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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/EmcDigiNonuniformityPars2.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  $\pi^0$  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

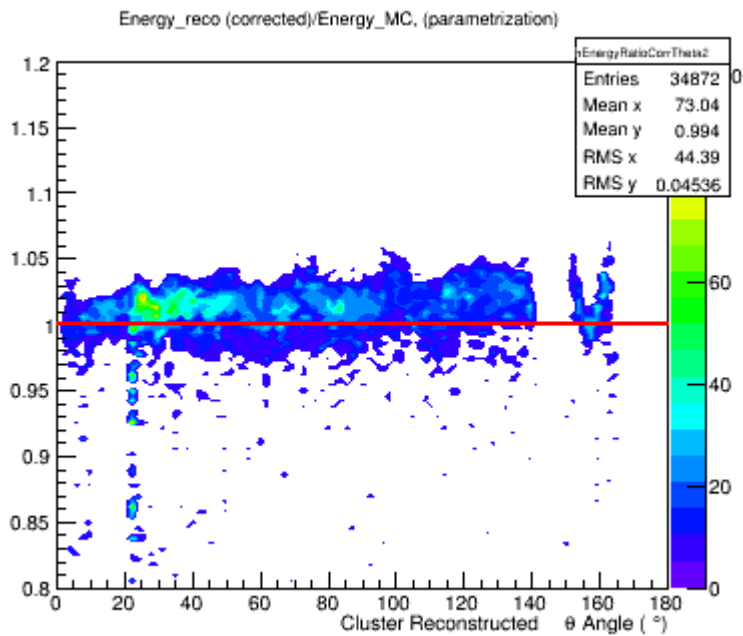
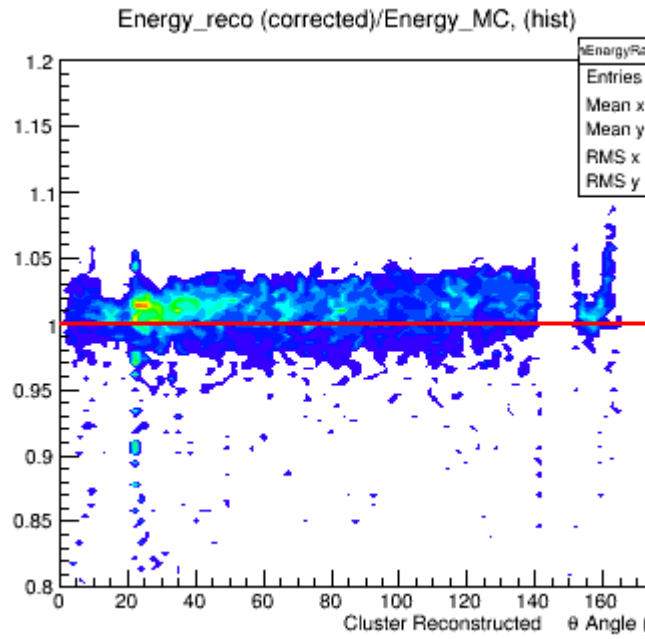
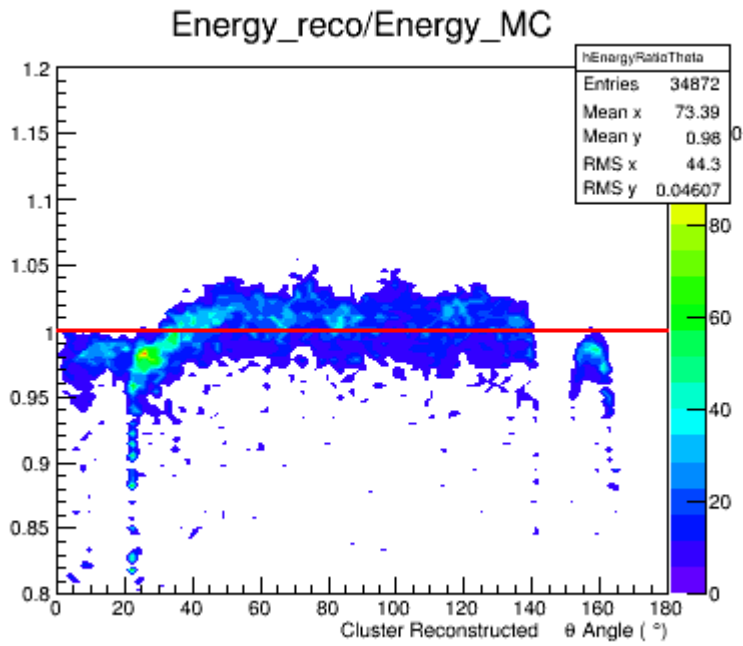
```
fEmcCalibrator= PndEmcClusterCalibrator::MakeEmcClusterCalibrator(2, 3);
```

Dima

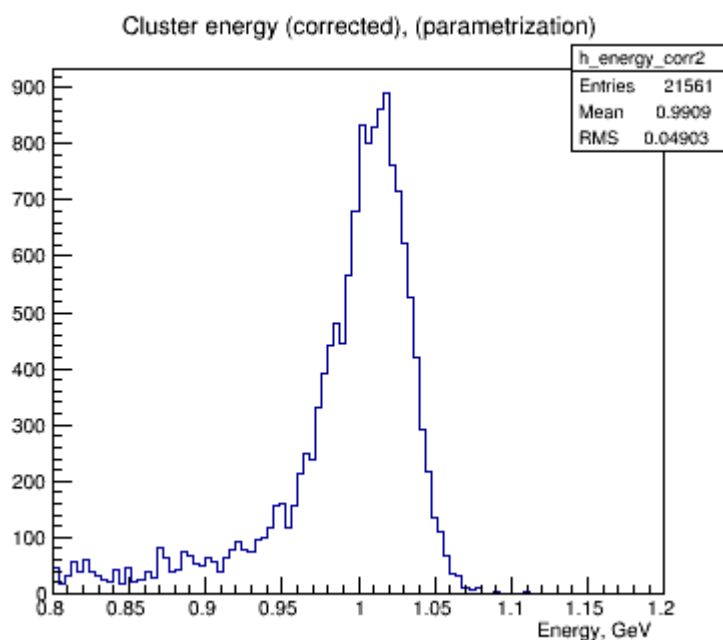
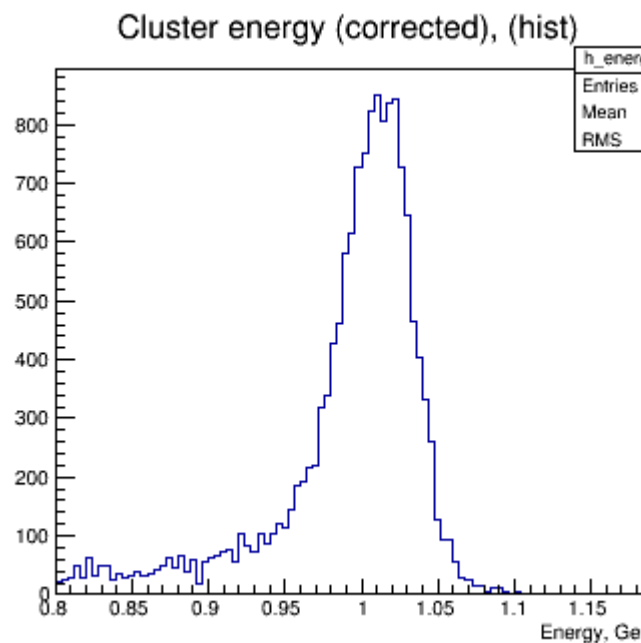
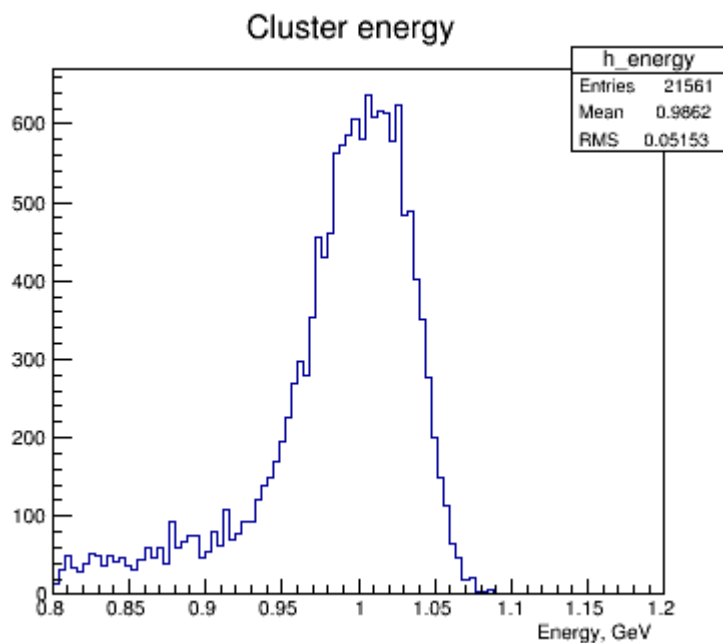
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## File Attachments

1) [e\\_vs\\_theta.png](#), downloaded 1058 times

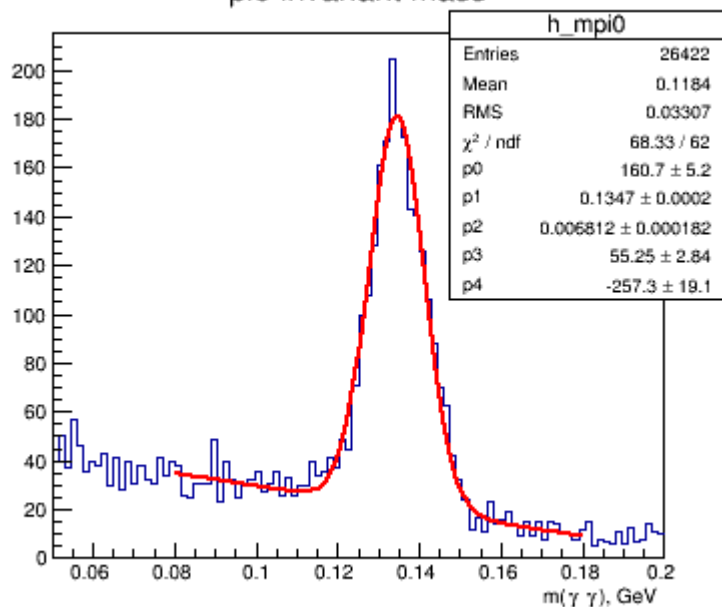


2) [energy\\_1GeV.png](#), downloaded 1029 times

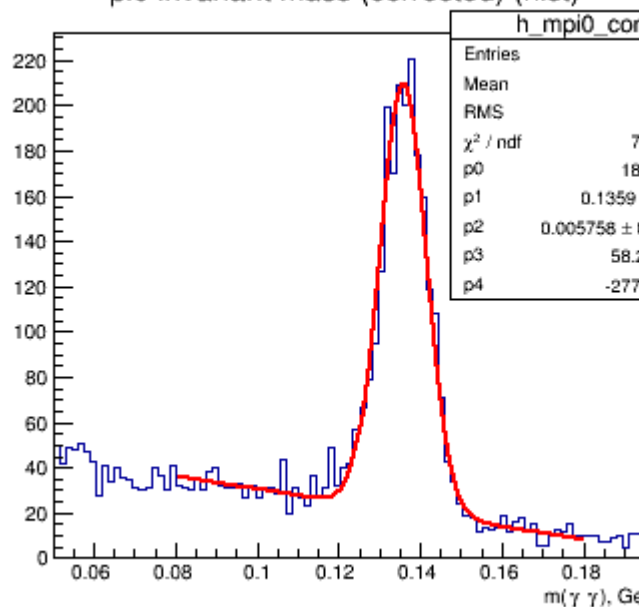


3) [mpi0.png](#), downloaded 1023 times

pi0 invariant mass



pi0 invariant mass (corrected) (hist)



pi0 invariant mass (corrected) (parametrization)

