Tiny Update w/ fun4all & Questions about EEEMC for Pre-Proposal

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ePIC EEEMC & BECAL NSF Prop Grp Meeting

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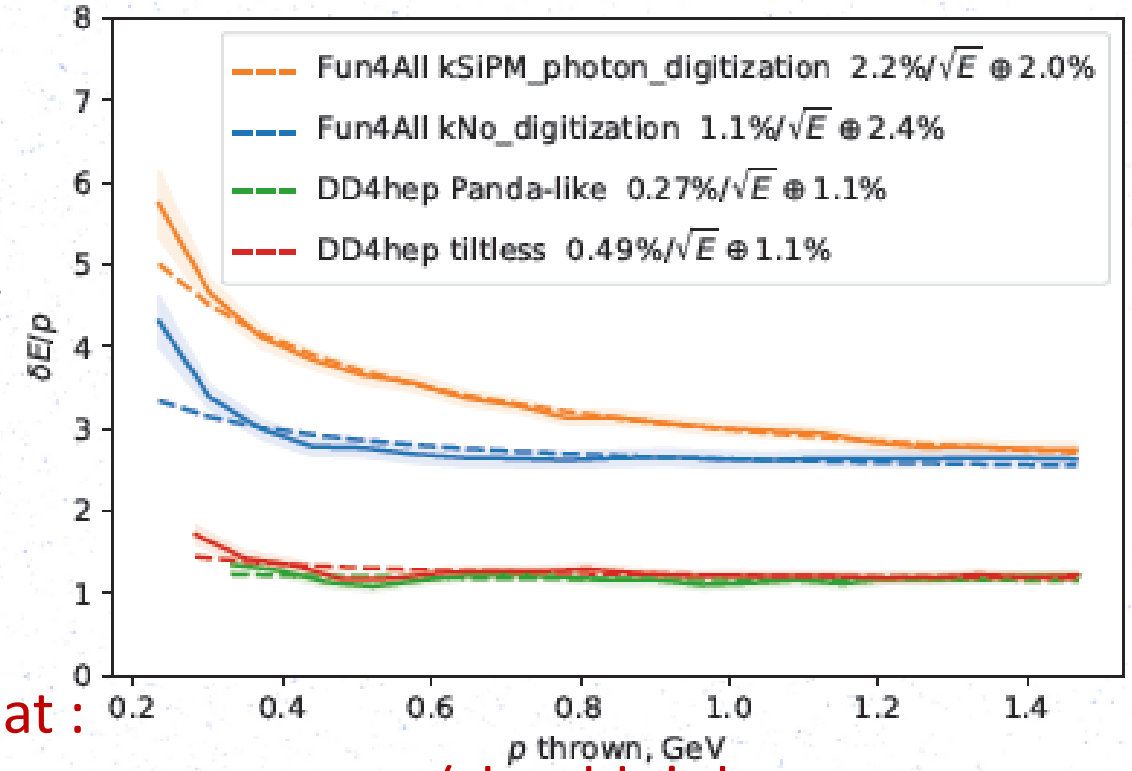
Review: Status of fun4all

- Nico made large statistics file in July
- This was the basis of first results which showed seemingly larger (worse) BECAL resolution than ECCE proposal (at around 5-10 GeV)
  - Using Nico's file, I showed that this was only caused by out of date calibration ran in the afterburner clustering
  - Last set of results with 3x3 and MA clustering in fun4all, same resolution as in ECCE proposal
- So now focus has been helping Dmitri investigating resolution diff fun4all vs dd4hep
- My own fun4all running with all latest gdml updates following Nico's instructions given on Mattermost in mid September (+mods)

From Dmitry



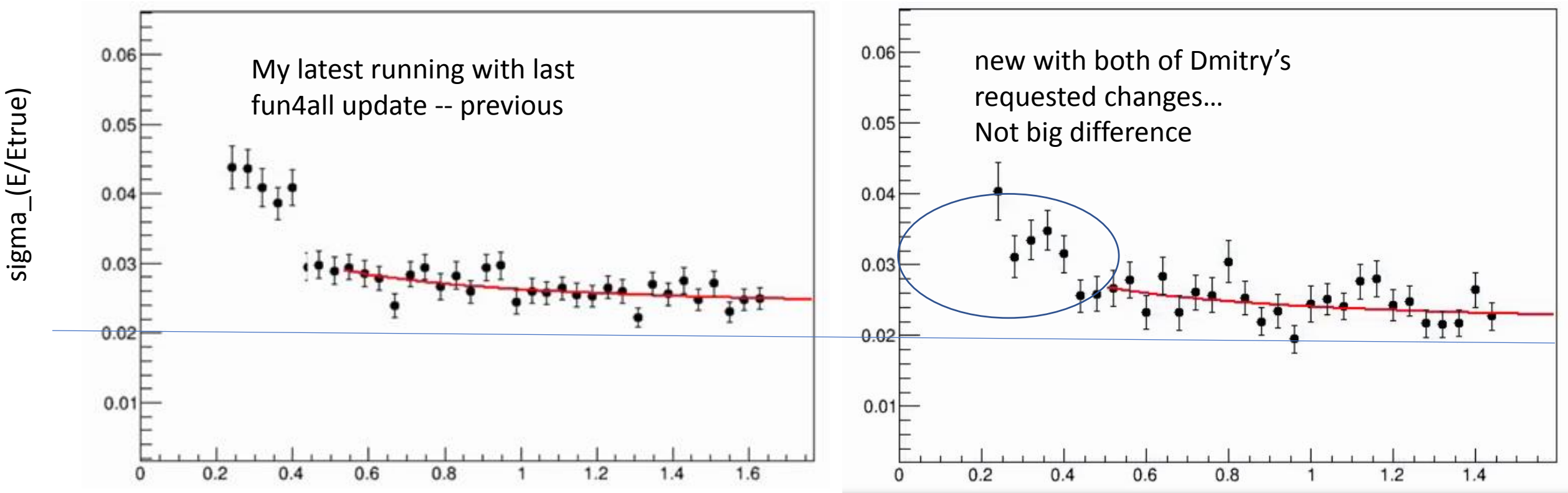
LAST THINGS TO CHECK in f4a (?) :

Dmitry sent me some changes to include to look at :

1) slightly diff single electron thrown particle phase space ranges (shouldn't have ~any difference, but might result in very small differences in eta ranges included in resolution plots)
2) Turn digitization off in my sim too

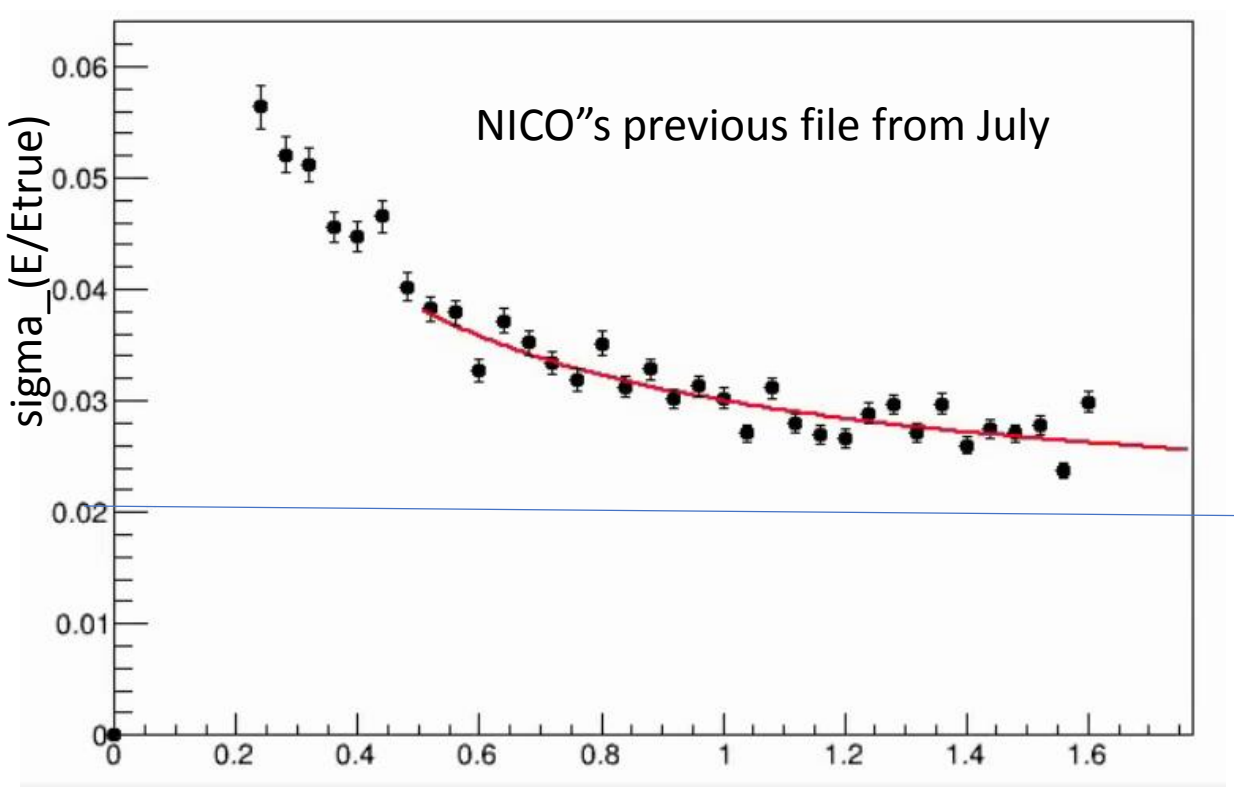
Last f4all updates w and w/o Dmitry's requested changes

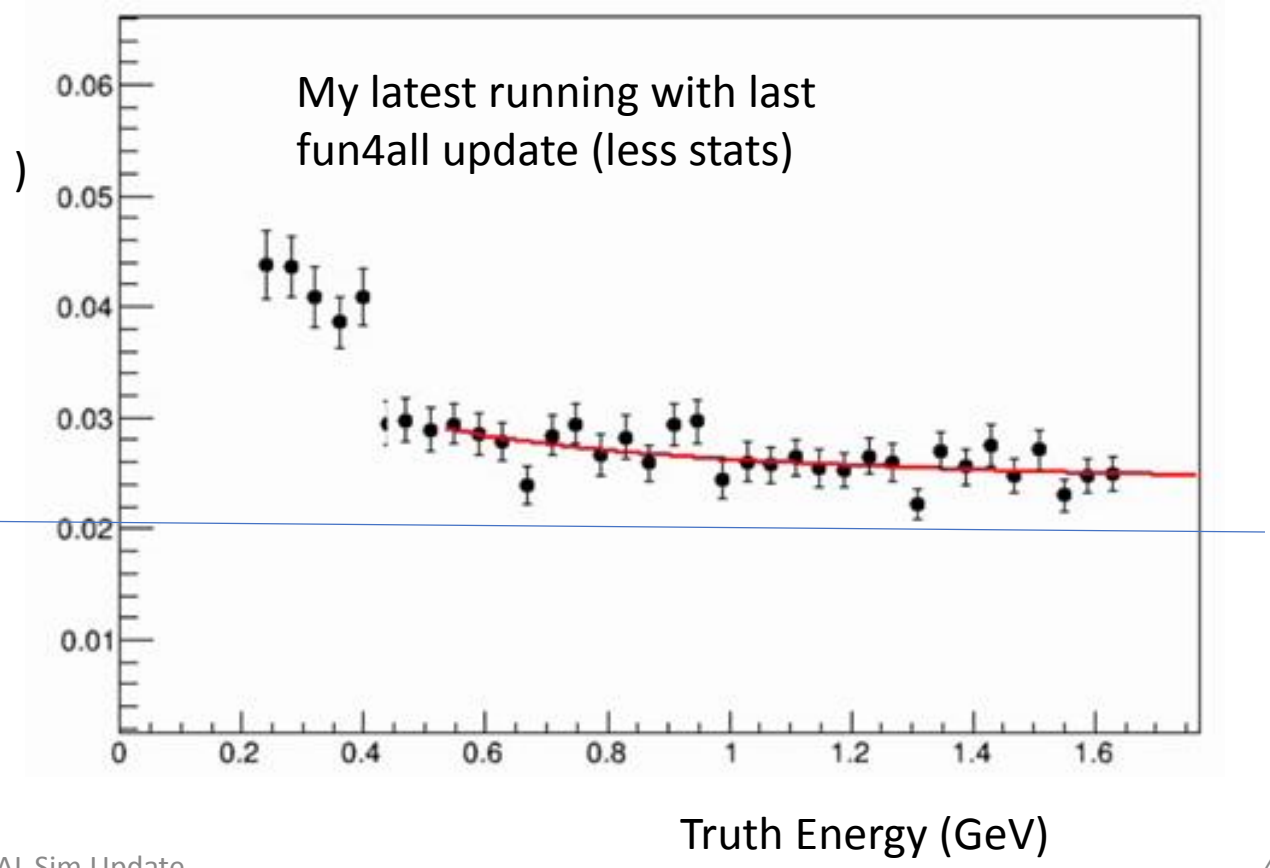
- Implemented Dmitry patch files for the 2 changes
- Less stats but very little difference
- Digitization removal does reduce reso sigma a little (?), more at < 0.5 GeV
  - ~consistent with his previous studies



Review: Last f4all updates vs previous Nico July running

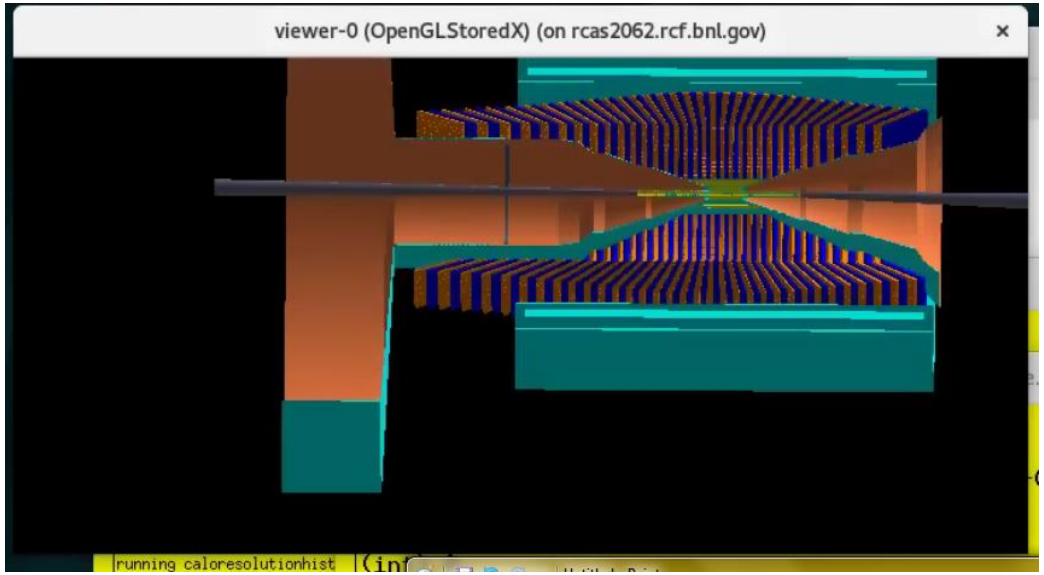
- I have also focused on the very low p/E response as Dmitri has been looking (< 1.5 GeV) – did not turn off digitization (which improved reso slightly for Dmitri)
- Very little difference – & very consistent with Dmitri's tests
  - I didn't bother quantifying it, both results are ~same
  - Don't trust diff below E < 0.4, here I am using actual RMS calc (not gaus core) but excluding low side tail
  - responses aren't gausian– quite asymmetric below ~1 GeV

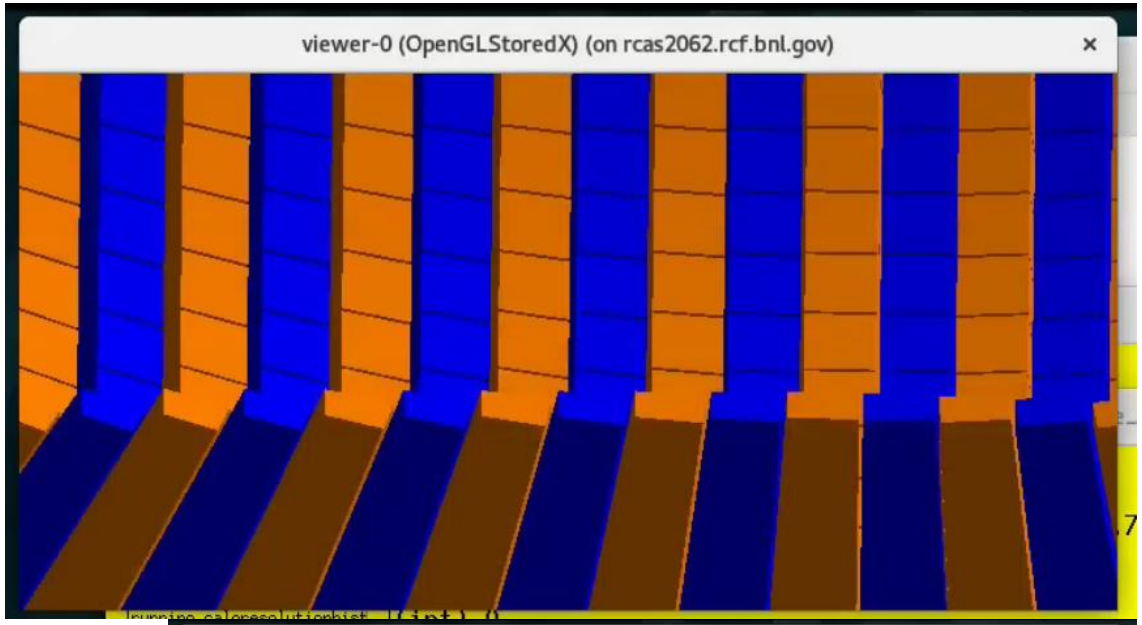


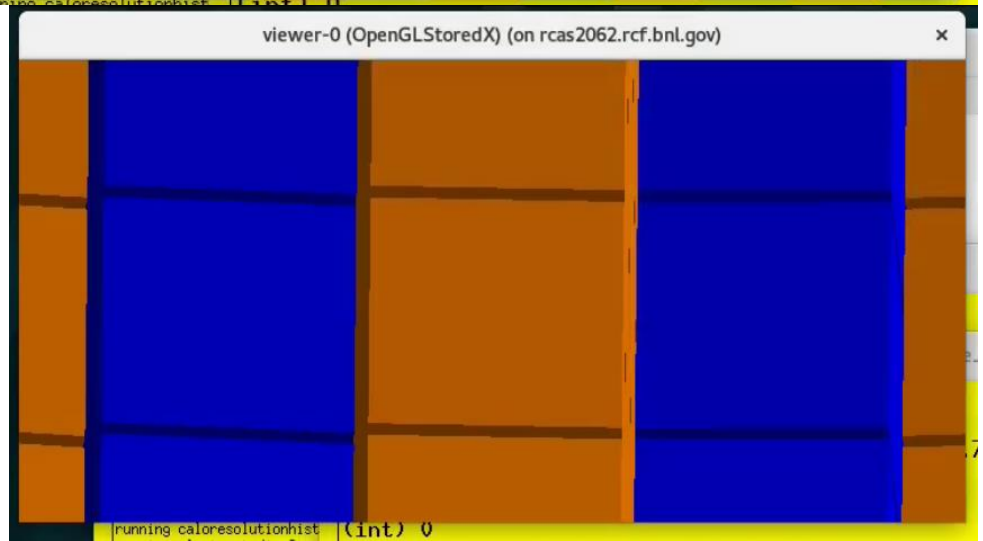


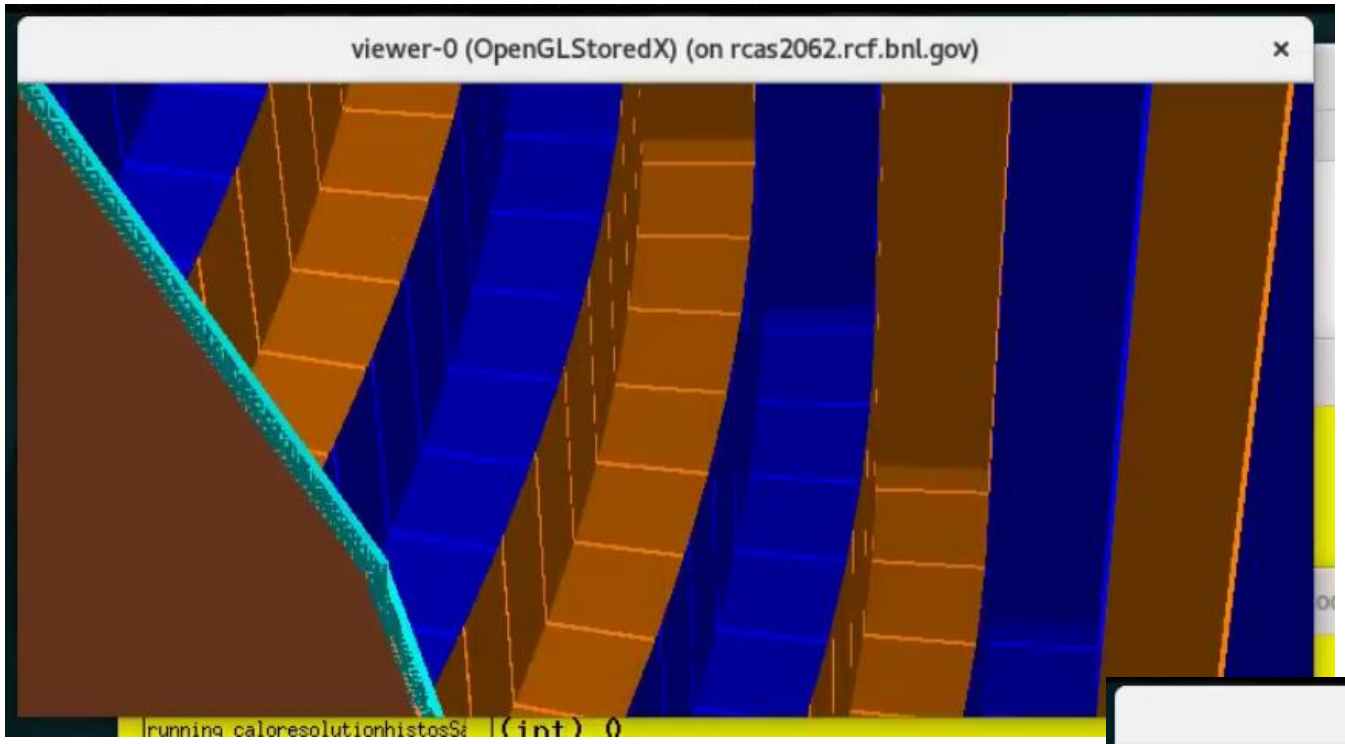
Searching the Geom Display for Carbon Fiber supports

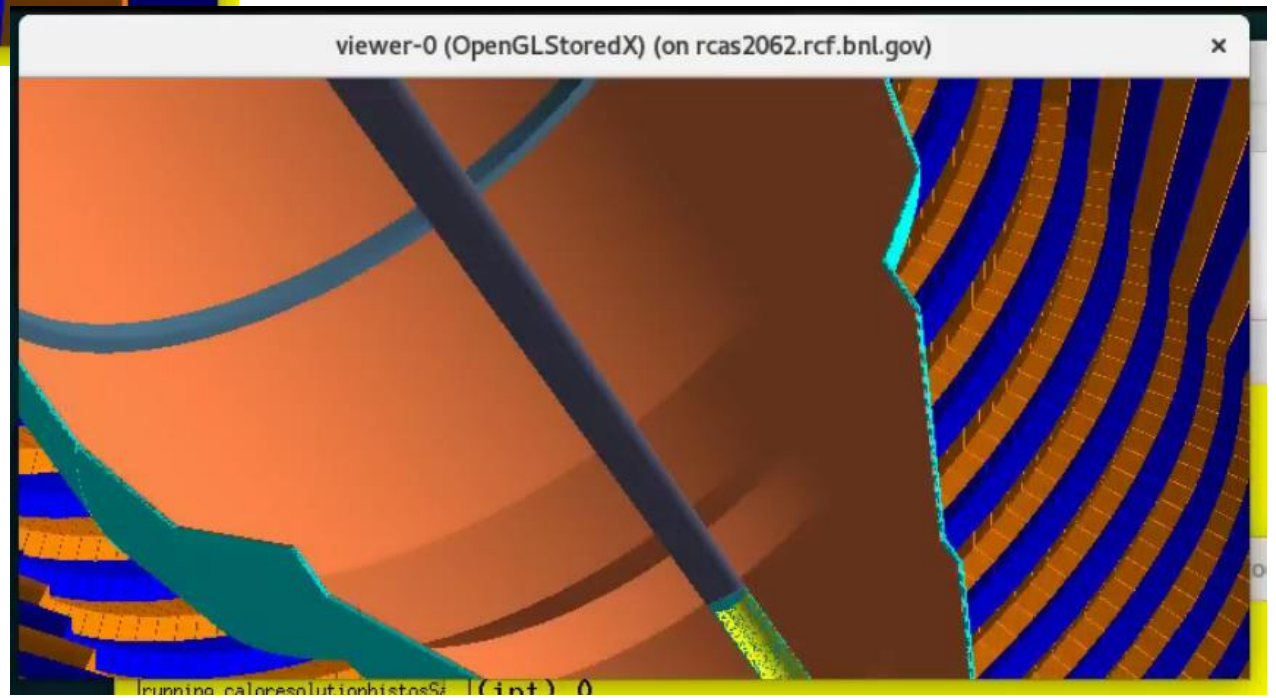
As Dmitry K suspected, I cannot see any carbon fiber supports in this latest gdml geom from Nico/Josh, perhaps they are deeper in cracks then I can see, will investigate another way.








viewer-0 (OpenGLStoredX) (on rcas2062.rcf.bnl.gov)

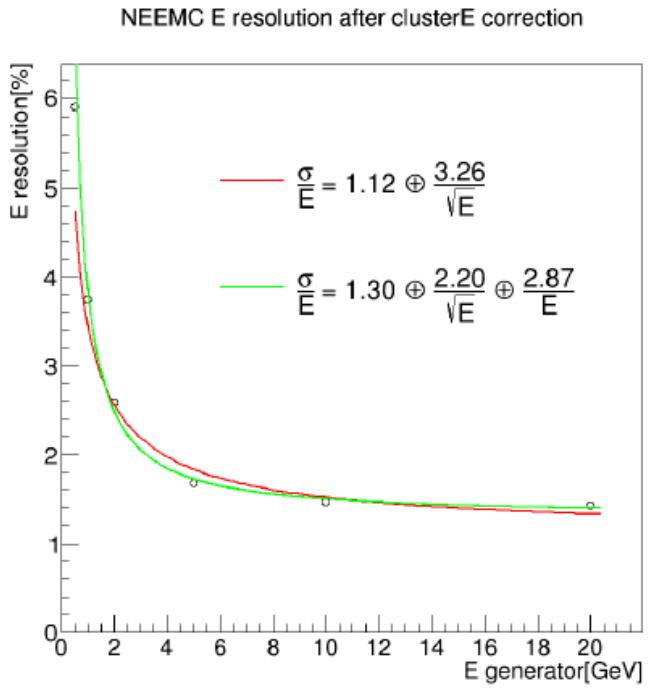

viewer-0 (OpenGLStoredX) (on rcas2062.rcf.bnl.gov)

Next - for now- Pre-proposal focus

- For now focus on Endcap sims for pre-proposal
- What now?
- I have (or could generate) fun4all versions of Endcap simulations
  - Specifically, I could make some plots demonstrating improvement in diffractive J/Psi or Phi measurements w/ EEEMC – not for preproposal?

- ❑ December 2nd: review final budget; start preparing individual budget justific supplement docs
- ❑ December 9th: first draft of the proposal narrative
- ❑ December 16th-22nd (up to January 5th): submit work packages to CUA SPO (albano@cua.edu). Please copy me as I need the info for the preparation of documents

Can we use PuKai's plots or should we remake?

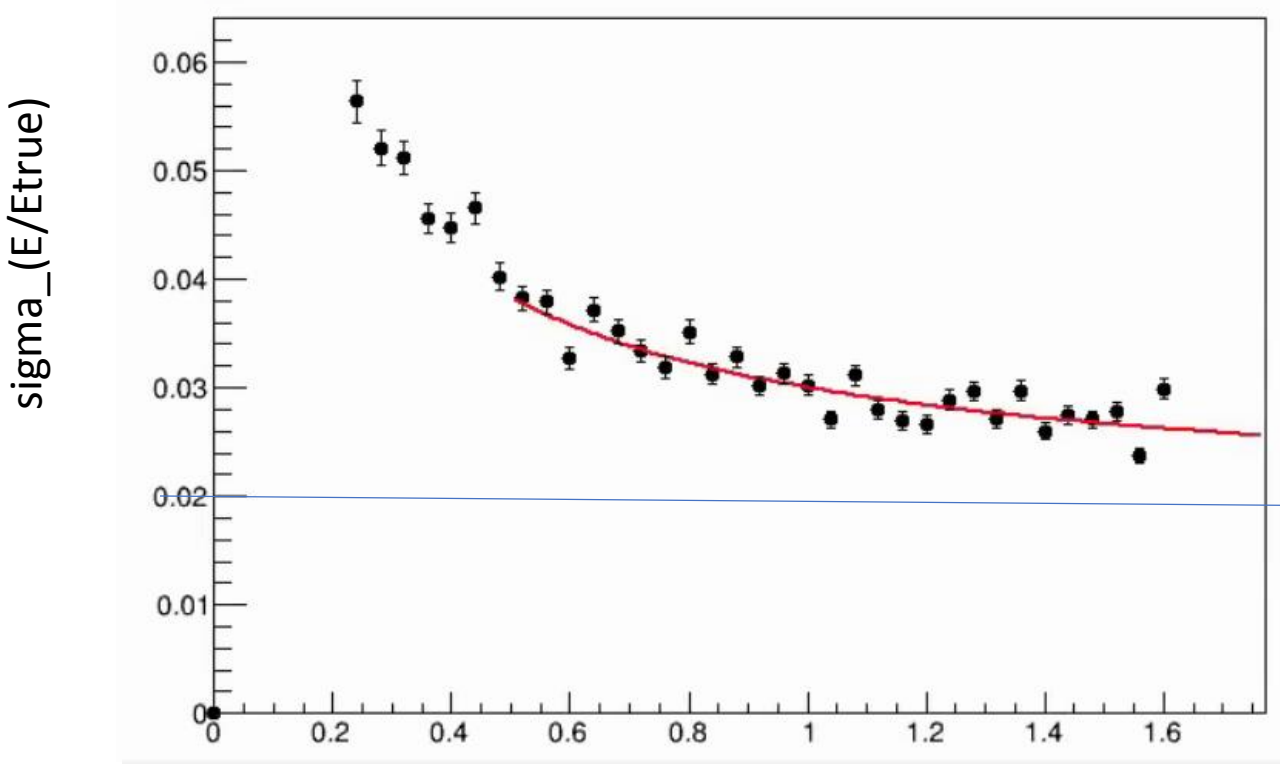


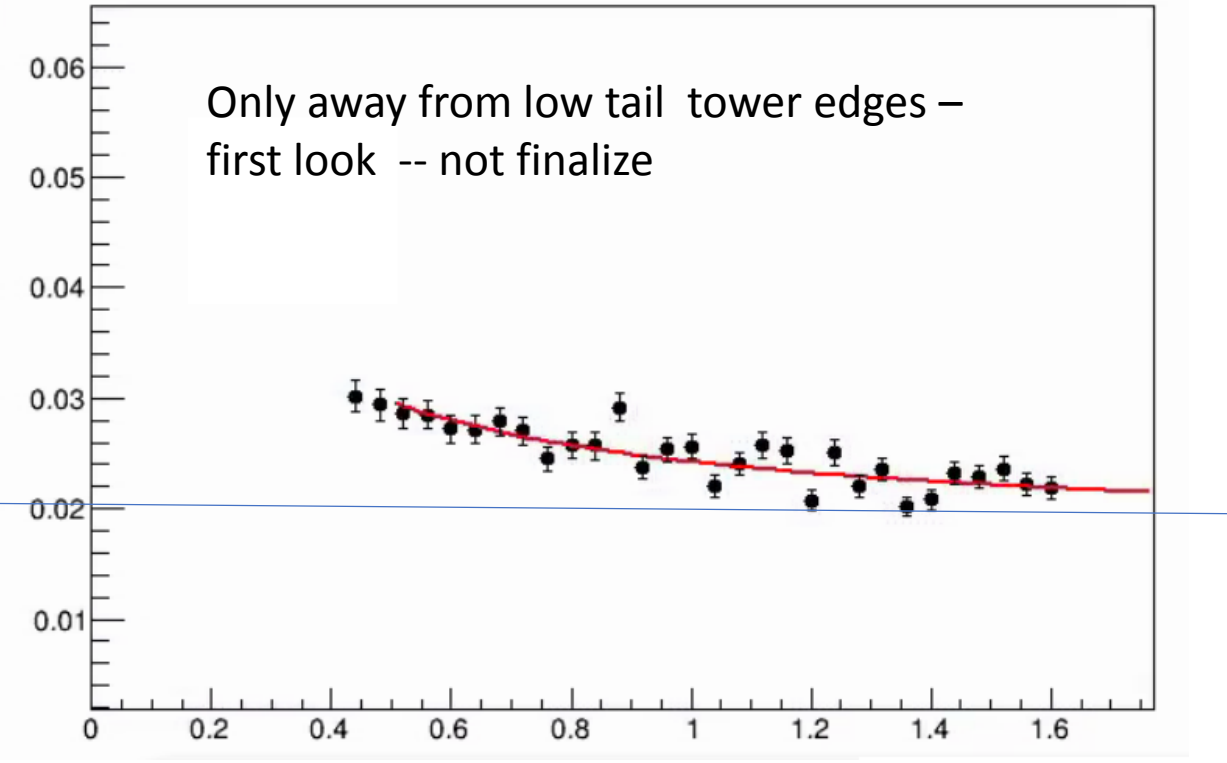
latest from dd4hep? "NEEMC?"

End

Try Avoiding Gaps Using Nico's file

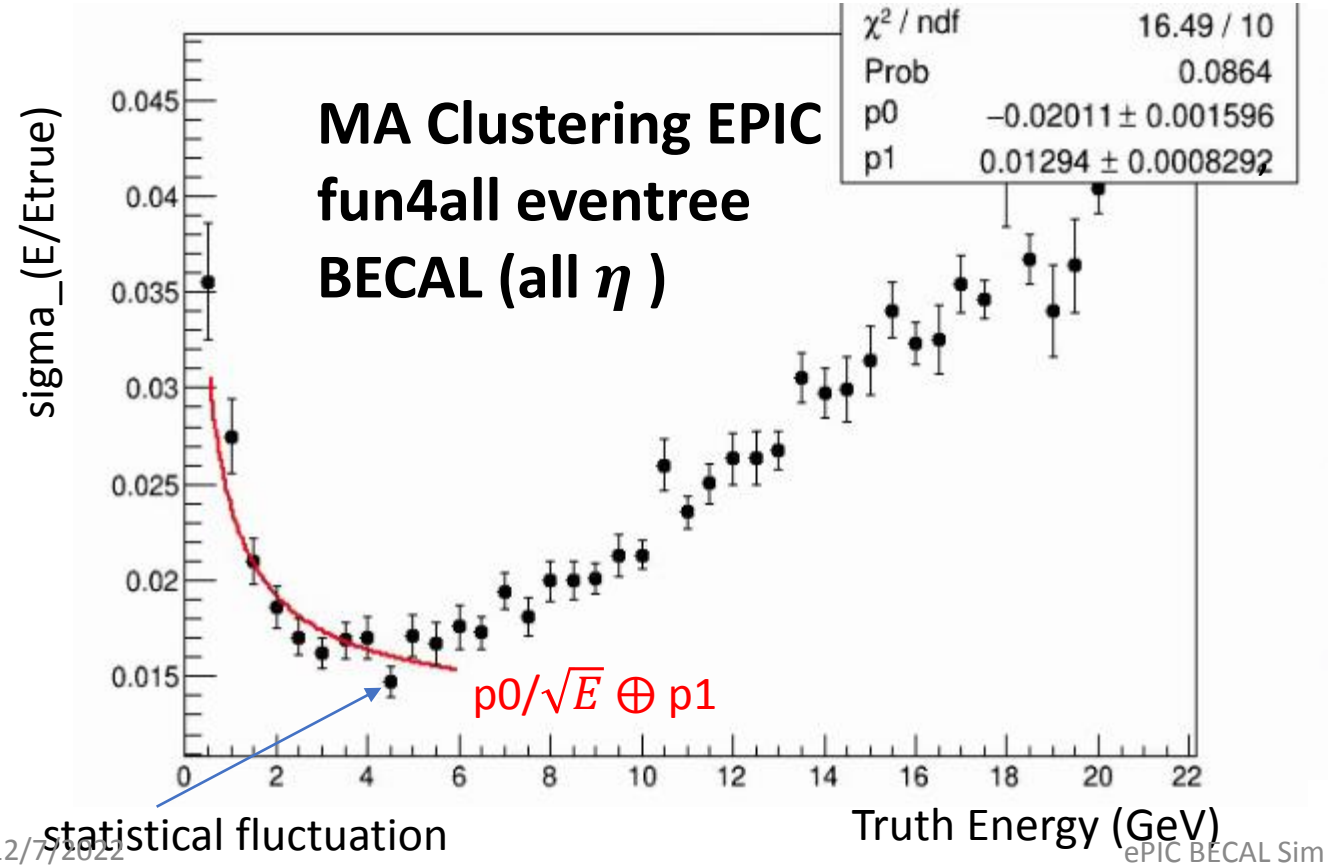
- I made maps and also verified from geom file, selecting only hits where truth particle eta, phi is near center of tower
- Also where low-tails are NOT

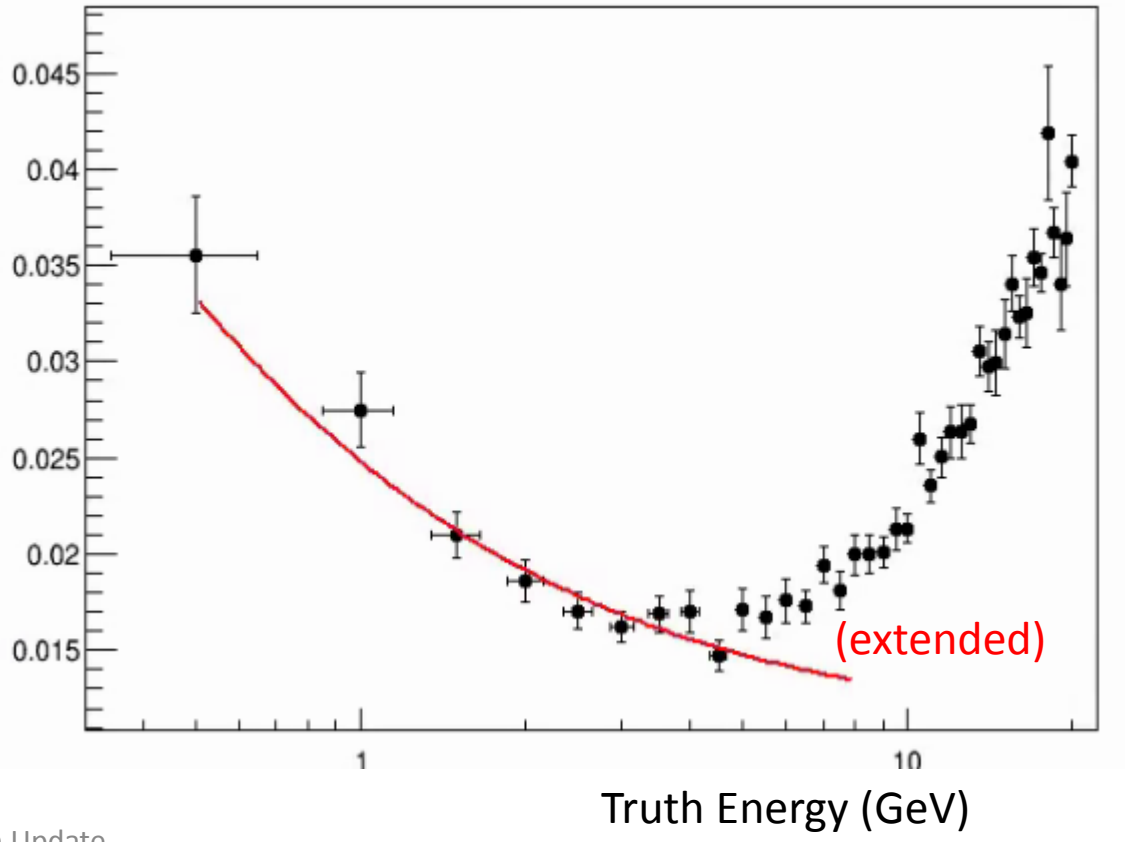




Me reproducing Nico's results (LAST WEEK)

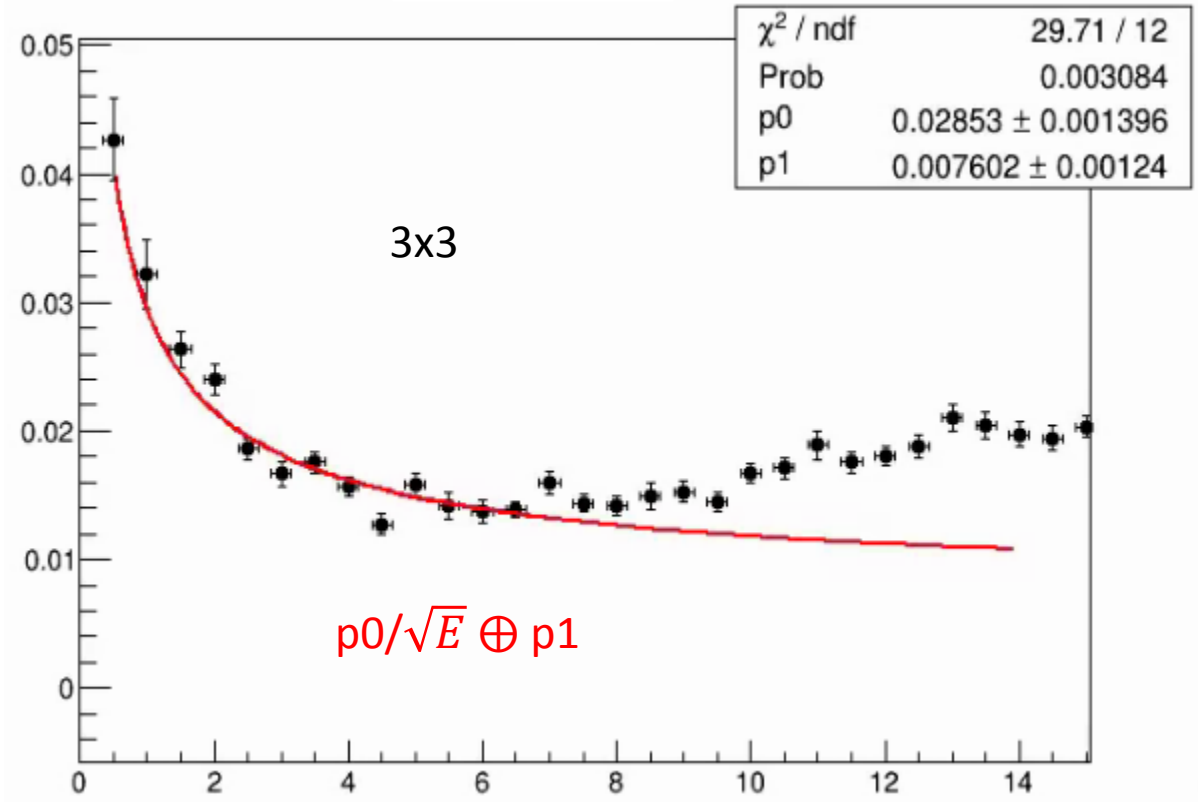
- I used the output of the treeAnalysis/clusterresolutionhistos.cxx module -- first using the MA clustering algorithm – treeProcessing/Analysis AnalysisSoftwareEIC Friede
- But did my own resolution fitting -- 2 sigma Gaussian "core" only (see next slide) - the behavior was a little dependent on this fitting
  - Looks pretty consistent

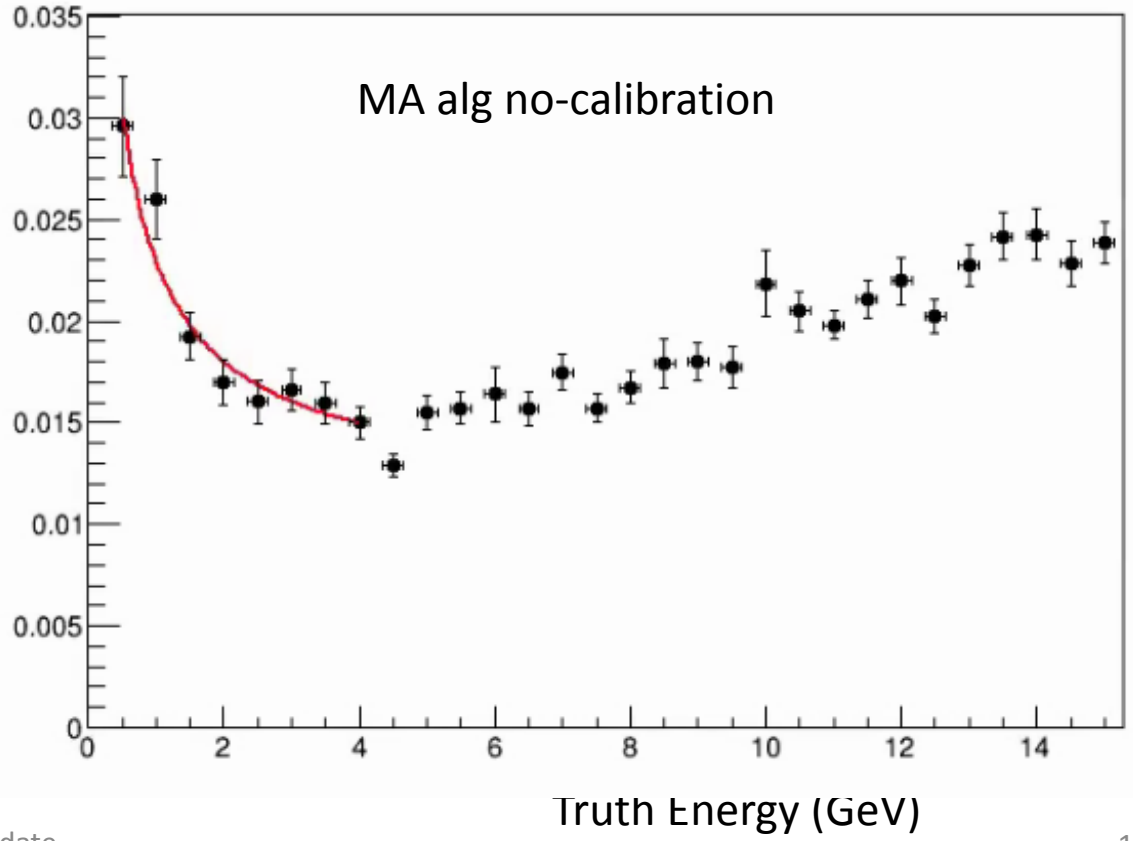




Calibration turned off for MA clustering alg

- Indeed with 3x3 alg, rise seemed delayed
- Now I see that without calibration defined for MA alg, it looks much more similar to 3x3 and Ecce proposal → message said additional smearing was also added to “match test beam”.





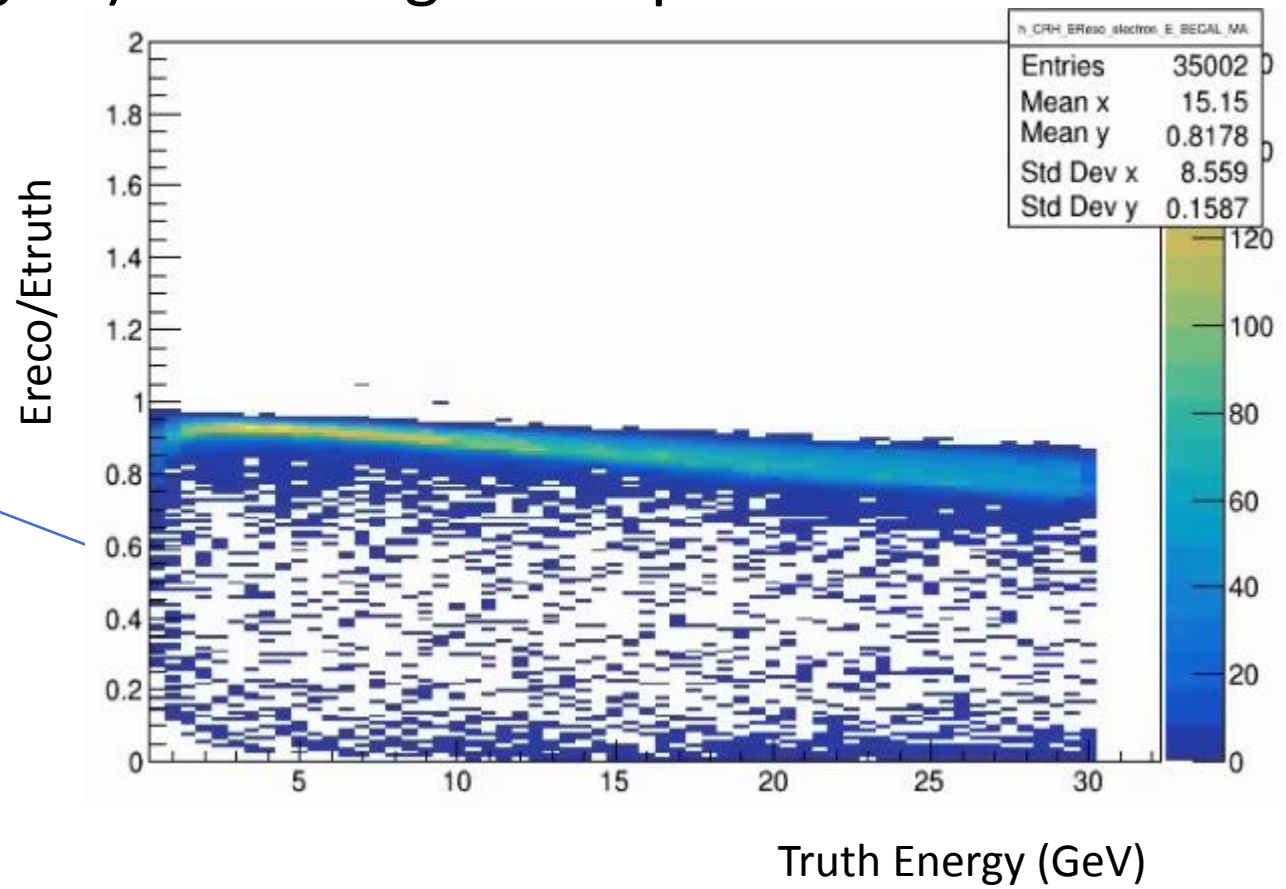
Backup

Repeat with ECCE 3x3 clustering

- Because minutes said the early (-er 5GeV ?) rise wasn't seen in a standalone sim using 3x3 clustering…
- I blindly applied the ECCE "3x3" (Algo 6) clustering and repeated
- Calibration applied, maybe not

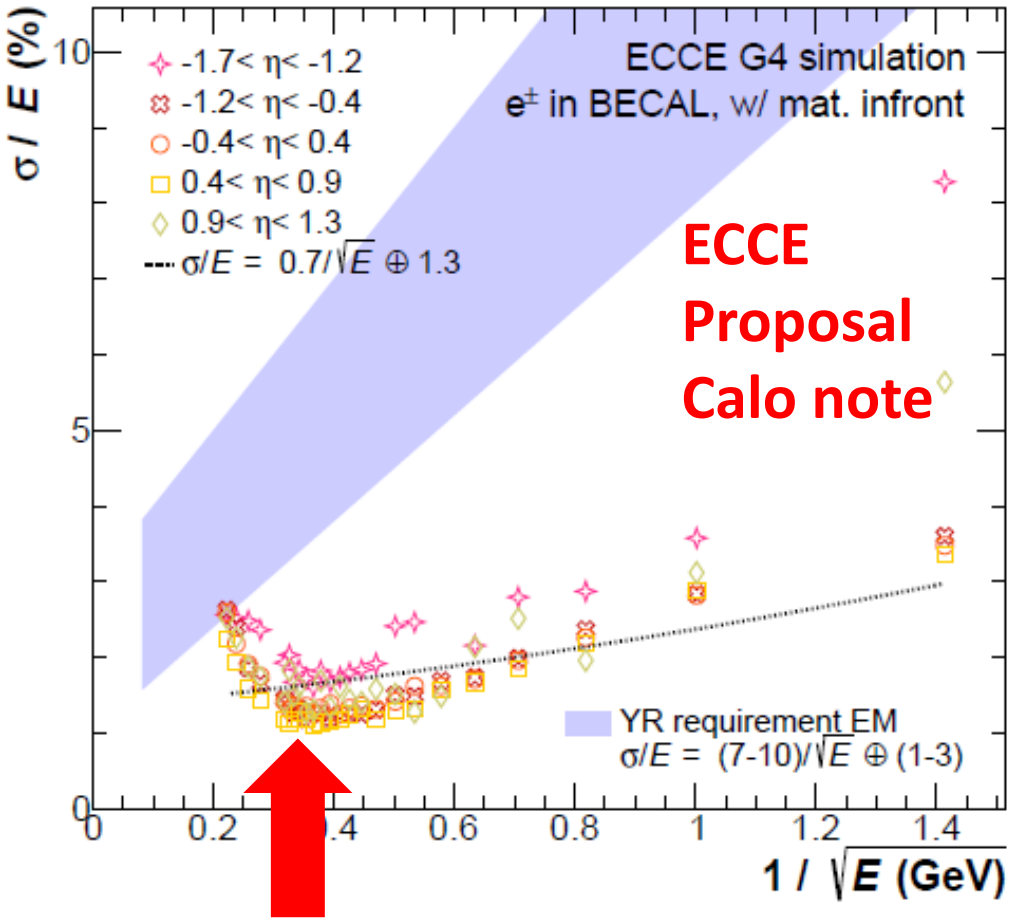
existent or good for 3x3 algo

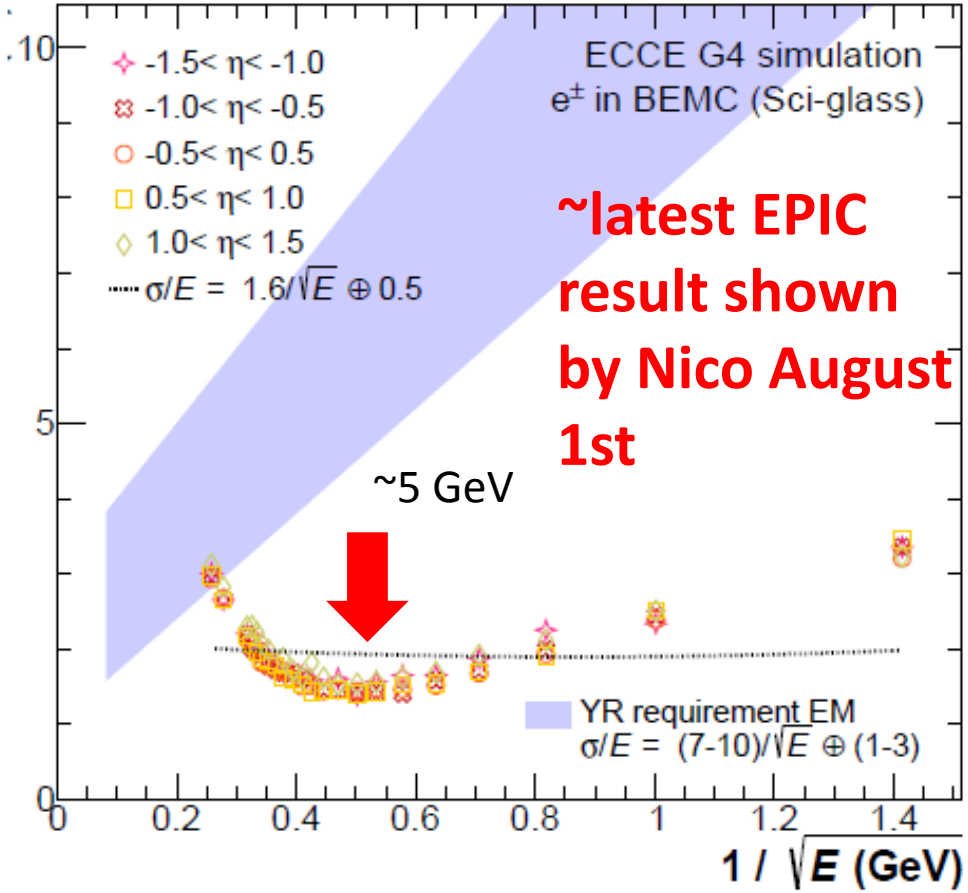
- Clear ~0 Ereco peak developing
  - (not too bad below 10 GeV?)
  - probably ignorable anyway



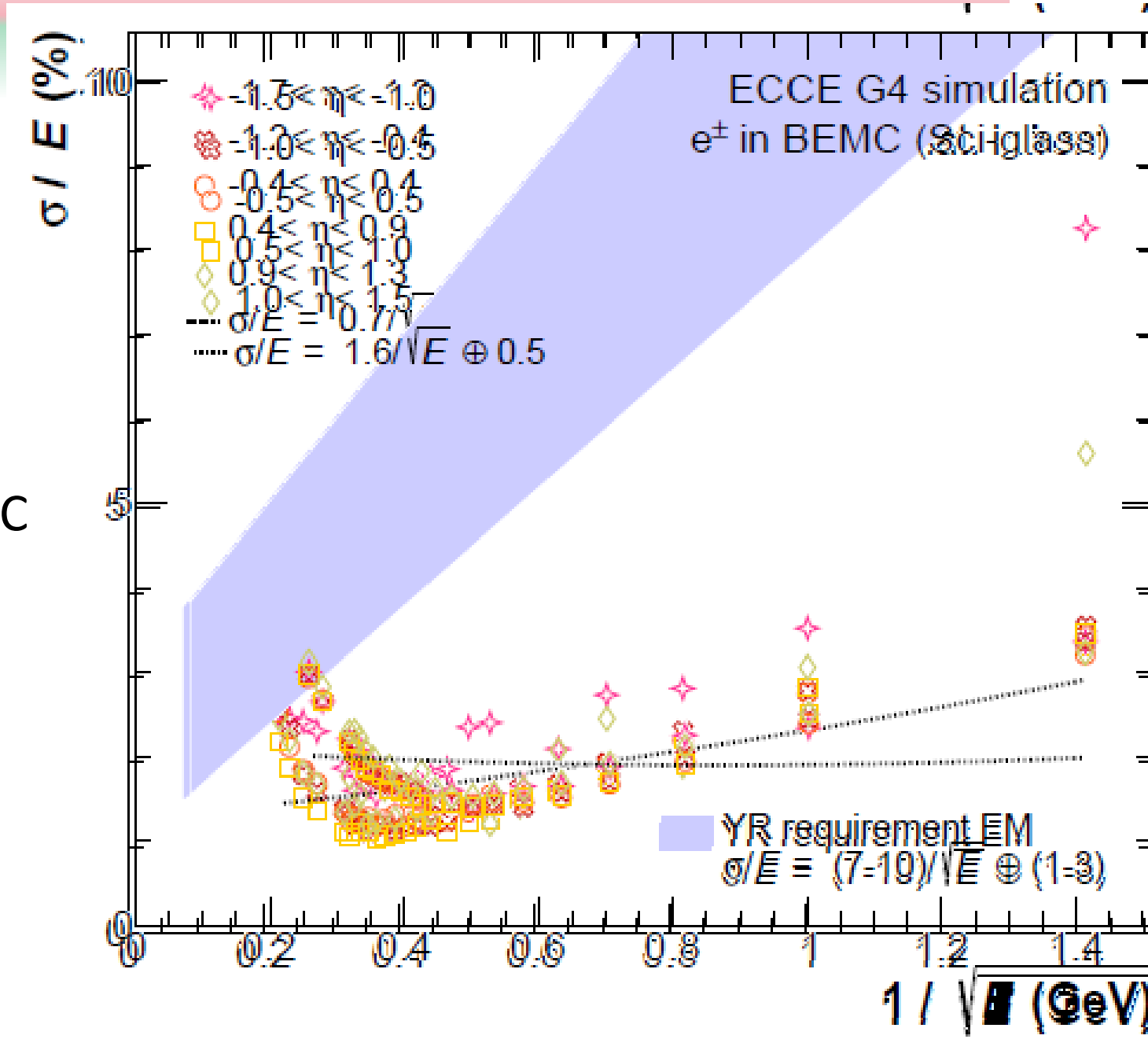
Me reproducing/understanding issue from last time

- Because I wasn't here for that discussion, going off minutes
- High energy rise starts earlier (~5 GeV) in lastest EPIC geometry





Overlaid … +

- Just because I was curious how this would look…

- Nico put the file he presumably generated Aug 1 results from on SDCC
- /gpfs02/eic/DATA/nschmidtornl/ (3 files there→ geom, electrons, pions)
- ~30 electrons / event, 0-~20 GeV
  - 800K events
  - studies that followed only used 40k events