

Digitization Noise

Digitization Choices

- None (kNo_digitization)
 - Simulation energy is copied into tower
- kSimple_photon_digitization (default)
 - Energy is translated into photons
 - Photons get translated into adc
 - Pedestal is subtracted
- kSiPM_photon_digitization
 - Adds efficiency of SiPM

Scales with the number of channels

Affected Calorimeters:

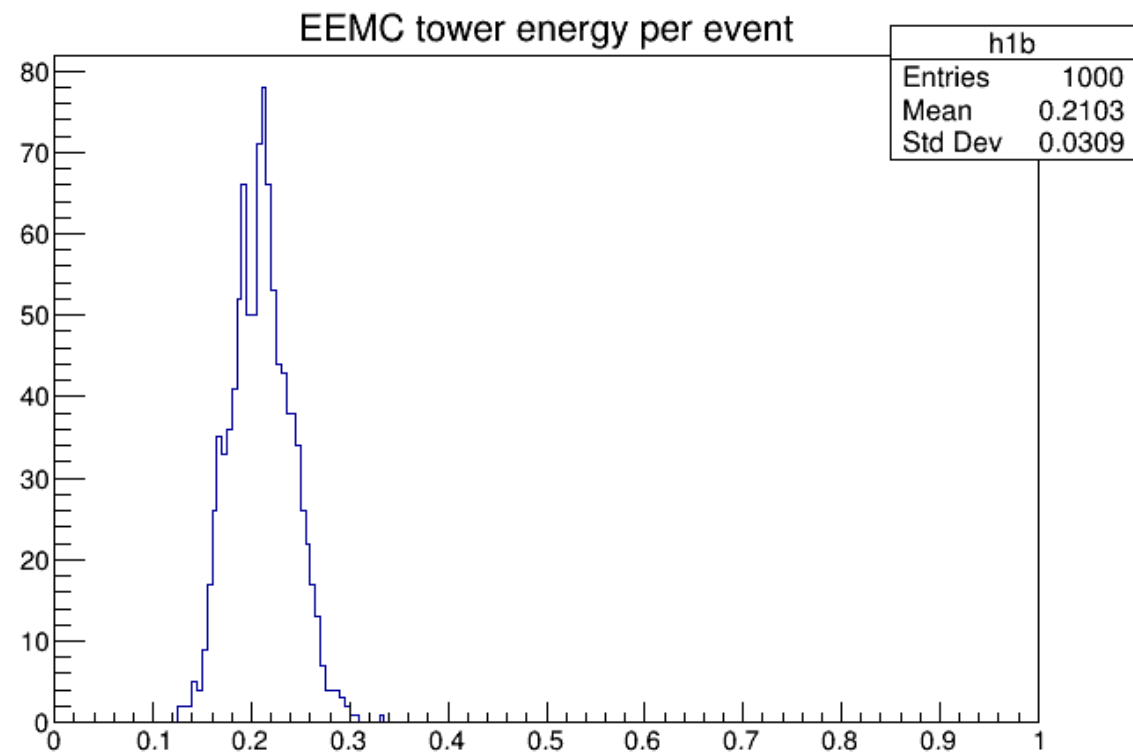
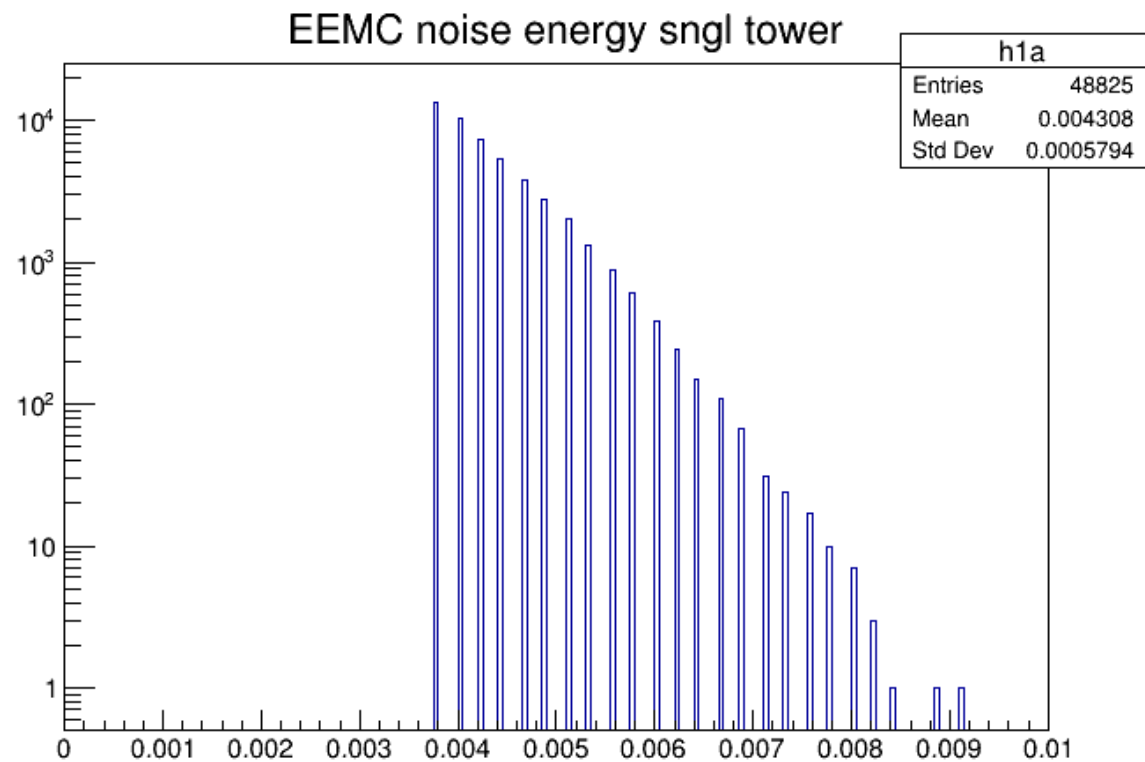
CEMC (~26GeV)

EEMC (0.2GeV)

HCALIN (0.7GeV)

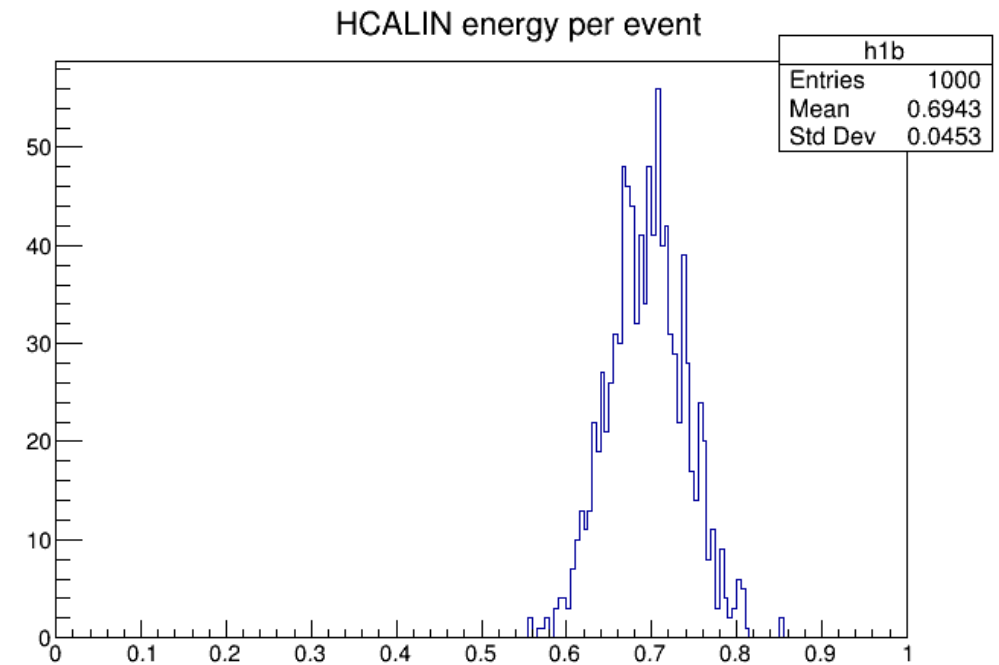
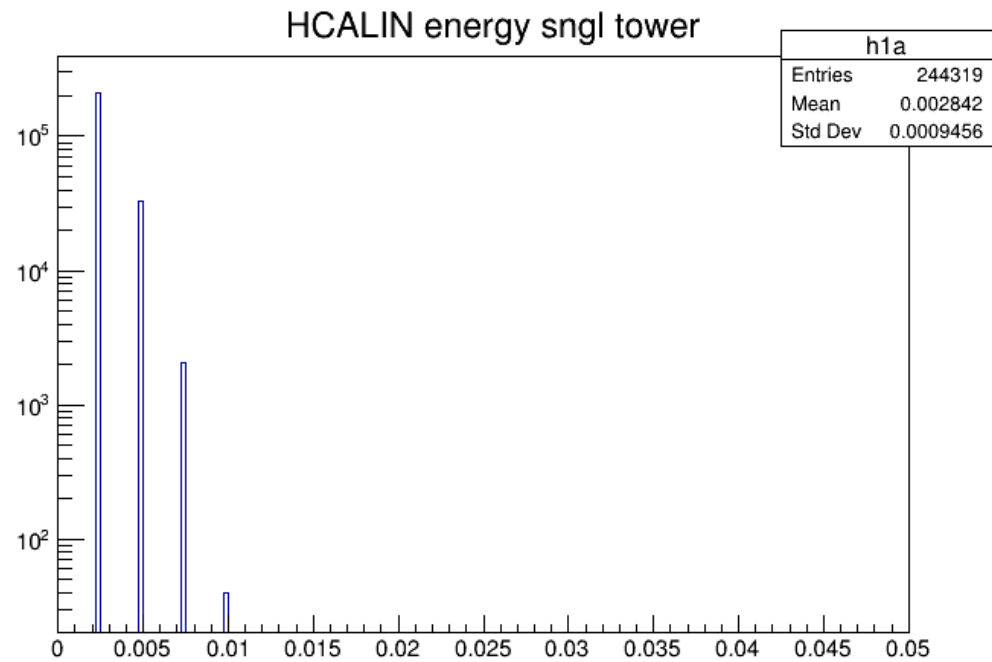
HCALOUT (1.7GeV)

EEMC



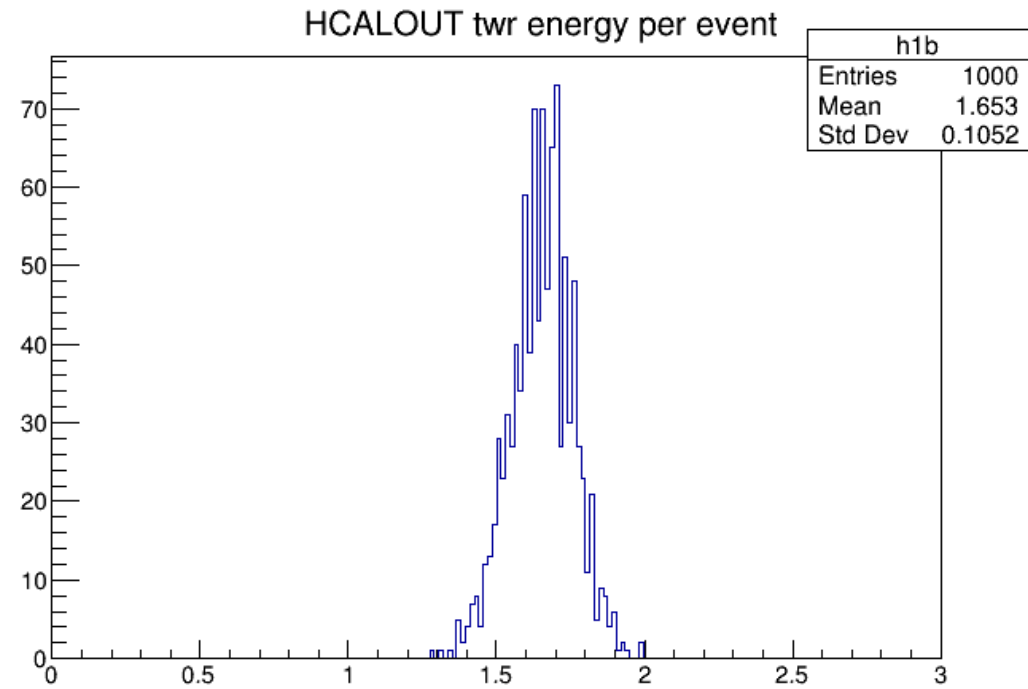
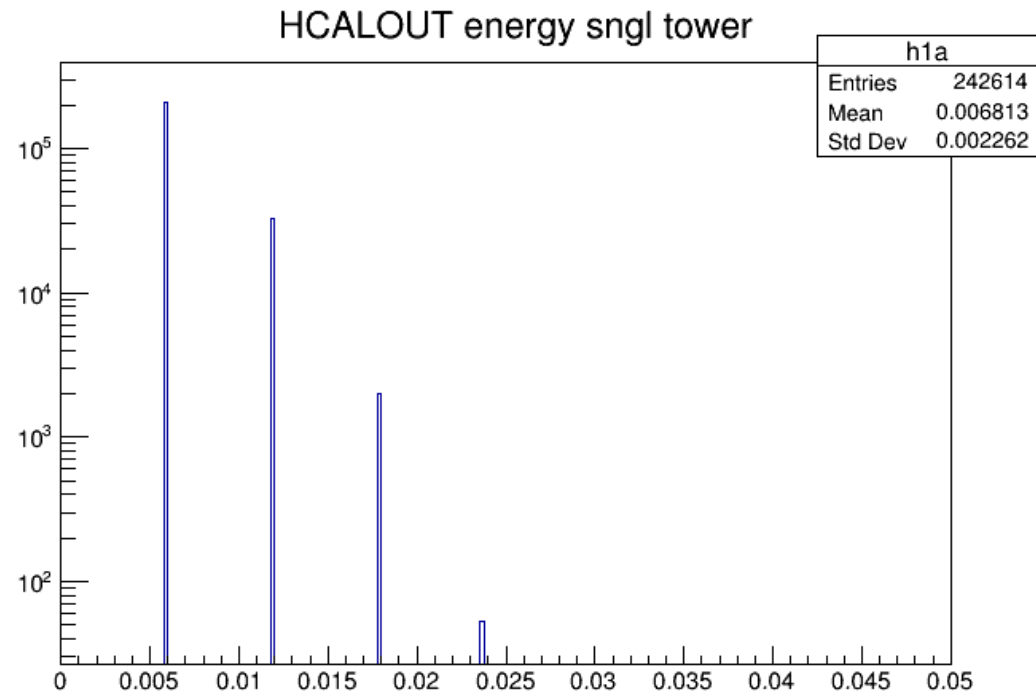
Noisy towers are removed by energy cut – no clusters

HCALIN



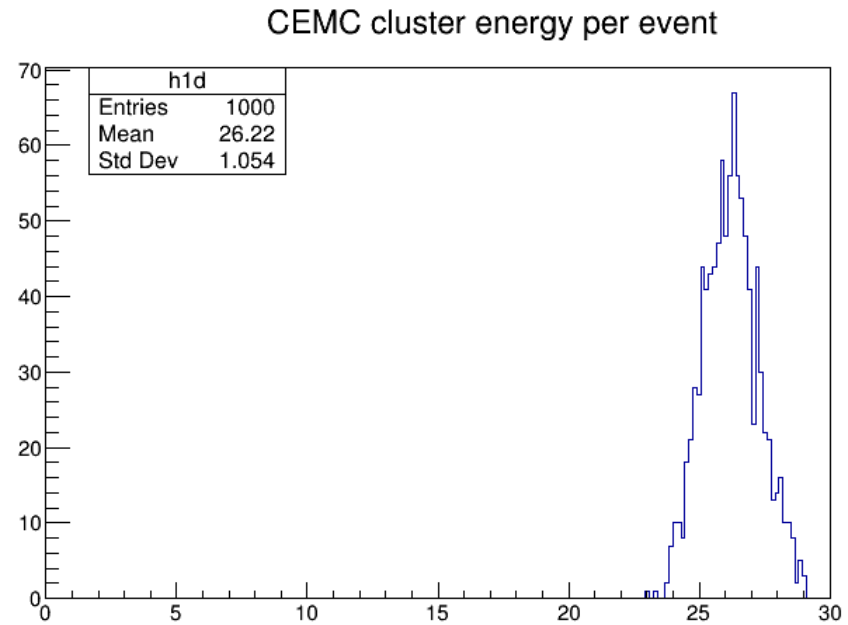
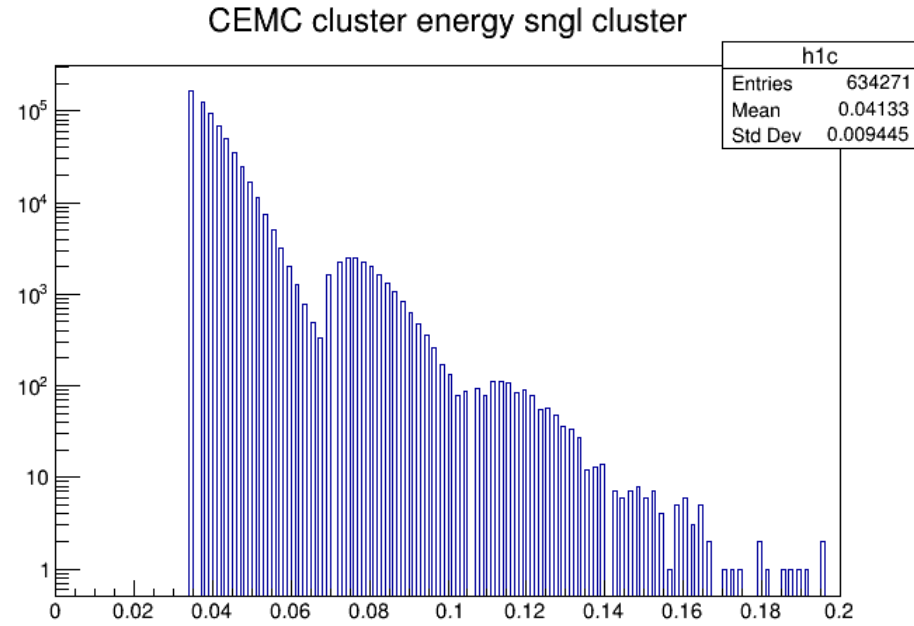
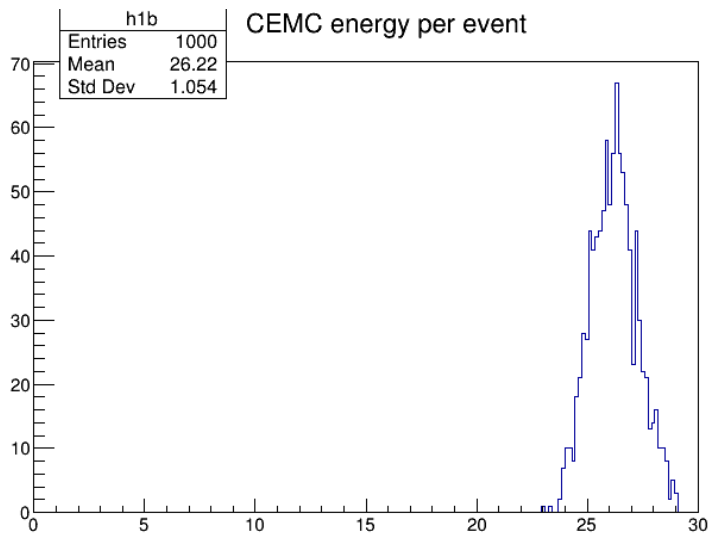
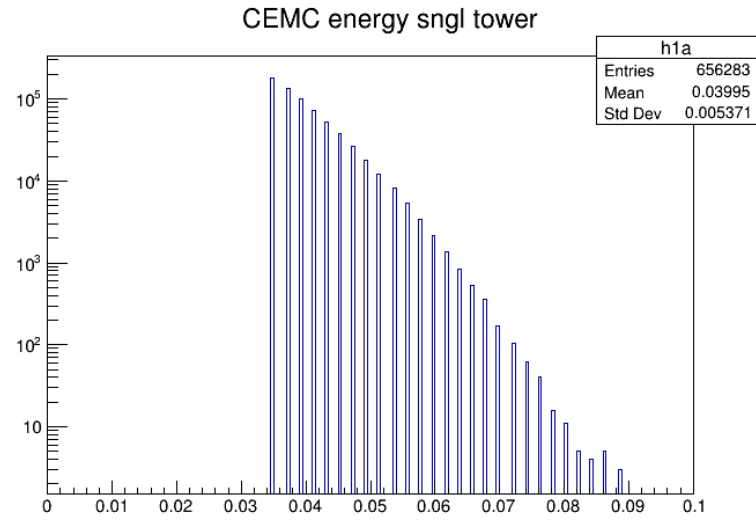
Noisy towers are removed by energy cut – no clusters

HCALOUT



Noisy towers are removed by energy cut – no clusters

CEMC



Noise survives tower energy cut, Noise energy adds to cluster energy

Summary

- The main effects are on the CEMC data
- Digitization was made configurable
 - To turn off, e.g. `G4CEMC::TowerDigi = RawTowerDigitizer::kNo_digitization;`
- It is set to no-digitization in our `Fun4All_G4_EICDetector.C` macro from now on (please do a git pull to update)
- The `EvalRootTTreeReco` code was updated to handle events without truth information (no event generator, noise only)

Support for `x8664_sl7` has been discontinued – please use
`source /cvmfs/eic.opensciencegrid.org/default/opt/fun4all/core/bin/eic_setup.csh -n`
Which will give you a `c++17` environment. No changes for macros but you need to recompile your code