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Subject: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Tue, 12 May 2015 10:03:36 GMT

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Dear All,

I have generated single photon events for energy 1 GeV using box generator. Anyone please tell me how should I calculate the reconstructed photon energy for each event. I have tried and sum-up all the energy of all secondary particles for each event. But it gives me unexpected value having mean at nearly 4 GeV.

regards

Kamal Dutta  
Gauhati University

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [StefanoSpataro](#) on Tue, 12 May 2015 10:19:12 GMT

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PndEmcCluster::energy() from the digi file, or PndPidNeutralCand::GetEmcRawEnergy() (for raw energy) ::GetEmcCalEnergy() (for calibrated energy) if you start from the pid file.

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Tue, 12 May 2015 12:13:06 GMT

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Thanks. But I do not understand why its 259 entries in PndEmcCluster::energy() for 100 primary photons. It is like I have 259 EMC clusters for 100 primary photons. Can you help me get it ?

regards  
Kamal Dutta

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [StefanoSpataro](#) on Tue, 12 May 2015 12:19:20 GMT

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The others are secondaries. You can select GetMcIndex()==0 to have only the primaries (even if you should see still some split-off).

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Tue, 12 May 2015 12:31:13 GMT

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Hi, the problem is, if I am getting more reconstructed photons than generated, how can I relate them. I mean, If I want to have the energy difference between the generated i.e 1 GeV and reconstructed, how it is possible ? As per my knowledge, if a single photon hits the EMC crystal, the digitized output should give a single cluster which will estimate the energy of the primary photon. Thus for 100 primary photons, it should have 100 emc cluster and their energy accordingly. Please correct me if I am wrong.

regards  
Kamal Dutta

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Subject: Re: Reconstructed photon energy for single photon event  
Posted by [StefanoSpataro](#) on Tue, 12 May 2015 12:33:25 GMT

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Again, one photon interacts with materials and form different signals in the emc, then you can have more than 1 clusters. if you select the mc index you should isolate your primary photon.

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Subject: Re: Reconstructed photon energy for single photon event  
Posted by [kamalpdutta](#) on Tue, 12 May 2015 12:46:42 GMT

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Thanks, Where can I get GetMcIndex() ?

regards  
Kamal Dutta

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Subject: Re: Reconstructed photon energy for single photon event  
Posted by [StefanoSpataro](#) on Tue, 12 May 2015 12:47:48 GMT

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PidNeutralCand::GetMcIndex()

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Subject: Re: Reconstructed photon energy for single photon event  
Posted by [kamalpdutta](#) on Wed, 13 May 2015 06:47:37 GMT

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Thanks a lot. I have written a piece of code to access PndPidNeutralCand::GetEmcCalEnergy(), but getting error. I have attached both the code and errors. Please have a look.

regards

#### File Attachments

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- 1) [gam\\_conv\\_pid.C](#), downloaded 475 times
  - 2) [errors](#), downloaded 504 times
- 
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Subject: Re: Reconstructed photon energy for single photon event

Posted by [StefanoSpataro](#) on Wed, 13 May 2015 07:08:29 GMT

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punk is a PndPidCandidate named "PidNeutralCand".

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Wed, 13 May 2015 10:16:08 GMT

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Hi Stefano,

I corrected according to you. Please look at the code. I have also attached the reconstructed photon energy plot. I am not understand how to accept it, as reconstructed photon energy of generated energy 1 GeV. It has 202 events and energy more that 1 GeV too. But the generated events are of 1GeV and 100 events.

#### File Attachments

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1) [gam\\_conv\\_pid.C](#), downloaded 466 times

2) [gam\\_e.eps](#), downloaded 492 times

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [StefanoSpataro](#) on Wed, 13 May 2015 10:20:12 GMT

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Again:

```
for (Int_t k = 0; k < ar_entries; k++){
    punkt = (PndPidCandidate*) hit_array->At(k);
    -> if (punkt->GetMcIndex()!=0) continue;
```

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Wed, 13 May 2015 10:25:10 GMT

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It gives the same output.

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [StefanoSpataro](#) on Wed, 13 May 2015 10:32:00 GMT

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I suppose not exactly the same.

In any case, the peak around 1 is your primary photon while the low energetic part comes from

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secondaries and split-off. You can get rid of it with a simple energy cut. The position of the peak depends on the calibration.

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Subject: Re: Reconstructed photon energy for single photon event

Posted by [kamalpdutta](#) on Wed, 13 May 2015 10:43:38 GMT

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But I am worried about the part above 1 GeV. How to estimate these values. If I want to estimate reconstructed photon energy for each of the primary photon and its start vertex of EM shower, how it is possible in this situation. The start vertex I calculated for 100 events using PndMCIndex. On the other hand, I got 202 reconstructed photon events from PndPidCandidate. It really puzzled me.

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