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Subject: Re: EMC resolution

Posted by [Dima Melnychuk](#) on Wed, 30 Oct 2013 14:23:31 GMT

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Some additional results on emc resolution from my side.

First of all after Jifeng put a latest version of digitization by default, (based on code for EMC feature extraction developed at KVI) the energy resolution is different.

I did study for barrel 30-130 degree range, 10 k events, 1 GeV photons.

For new digitization  $\sigma=1.6\%$

For previous digitization  $\sigma=1.2\%$

There are two options for non-uniformity, first is based on measurements and implemented by Christian Hammann,  $\sigma=2.6\%$

And second one (linear non-uniformity) is based on fit to reproduce prototype data and implemented by Hossein Moeini,  $\sigma=2.5\%$ , so both options are very close.

You can use this option with

```
PndEmcHitProducer* emcHitProd = new PndEmcHitProducer();
TString nonuniformityFile=gSystem->Getenv("VMCWORKDIR");
nonuniformityFile+="/macro/params/EmcDigiNoniformityPars2.root";
emcHitProd->SetNonuniformityFile(nonuniformityFile.Data());
```

So non-uniformity definitely affect the result as well as newer digitization.

But you can see if you use non-uniform response the peak position is shifted and calibration/energy correction is necessary. And shift is in different direction for two implementations of non-uniformity. Hossein provided correction for his case but it was for older digitization and newer digitization shift a peak position itself a little bit. So it should be redone.

So I plan to redo energy correction for new digitization with both non-uniformity options and I hope rather soon.

2.6% resolution for 1 GeV photon is what Christian Hammann quoted before as a result in agreement with prototype data.

So when energy correction will be ready the question can be closed.

Dima

## File Attachments

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- 1) [energy1.png](#), downloaded 356 times
  - 2) [energy2.png](#), downloaded 339 times
  - 3) [energy3.png](#), downloaded 344 times
  - 4) [energy4.png](#), downloaded 405 times
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