LFHCal simulation progress

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- dd4hep: `lfhcal-dev-branch`
- eicrecon: `LFHCal-dev2-branch`
- Main progress:
  - Summing hits before digitization to tower segments working
  - Corrected settings for digitization & reconstruction
  - Added time cut on digit level
  - Plugin with new clusterizer (MA as for fun4all)
- In the works:
  - Work through eic-recon island clusterizer (current settings not working for LFHCal)
  - Implement alternative clusterizer (MA) in algorithms for others to use
 - Understand observed too good performance

Setting up the reco chain components
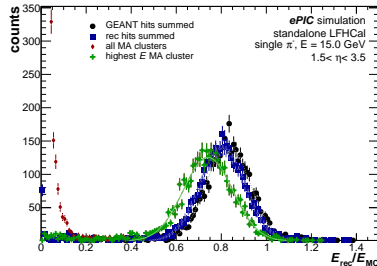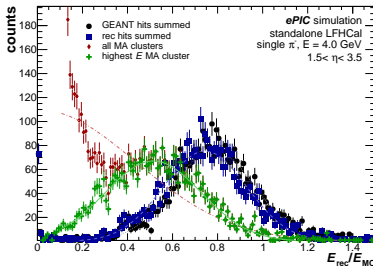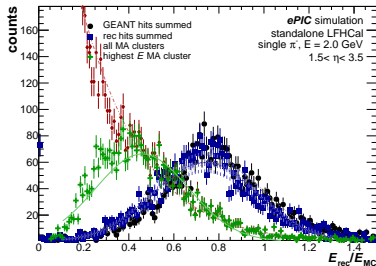
- Digitization done with 15-bit ADC, max dynamic range per segment 1 GeV (1 ADC $\sim$ 0.015 MeV)
- Max digit time: 100 ns, no time smearing so far
- Will need adaption for HGCROC 10-bit ADC (low E) + 12-bit TOT (high E)
- Pedestal noise gaussian 20 ADC mean, 0.8 ADC width (will need to be checked and adjusted)
- MA Clustering: 100 MeV seed, 1 MeV aggregation (most likely to optimistic)
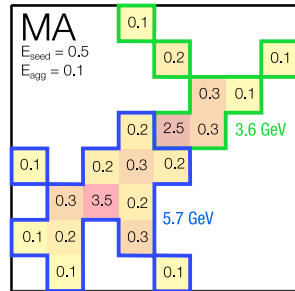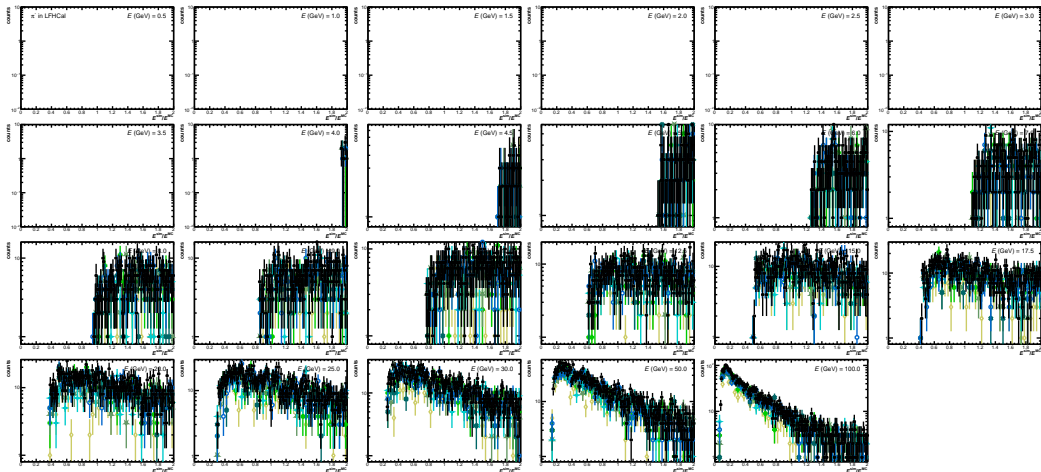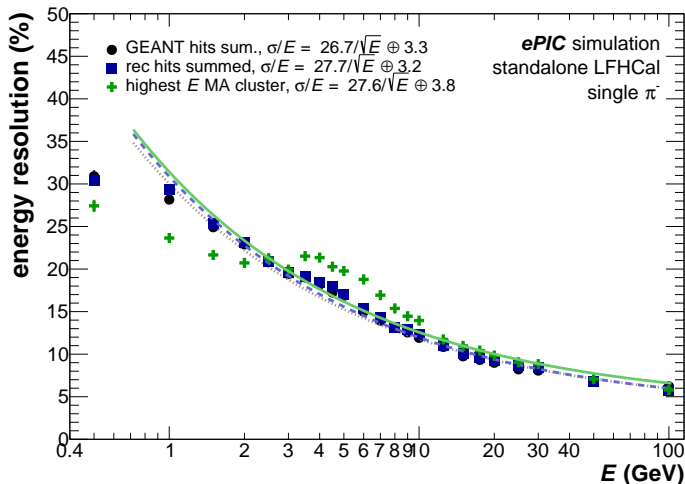
Obviously this isn't working yet

- Resolution still "too" good, in the process of tracing problem
- η dependence somewhat reasonable
- Rec clusters < 4 GeV with significant shift in mean, reso not really trust worthy
- Looking a details in clusterizer (maybe employ ML to optimize)

The chart shows:
- GEANT hits sum., $\sigma/E = 26.7/\sqrt{E} \oplus 3.3$
- rec hits summed, $\sigma/E = 27.7/\sqrt{E} \oplus 3.2$
- highest E MA cluster, $\sigma/E = 27.6/\sqrt{E} \oplus 3.8$

ePIC simulation standalone LFHCal single π^-

energy resolution (%) vs E (GeV)

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