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);

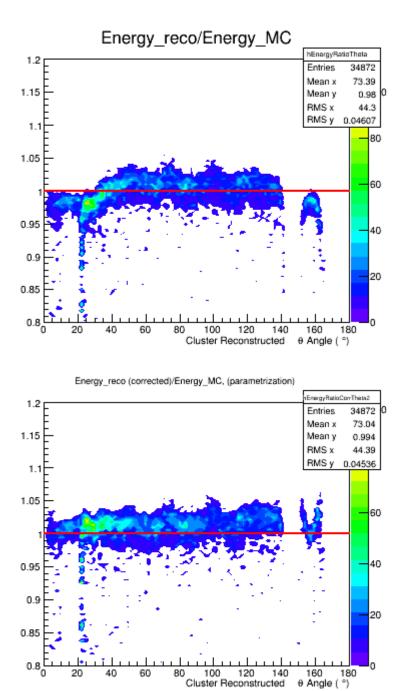
Dima

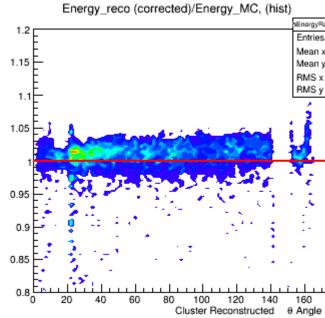
File Attachments

1) e_vs_theta.png, downloaded 1163 times

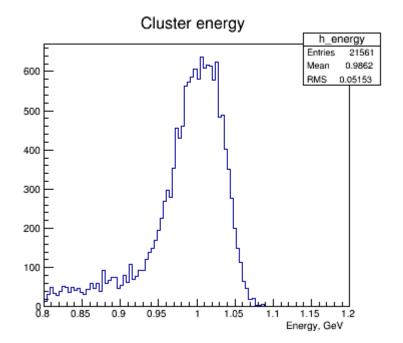
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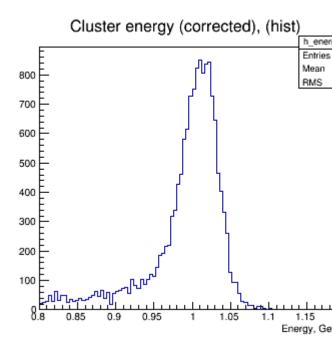
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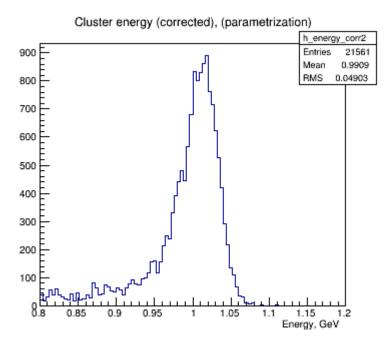




2) energy_1GeV.png, downloaded 1136 times







3) mpi0.png, downloaded 1135 times

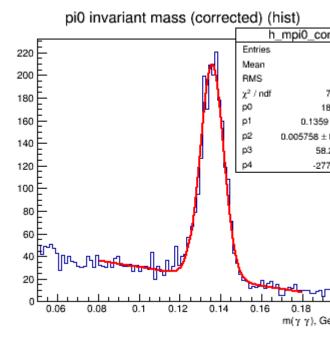
pi0 invariant mass h_mpi0 26422 Entries 200 0.1184 Mean RMŞ 0.03307 180 $\chi^2 \, / \, ndf$ 68.33 / 62 160 р0 160.7 ± 5.2 p1 0.1347 ± 0.0002 140 p2 0.006812 ± 0.000182 рЗ 55.25 ± 2.84 120 -257.3 ± 19.1 100 80 60 20

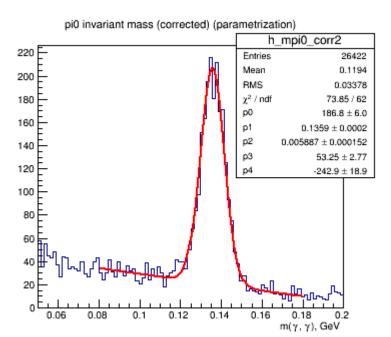
0.18

m(γγ), GeV

0.2

0.16





0

0.06

80.0

0.1

0.12

0.14