Discussion for A few MC Items

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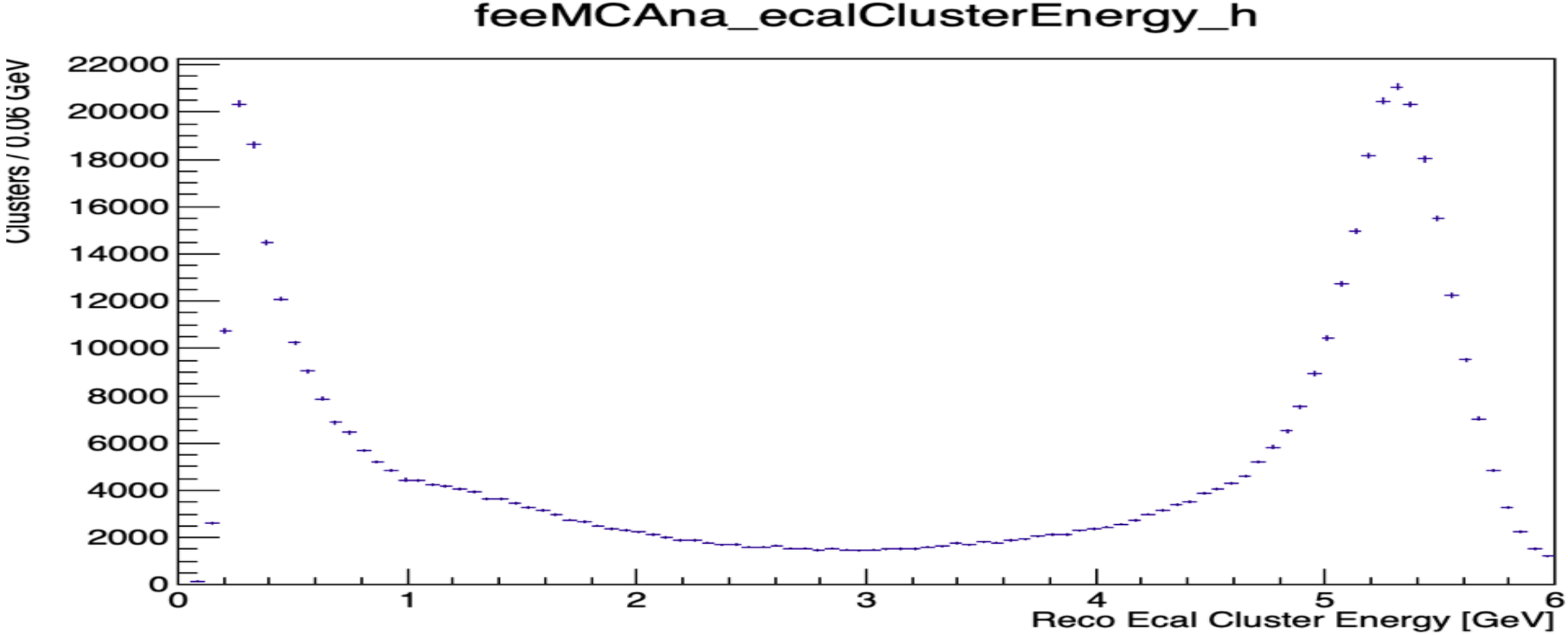
Pair Triggers for 2021 Experiment

- Pair triggers for 2019 experiment:
  - Pair 0: A’ -> e+e-
  - Pair 1: Moller
  - Pair 2: pi0
  - Pair 3: A’ -> mu+mu-
- For 2021, pair trigger for Moller is not adopted.
- Pair trigger for A’ -> e+e-:
  - Since we have 4 singles triggers for ap, do we need pairs trigger for it?
  - How many events with e+e- pair are missed by Hodoscope for 2019? Even for such events, singles2 trigger should be able to cover them.
- Trigger for pi0 and A’ -> mu+mu-
  - How did we determine pair triggers for pi0 and A’ -> mu+mu- for 2019? No studies about them are mentioned in Sam’s analysis note about trigger.
  - Do we need to take strict trigger tuning analysis for them, like for ap?
  - If so, rad_mu can be produced, and ap_mu generation is supposed to be available by MadGraph. Do we have package for generation of pi0 case?

Energy of Recon. Clusters for FEE MC



In the 2019FEE sample, the peak of recon. cluster energy is far from 4.55 GeV.

- Did anybody find the issue before?
- The recon. steering file “PhysicsRun2019MCRecon.lcsim” implements EcalRunningPedestalDriver, while the recon. steering file for 2016 does not include it. It should have effects since pedestals and gains used in digitization readout drivers are from database. Can we directly remove EcalRunningPedestalDriver from PhysicsRun2019MCRecon.lcsim?
- For real data, have we ever had study for comparison of Ecal cluster energy with and without application of EcalRunningPedestalDriver in recon?

Pedestals and Gains Applied in the Readout System

- In the old readout system, pedestals and gains used in digitization drivers and the trigger system are from database.

- In the updated system with application of DAQ configuration, pedestals and gains used in digitation drivers are from database, while pedestals and gains used in the trigger system are from DAQ configuration.

- The updated system is more natural, and closer to real experiments. So far, the updated system is available for 2019 MC since all 2019 DAQ configuration versions are accessible by hps-java.

- For 3.7 GeV MC sample with ideal run 1193700, I still use the old system. Two questions:

    - For digitization in readout, we have to use pedestals and gains from database. Currently, we use database of 2019 for production of 3.7 GeV samples. Is it suitable?

    - For DAQ configuration of the 2021 experiment, will we keep the same as the 2019 experiment for pedestals and gains, so that we can use the updated readout system with application of 2019 DAQ configuration in the trigger system?

Rate from MC to Experiment

- For pure samples we used for trigger tuning, each two signal events are spaced by 249 empty events. It means that there is one signal event every 250 events in a file after spacing.

- In readout for pulser trigger, a trigger is limited to be sent every 125 time-clock (i.e. 250 events). It lets all events from SLIC read out.

- When calculating rate from MC to experiment, should we consider a factor that “the minimum time that no trigger can be accepted after a trigger was just accepted in experiment”? The factor is ~3us for the 2016 experiment, suggested by Ben.