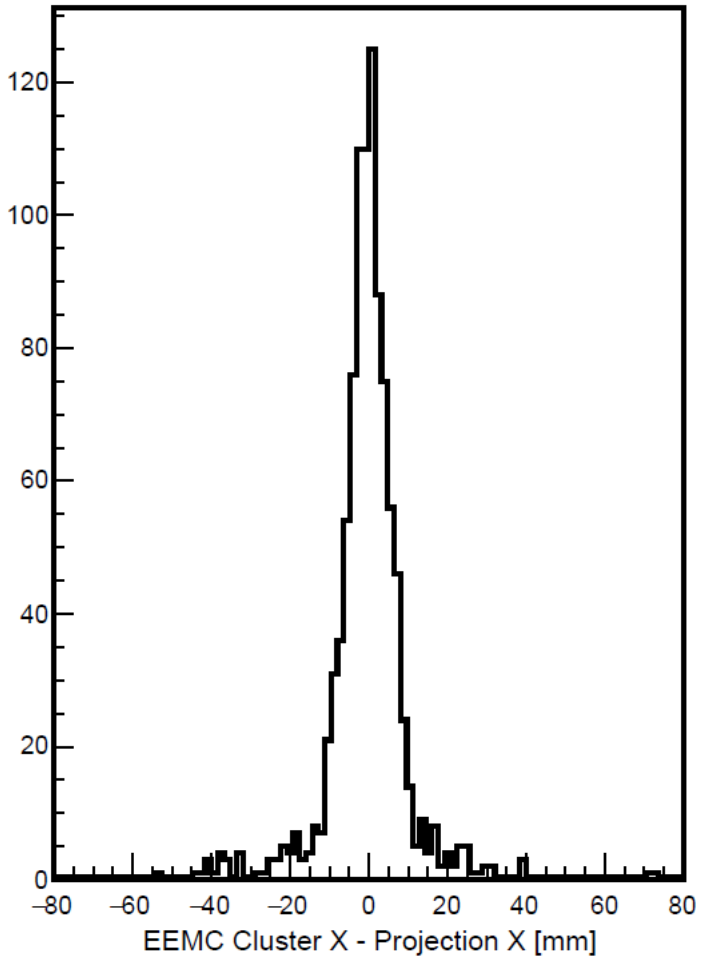

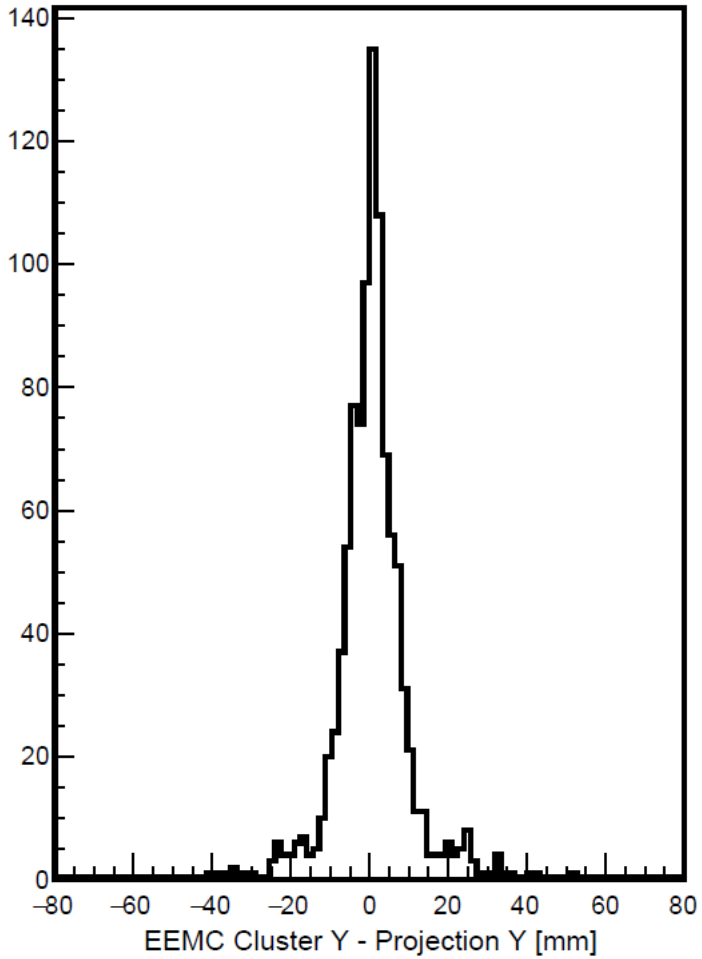

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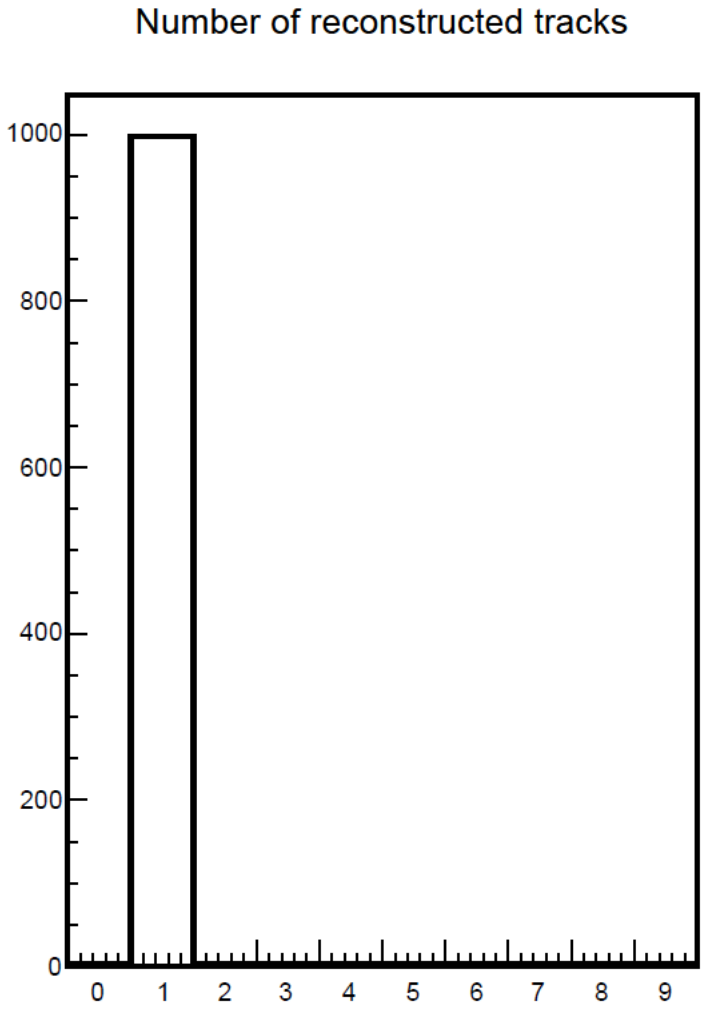

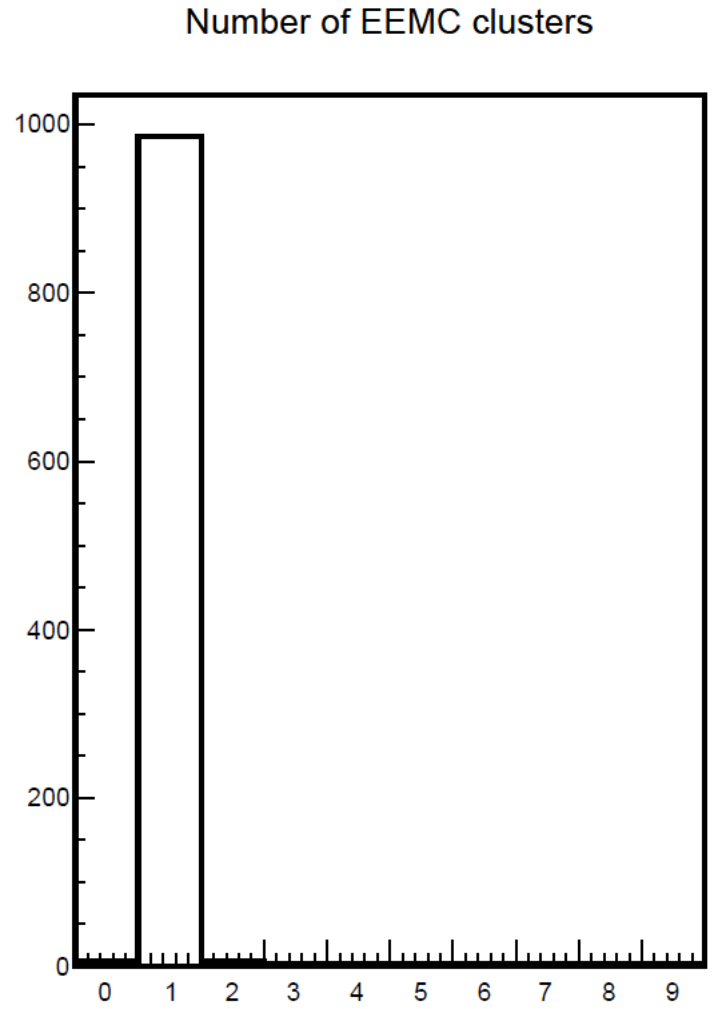

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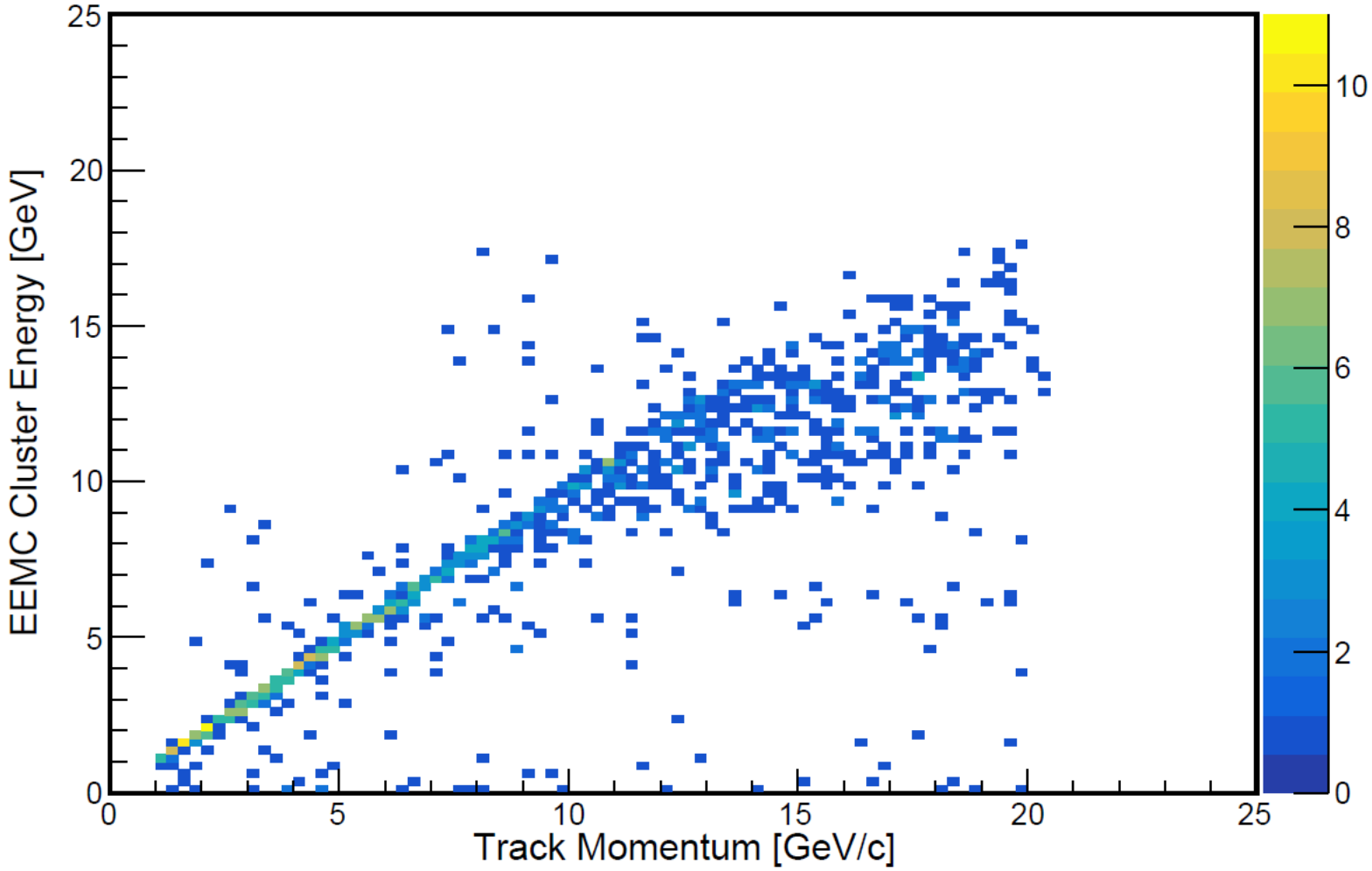

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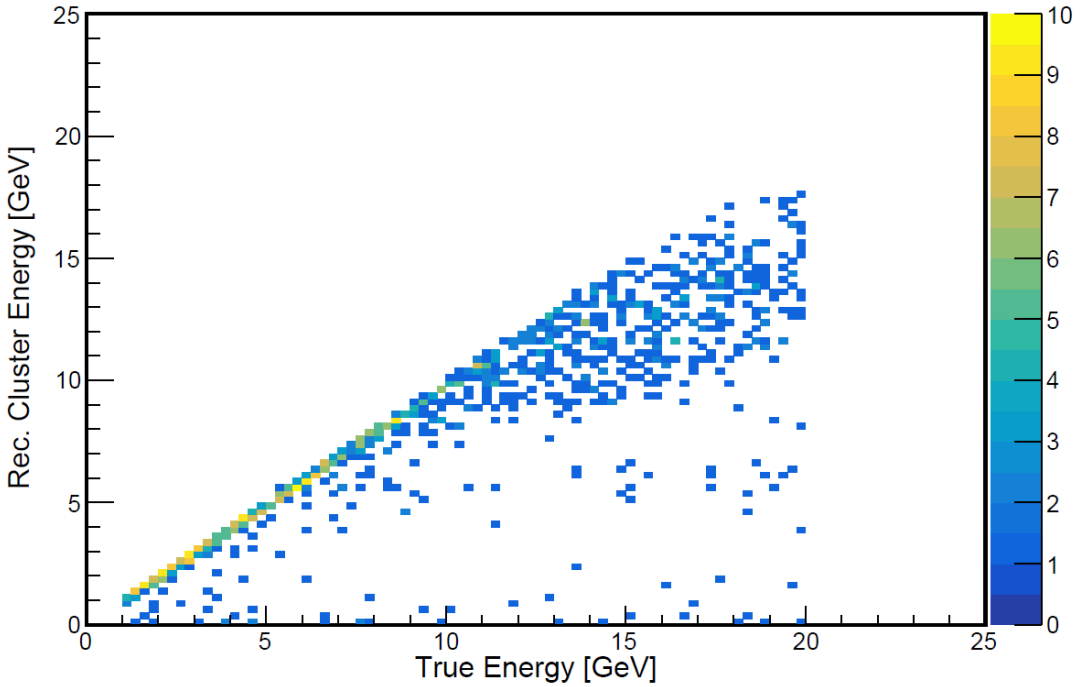
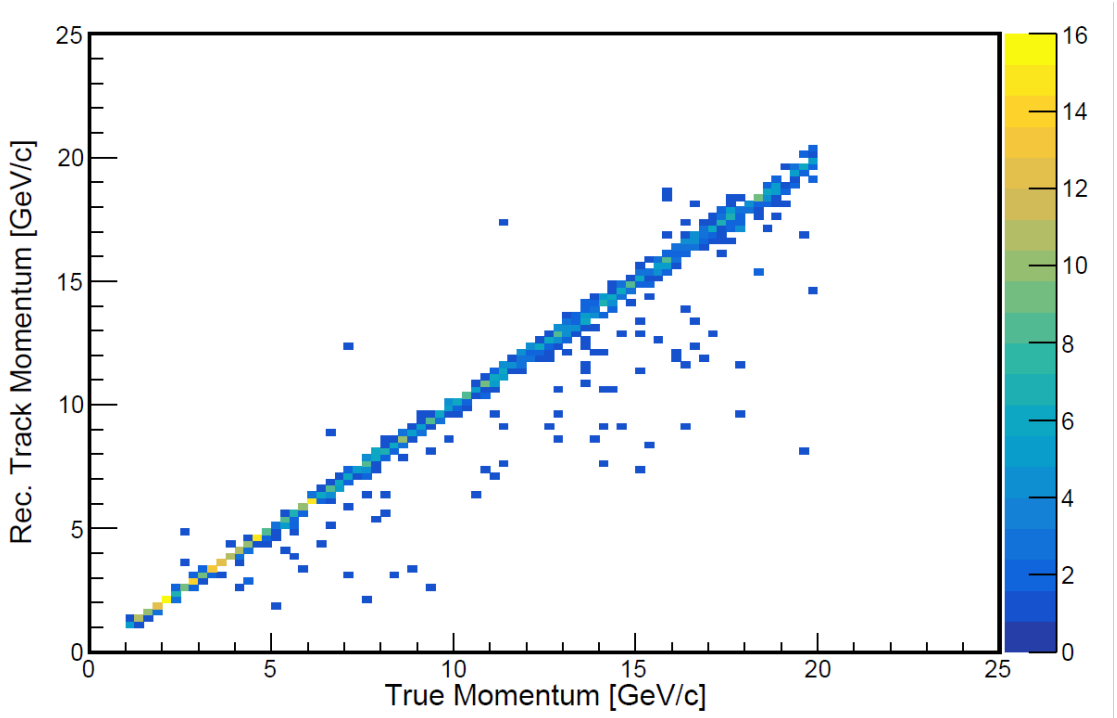


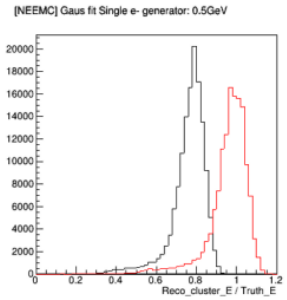


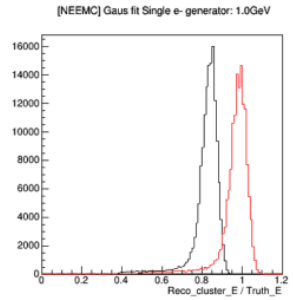
Comments

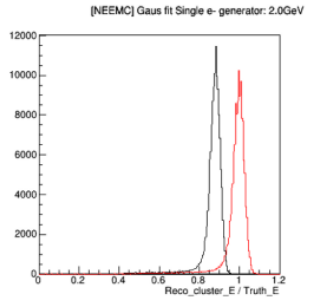
- The track projection itself looks very good!
- I see poor energy reconstruction and resolution for the EEMC for >10 GeV electrons if I use both the ‘nightly’ and the latest tagged geometry. This seems to disagree with the results from the calorimeter group.
- I used *Juggler* for all the above plots – using the calorimeter reconstruction benchmarks ‘options’ file.
- Need to test with *EICRecon* to see if effect persists – this is the next thing to do.

Slide from Calorimeter group

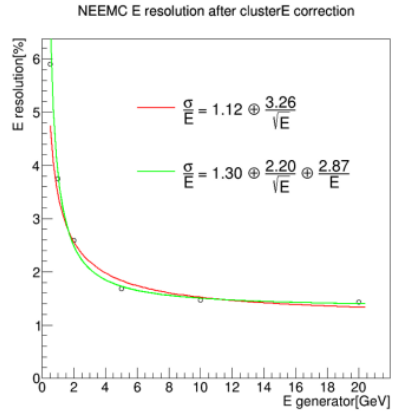
Backward ECal

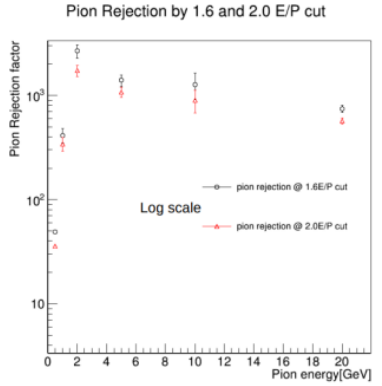






- First look at single particle simulations
- Energy resolution and pion rejection values as expected
- No issue identified so far





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