Subject: Photon energy distribution using DPM
Posted by Ganesh Tambave on Wed, 28 Mar 2012 16:50:41 GMT
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Dear All,

I have tried to reproduce fig.3.2 (please find attached: EMCTDR_fig.3.2.png) shown in EMC TDR page no.33 using DPM event generator to estimate pile-up probabilites.
I have reproduced it for 15 GeV anti-proton (please find attached: dpm_photon_2D.png and it's y-projection for theta 5 to 21 deg.: dpm_photon_2D_y-proj.png).
If I compare both the figures then they don't look same, the photon energy distribution mean in my figure is about 1.5 GeV and in TDR fig. is about 200 MeV.
Can anyone help me to understand this difference?

I'm using only MC true information from DPM (no detector at all).

Regards,
Ganesh Tambave

File Attachments

1) EMCTDR_fig.3.2.png, downloaded 819 times

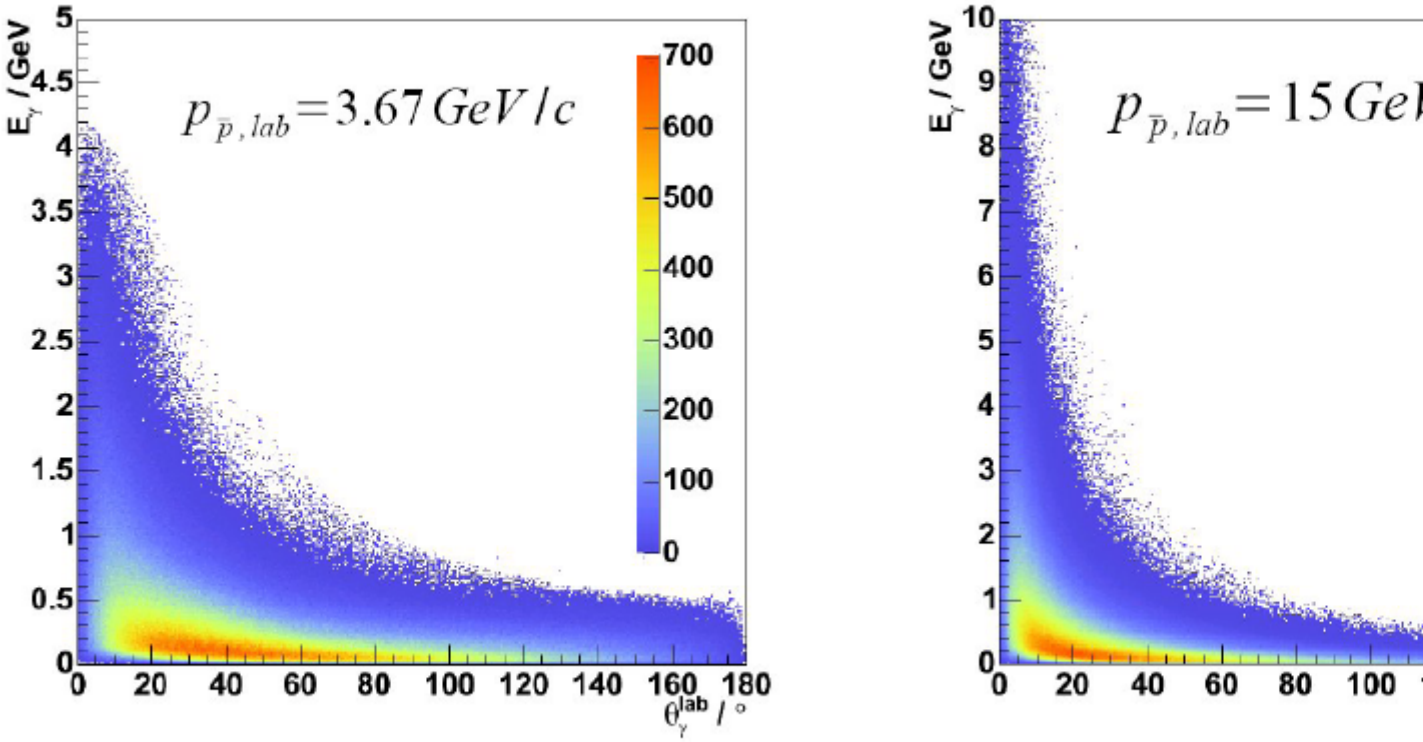
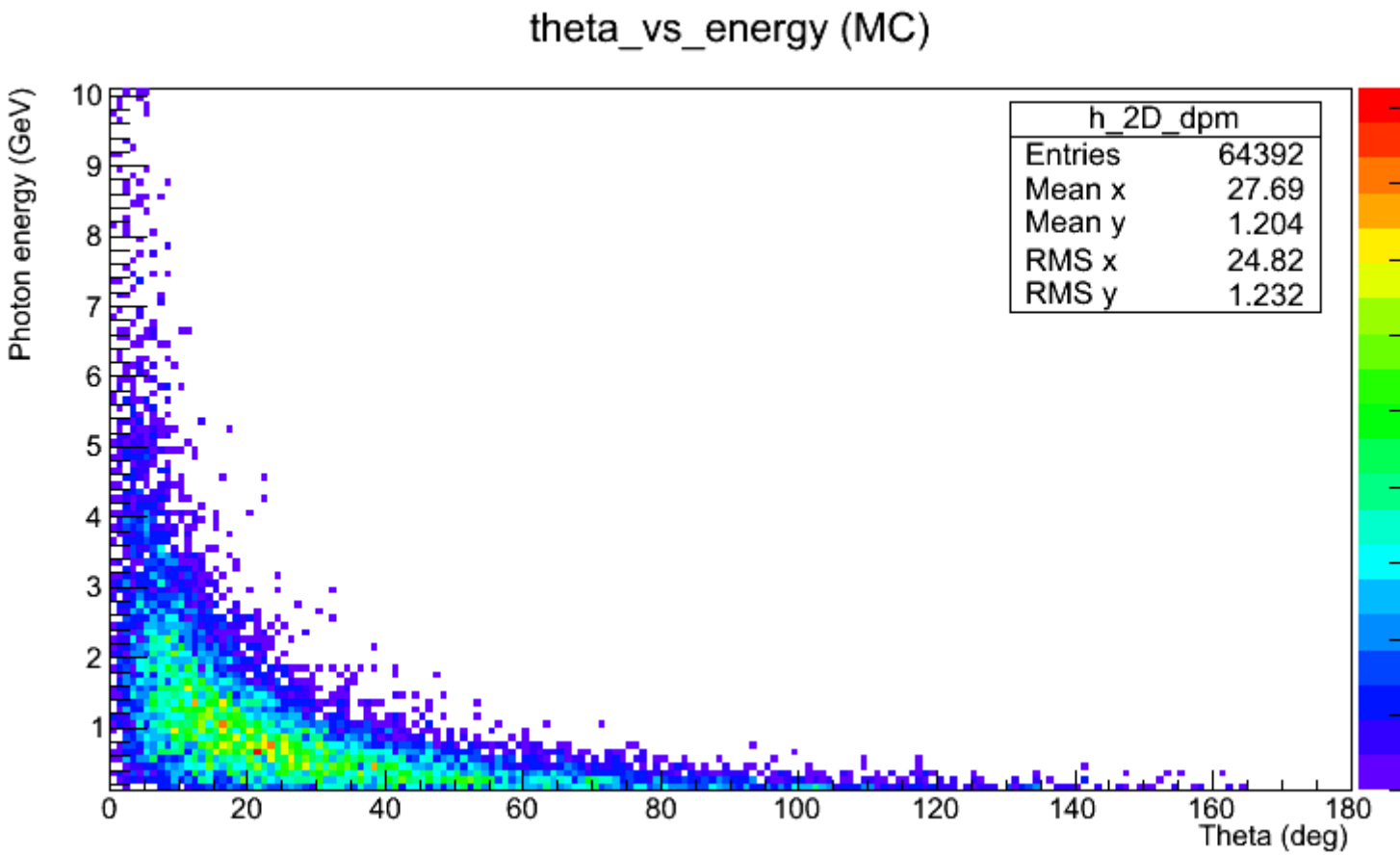
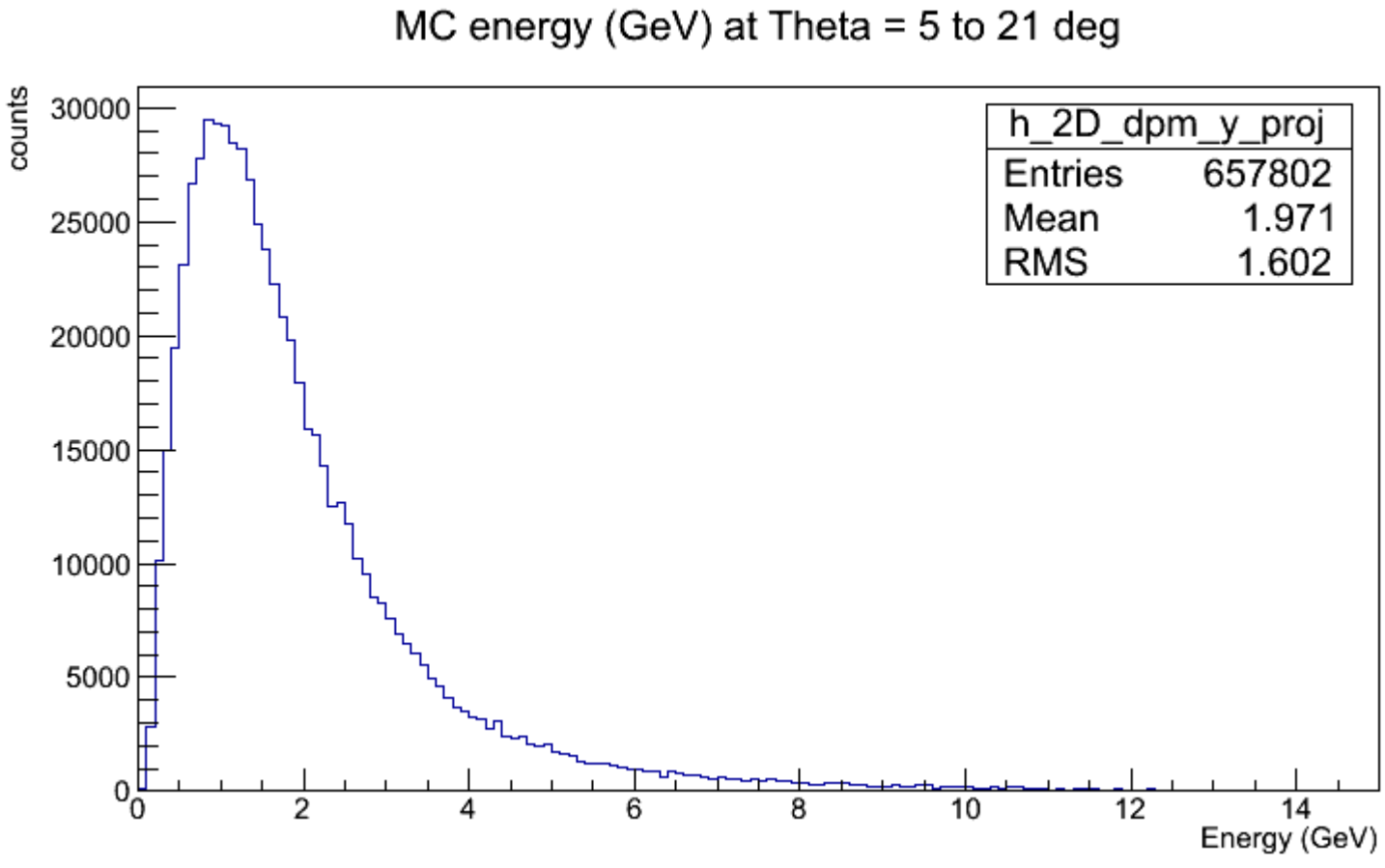


Figure 3.2: Photon energy distribution vs. lab. angle for two momentum set

2) dpm_photon_2D.png, downloaded 801 times



3) dpm_all_2D_y-proj.png, downloaded 798 times



Subject: Re: Photon energy distribution using DPM
Posted by StefanoSpataro on Thu, 29 Mar 2012 13:41:51 GMT
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Is it possible that the DPM plot includes also secondaries? Just trying to guess...

Subject: Re: Photon energy distribution using DPM
Posted by Ganesh Tambave on Fri, 30 Mar 2012 08:52:32 GMT
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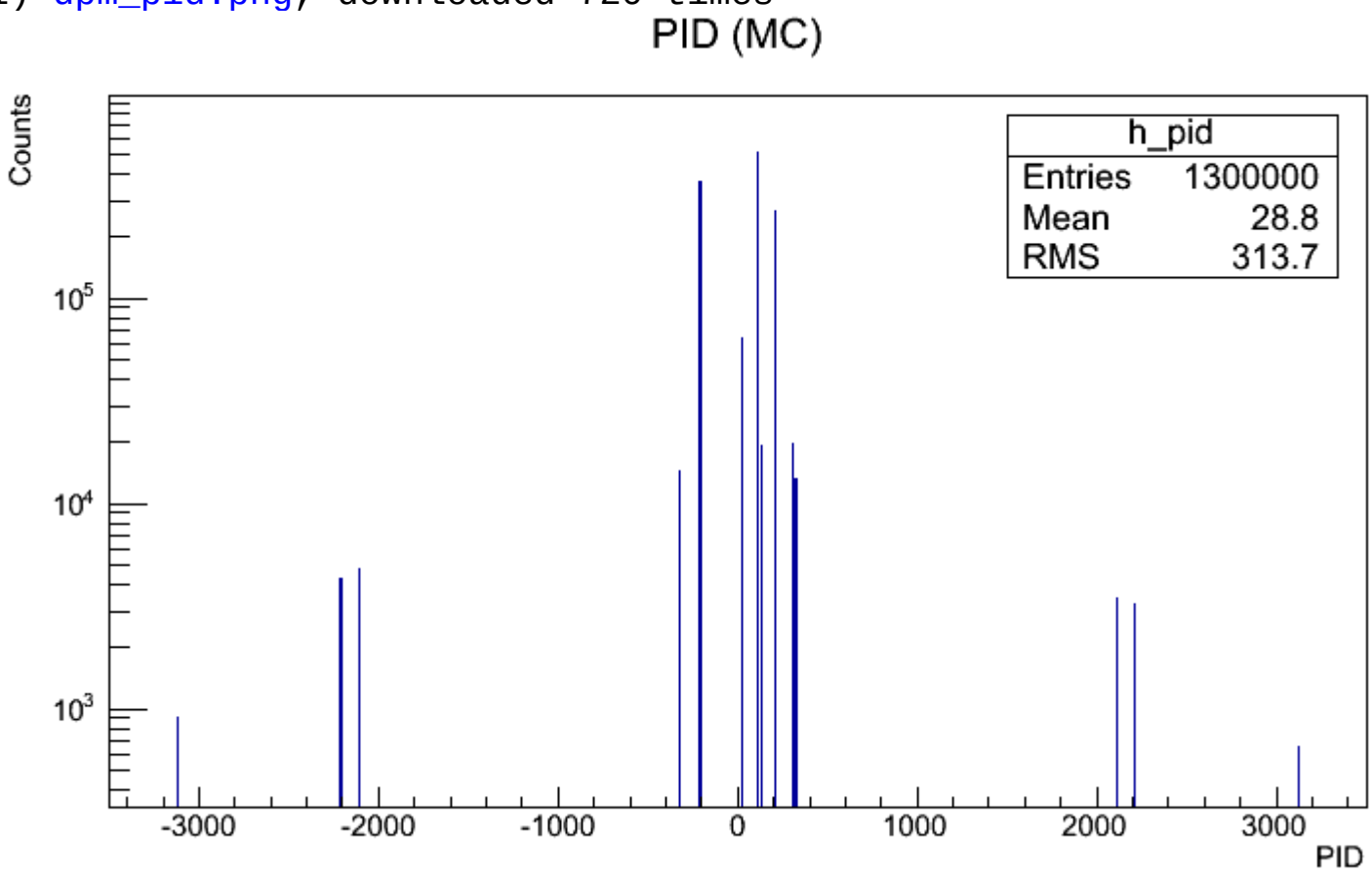
Dear Stefano,

Please find attached pdg ID from DPM. I have selected only
photons out of it and plotted photon energy distribution.

Regards,
Ganesh

File Attachments
1) dpm_pid.png, downloaded 720 times



Subject: Re: Photon energy distribution using DPM
Posted by Johan Messchendorp on Fri, 30 Mar 2012 08:56:53 GMT

Hi,

The question is what was done for the EMC TDR: did they take the interactions with the detectors into account (DPM+detectors), and hence, showed the distribution of photons including secondaries photons from interactions with the material? Or was the TDR result also without any detectors, e.g. just from the MC of the event generator?

Greets,

Johan.

Subject: Re: Photon energy distribution using DPM
Posted by Ganesh Tambave on Fri, 30 Mar 2012 09:13:08 GMT

Dear Johan,

I'm sorry, I don't know the details of TDR fig. since I don't know who made it.

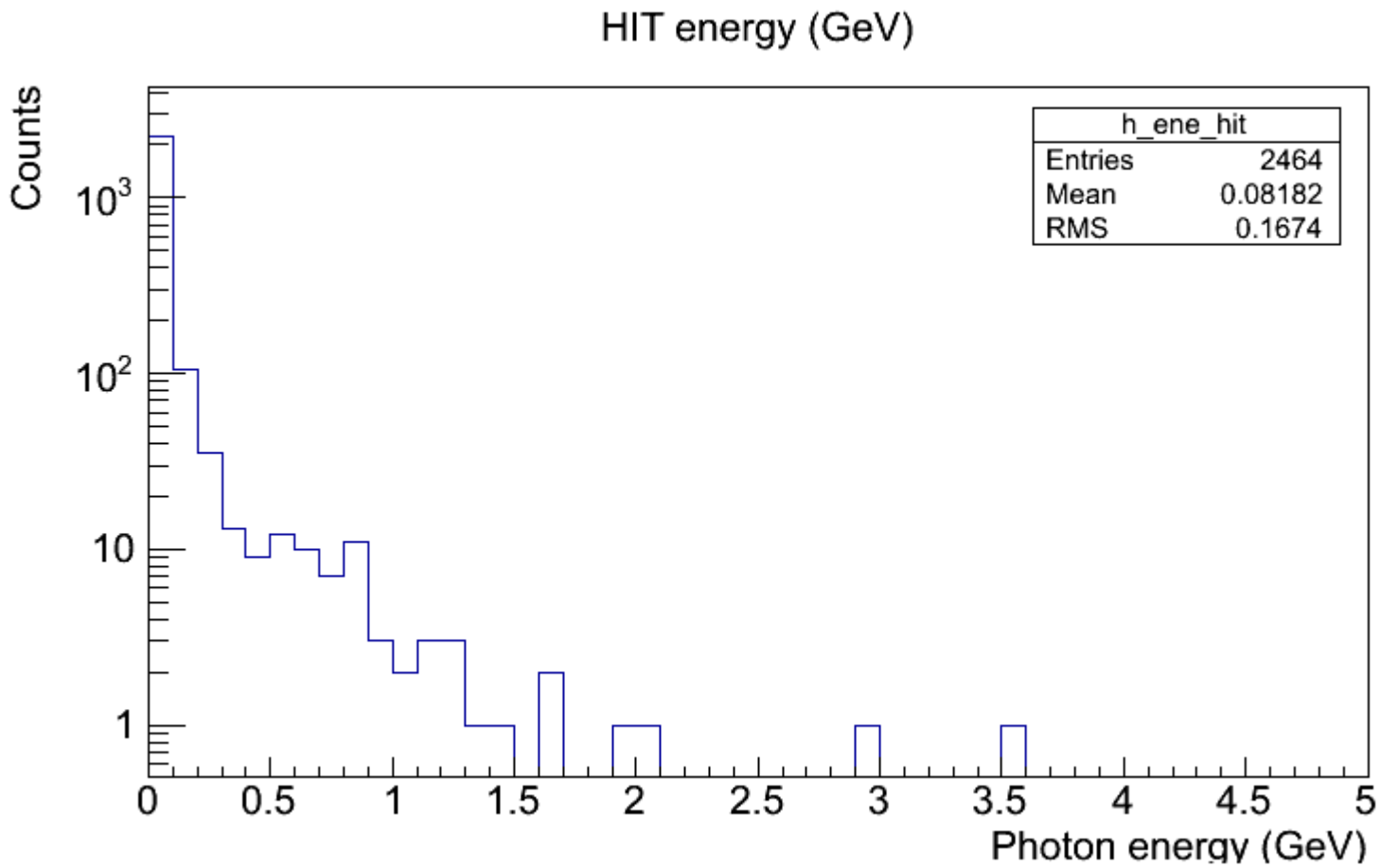
But I have produced photon energy distribution using DPM+forward endcap EMC using EMC hit information. About the forward endcap geometry, I used all panda EMC for the simulation and in the analysis I have selected only module==3, which is for Farward endcap emc.

Please find attached,
photon energy vs. angle (emc_hit_dpm_photon_TE.png) and
photon energy distribution (emc_hit_dpm_photon_energy.png)

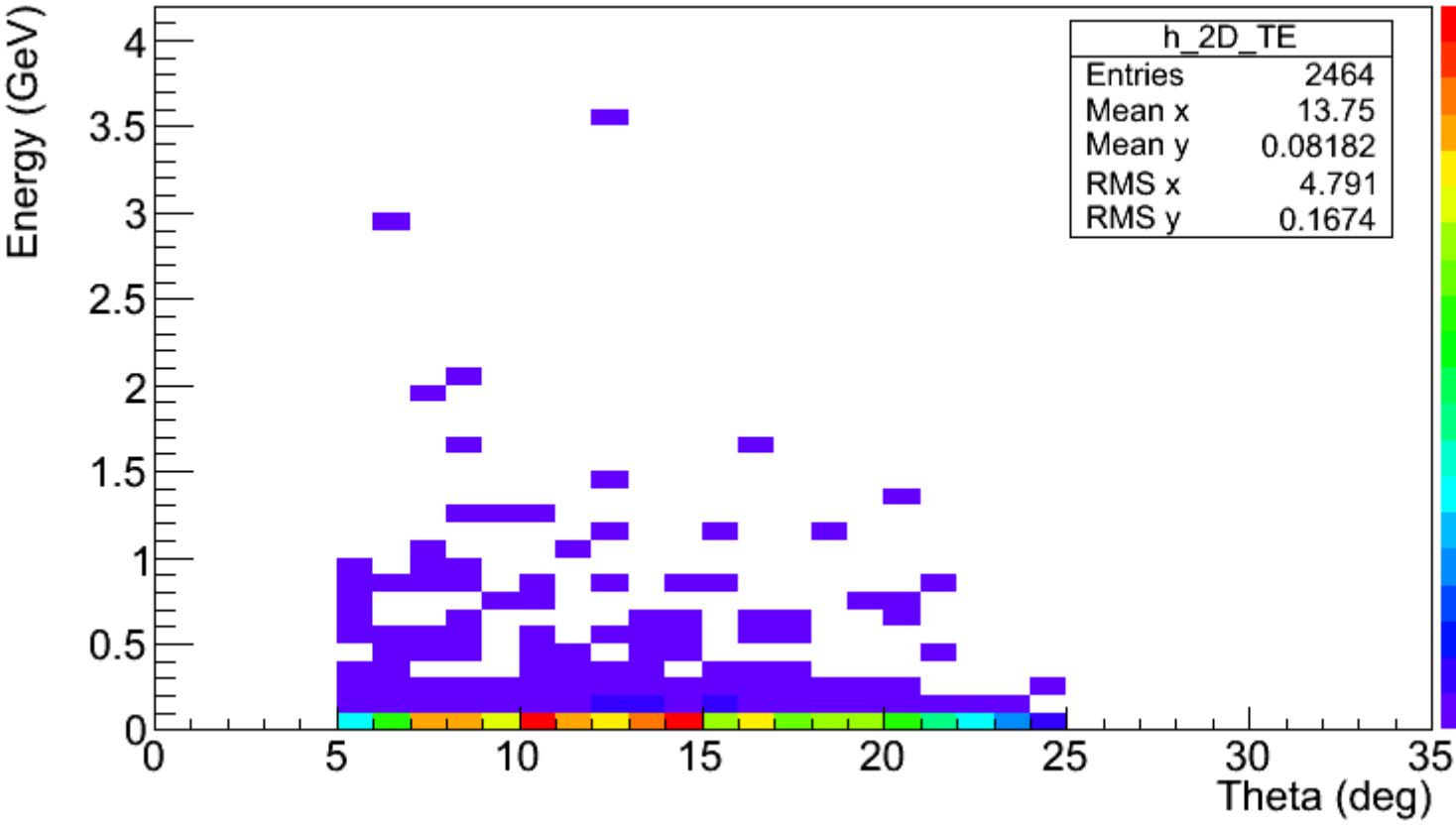
Regards,
Ganesh

File Attachments

1) emc_hit_dpm_photon_energy.png, downloaded 715 times



2) emc_hit_dpm_photon_TE.png, downloaded 712 times



Subject: Re: Photon energy distribution using DPM
Posted by Johan Messchendorp on Fri, 30 Mar 2012 09:16:14 GMT
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Hi,

The producer of the TDR plot is - most likely - Bertram Kopf. You might want to contact him directly about the details of the plot. I furthermore have contacted Aida (she is in charge of the DPM stuff) and asked her to reproduce the spectrum to confirm your observation.

Greets,

Johan.

Subject: Re: Photon energy distribution using DPM
Posted by Aida Galoyan on Fri, 30 Mar 2012 16:03:07 GMT
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Hi Ganesh,

Looking at your figure 2 at 15 GeV we see that <E_gamma>=1.2 GeV.
In your Fig.3 <E_gamma> = 1.9 GeV. It is due to restriction on the
theta (5 - 21 deg.) According to the TDR fig., it must be so.
Why are you talking about <E_gamma>= 200 MeV?

>>>>>>>>>>>>>
If I compare both the figures then they don't look same, the photon energy distribution mean in my figure is about 1.5 GeV and in TDR fig. is about 200 MeV.
>>>>>>>>>>>>>

In TDR fig., there is no average value of <E_gamma>. I can not see
any question.

Best regards,
Aida

Subject: Re: Photon energy distribution using DPM
Posted by StefanoSpataro on Fri, 30 Mar 2012 16:49:36 GMT
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From the Tdr picture (figure 1) it is clear that the photon energy distribution is well below 1Gev, different from the new plots. And in those 2D plots there are no polar angle selections.

Subject: Re: Photon energy distribution using DPM
Posted by Ganesh Tambave on Mon, 02 Apr 2012 11:04:38 GMT
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Dear Aida,

Thank you for your reply.

The question is,

If I compare fig.1 (i.e EMC TDR 2D plot) and fig.3 (my figure with theta selection: 5-21 deg), you can see that the vertical axis of fig.1 (EMC TDR 2D plot) photon energy distribution mean is well below 1 GeV (~200 MeV) and in fig.3 (my figure with theta selection: 5-21 deg) it is above 1 GeV (~1.6 GeV).

I was trying to understand the reason behind this difference.

In my studies I have used only DPM generator information and I don't know about the details about EMC TDR fig.

Regards,
Ganesh

Subject: Re: Photon energy distribution using DPM
Posted by Bertram Kopf on Mon, 02 Apr 2012 14:51:34 GMT
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Dear Ganesh and all others,
meanwhile, we could reproduce the plots shown in EMC TDR on page 33. We considered the pure MC-truth information of the DPM generator without any secondaries (i.e. w/o the material budget in front of the EMC). In order to get reasonable results we required that all short and long living resonances (pi0, eta, Delta, Sigma, etc.) are decaying within the generator. The new plots for 15GeV/c beam momentum are in good agreement with the figures of the EMC TDR and can be seen here:

a) Egam vs. theta
gam_e_theta.png

b) Egam for 5deg > theta > 21deg
gam_e_in_fwd.png

In addition you can find here the particle list for the first events where at least 1 photon is in the region between 5deg > theta > 21deg:
FirstEvents5To21deg.txt

Of course, our results are in disagreement with the results obtained by Ganesh. At the moment I don't know why. But is it possible that in Ganesh studies all long living particles like Lambda, Sigma, etc. are required to be stable?

Best regards,
Bertram.

Subject: Re: Photon energy distribution using DPM
Posted by Bernhard Roth on Tue, 03 Apr 2012 13:01:46 GMT
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Hello everybody,

I've repeated the study from yesterday (Bertram has posted about that before), but now with the current DPM generator taken from PandaRoot. Therefore I have ported it to the BaBar-like software, just to be able to compare the results.

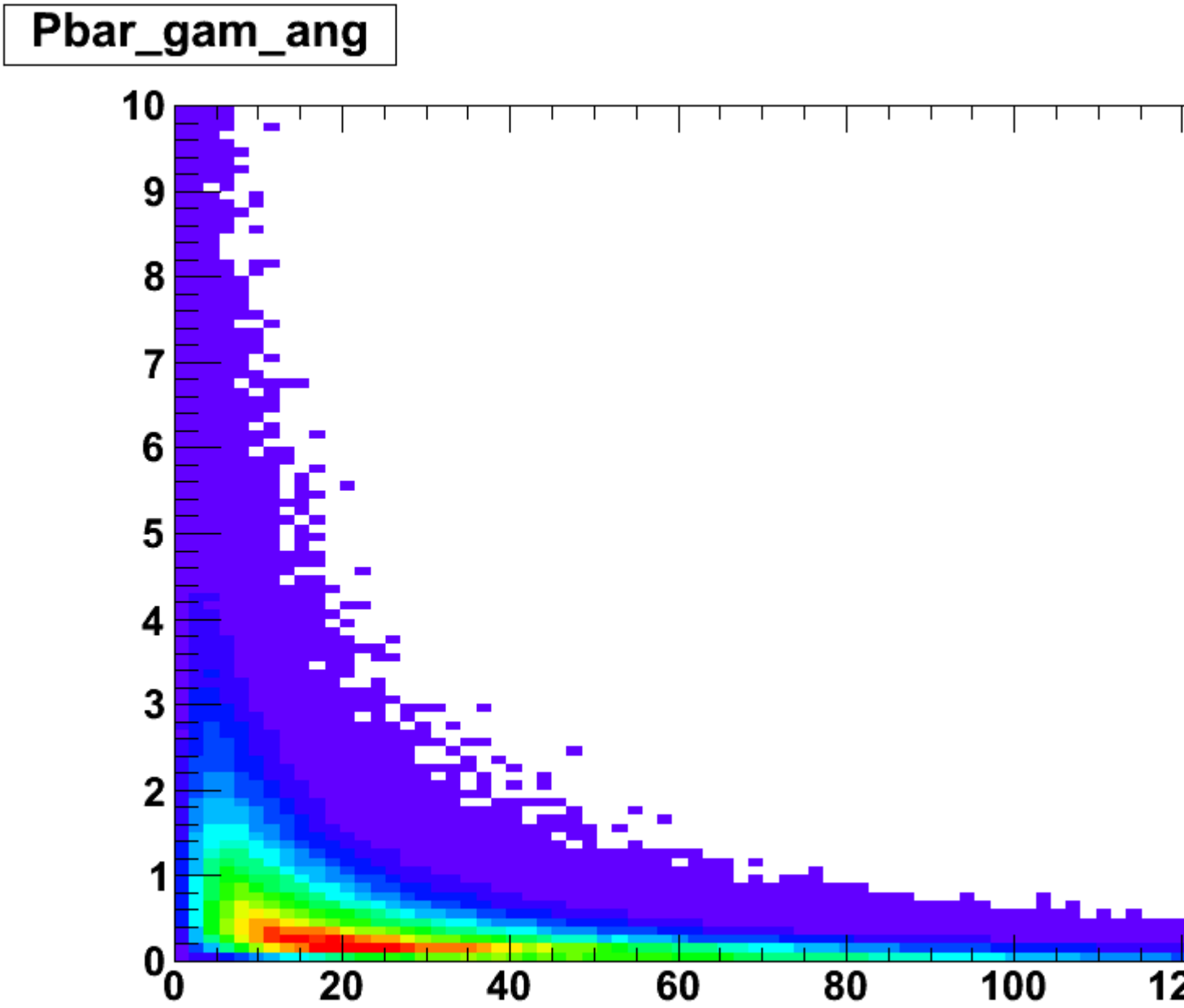
The distribution I got is the same as in the EMC TDR, as shown in the attached file. (DPM generated events at 15GeV beam momentum)

And bye the way: by turning off the elastic scattering (Elastic=0.) in pgenerators/DpmEvtGen/main.cc, the generator is about 100 times faster.

Regards,
Bernhard

File Attachments

1) gam_e_theta_newDPM.png, downloaded 714 times



Subject: Re: Photon energy distribution using DPM
Posted by Johan Messchendorp on Thu, 05 Apr 2012 07:23:48 GMT
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Hi,

I understand from Ganesh that the problem is now solved.... it was indeed the secondaries. For instance the pi0s were not decaying by default by the generator (done by the transport model). Ganesh was basically looking only at the "hard photon" spectrum from DPM....

Greets and thanks to all for the comments,

Johan.

Subject: Re: Photon energy distribution using DPM
Posted by Ganesh Tambave on Thu, 05 Apr 2012 08:07:00 GMT
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Dear all,

Thank you very much.

Regards,
Ganesh