Subject: Re: EMC resolution
Posted by Dima Melnychuk on Wed, 06 Nov 2013 11:35:29 GMT
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Hi,

I have just update emc energy correction parameters for the case of non-uniformity switched on with the latest version of digitization.

I also switched on the use of non-uniformity by default in all.par

The files with correction are in /macro/params/
emc_correction_hist_gamma_2.root
emc_correction_hist_gamma_3.root
emc_correction_hist_gamma_4.root
emc_correction_par_gamma_2.root
emc_correction_par_gamma_3.root
emc_correction_par_gamma_4.root

You use correction like

PndEmcAbsClusterCalibrator * calibrator1=
PndEmcClusterCalibrator::MakeEmcClusterCalibrator(1, 3);

And then obtain calibrated energy like
cluster_energy_calibrated=calibrator1->Energy(cluster);

And here first number stands for the method applied (1 - correction from histogram, 2 - correction from parametrization)

Second number stands for version and here
1 - previous version of digitization, no non-uniformity (deprecated)
2 - current version of digitization, no non-uniformity
3 - current version of digitization, with non-uniformity
(should be used by default)
4 - current version of digitization, with non-uniformity calculated by Hossein (linear non-uniformity 1.5%, set from the file /macro/params/EmcDigiNoniformityPars2.root)

By the way the macro which produces the last non-uniformity file is
/macro/emc/dedicated/fill_nonuniformity_param.C

Here some plots which demonstrate how applying non-uniformity change reconstructed emc energy. I do not know if it's by accident or by intention of Christian Hammann who provided non-uniformity parameters from measured data in case of barrel EMC correction is almost not needed, i.e. 1 GeV energy peak is centred around 1 GeV. But for endcaps correction is still needed anyway.

For energies in range 0-10 GeV energy versus polar angle

Reconstructed energy of 1 GeV photons

Reconstructed pi0 invariant mass

In this last case the corrected energy gives even slightly worse results.

In PndPidCorrelator.cxx
fEmcCalibrator= PndEmcClusterCalibrator::MakeEmcClusterCalibrator(2, 1);

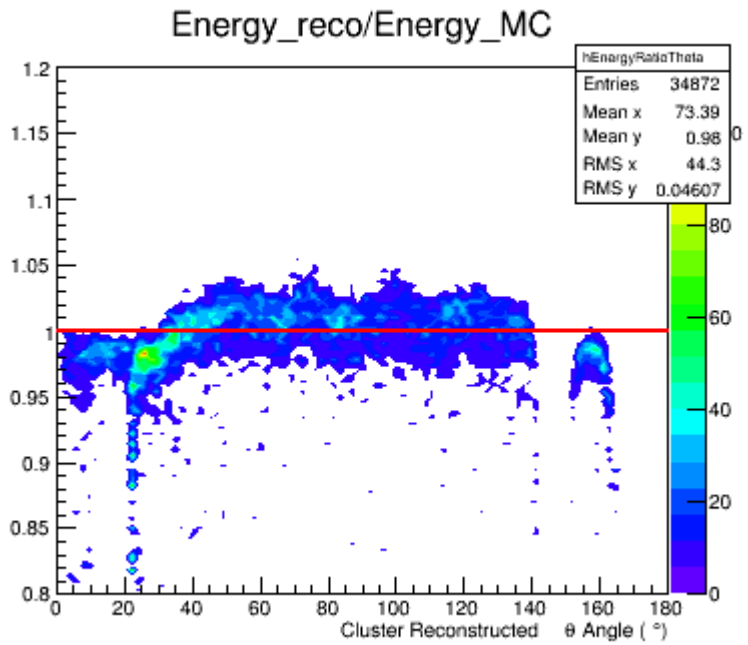
should be modified to

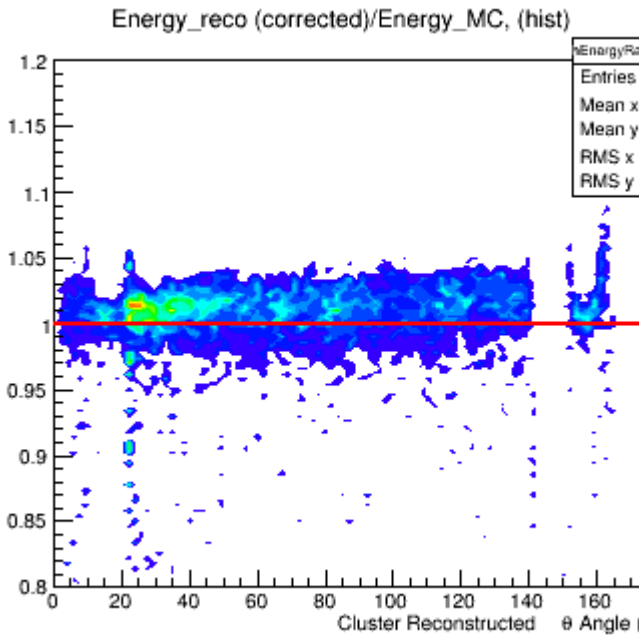
fEmcCalibrator= PndEmcClusterCalibrator::MakeEmcClusterCalibrator(2, 3);

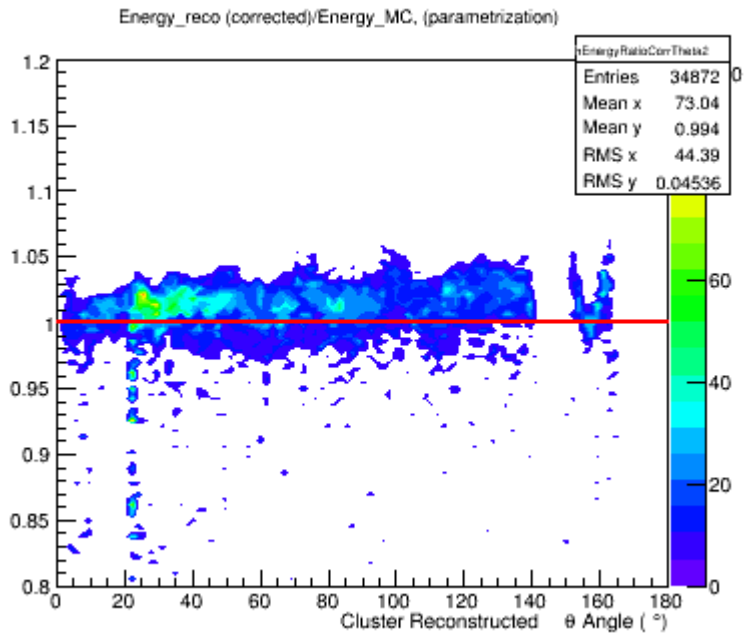
Dima

File Attachments

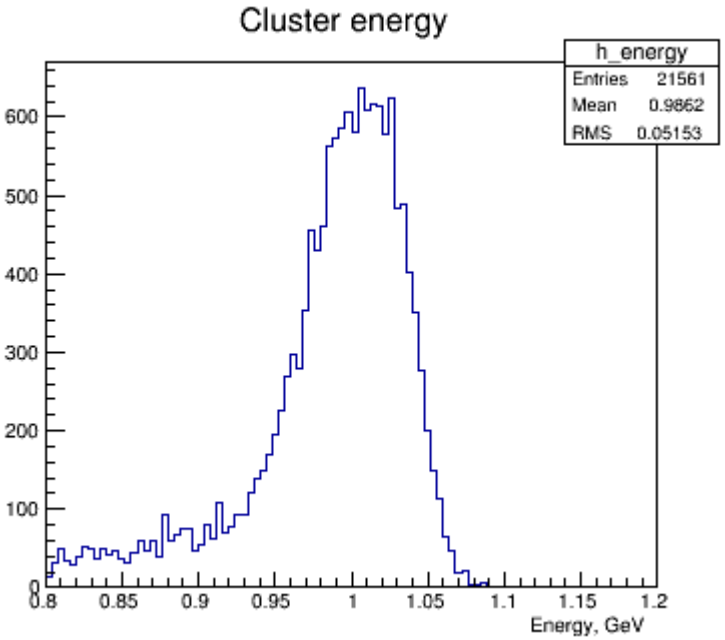
1) e_vs_theta.png, downloaded 2174 times

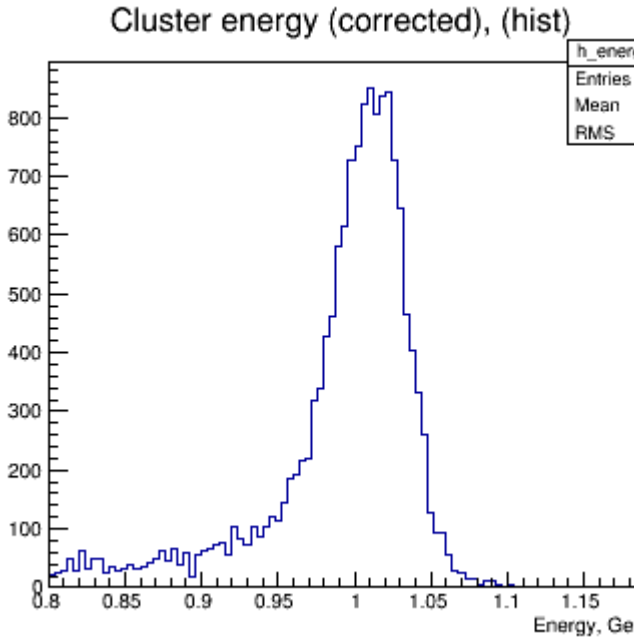


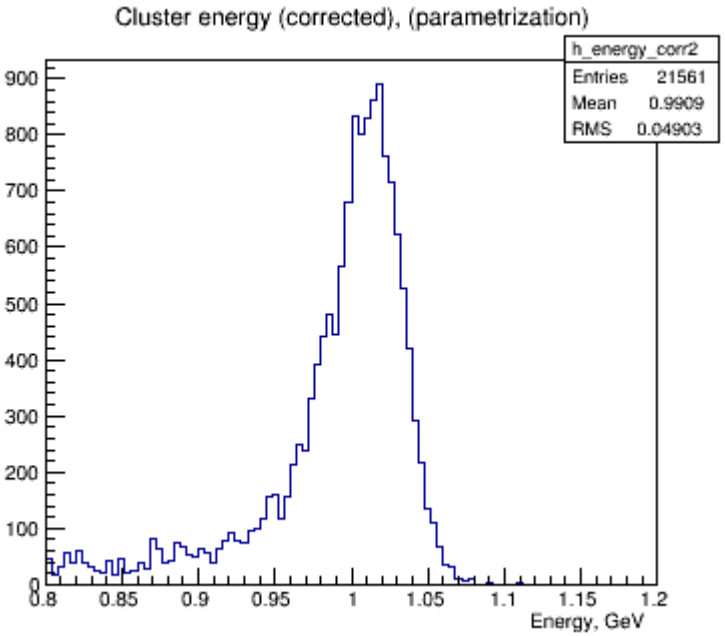




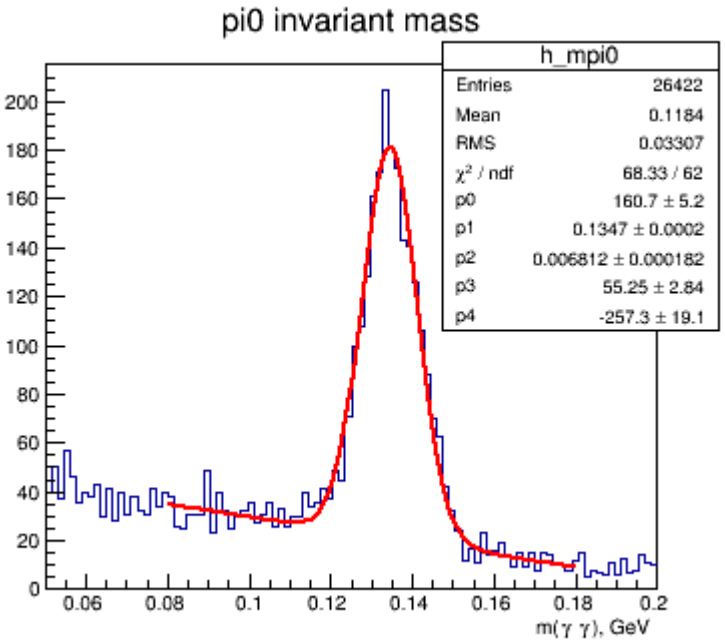
2) energy_1GeV.png, downloaded 2145 times

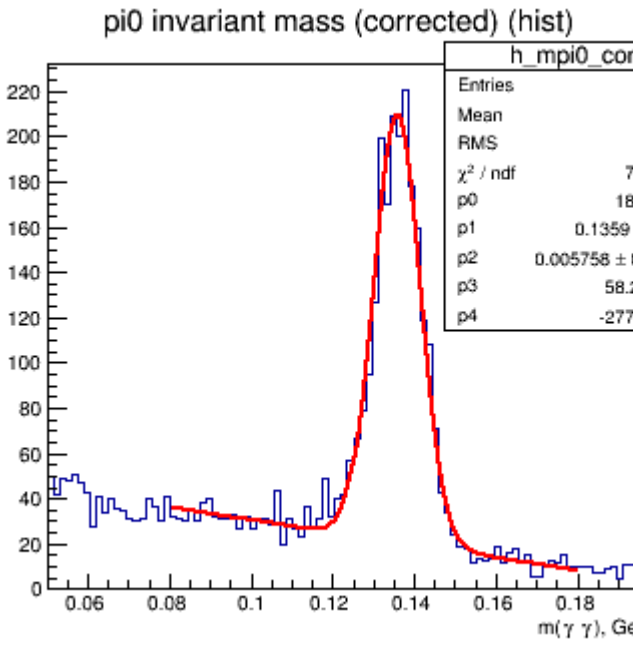


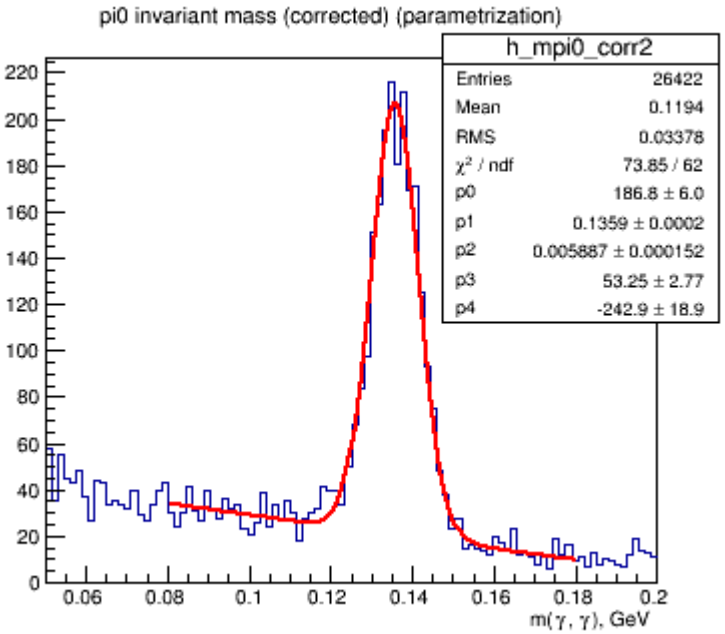




3) mpi0.png, downloaded 2142 times


pi0 invariant mass
h_mpi0
Entries 26422
Mean 0.1184
RMS 0.03307
χ² / ndf 68.33 / 62
p0 160.7 ± 5.2
p1 0.1347 ± 0.0002
p2 0.006812 ± 0.000182
p3 55.25 ± 2.84
p4 -257.3 ± 19.1
m(γ γ), GeV


pi0 invariant mass (corrected) (hist)
h_mpi0_cor
Entries
Mean
RMS
χ² / ndf
p0
p1 0.1359
p2 0.005758 ±
p3
p4
m(γ γ), Ge


pi0 invariant mass (corrected) (parametrization)
h_mpi0_corr2
Entries 26422
Mean 0.1194
RMS 0.03378
χ² / ndf 73.85 / 62
p0 186.8 ± 6.0
p1 0.1359 ± 0.0002
p2 0.005887 ± 0.000152
p3 53.25 ± 2.77
p4 -242.9 ± 18.9
m(γ, γ), GeV