Subject: correction in emc bump splitting
Posted by Dima Melnychuk on Tue, 13 Jan 2009 03:10:21 GMT
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Hi all,

I have corrected the small bug in emc code which affected bump splitting and particularly calculation of the bump position. (rev.4314)

The energy of the bumps was calculated properly but to suppress merged pi0, we need not only energies of the bumps but also opening angle of pi0. And the bug in the calculation of bump position resulted in wrong opening angle and as a result in low efficiency of the merged pi0 suppression.

The pictures below gives some demonstration of the bump splitting for 200 event, 5 GeV pi0 generated in [30;60] degree theta range.

The following picture presents the MC Truth energy of gamma's from pi0 decay and reconstructed energy of EmcClusters.

The same for EmcBumps

i.e. the energy distribution is reproduced.

The opening angle of pi0 for MC Truth and EmcClusters

And reconstructed opening angle for EmcBumps

And finally pi0 invariant mass for EmcClusters

and EmcBumps

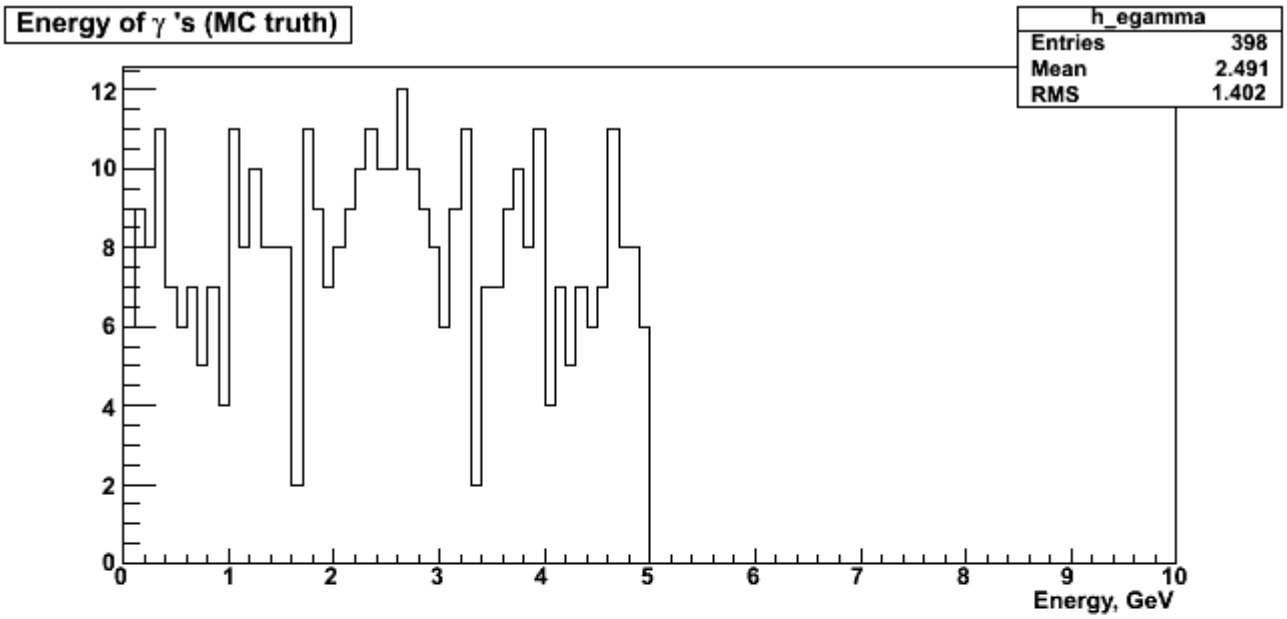
i.e. without bump splitting only 10 % of pi0 are reconstructed.

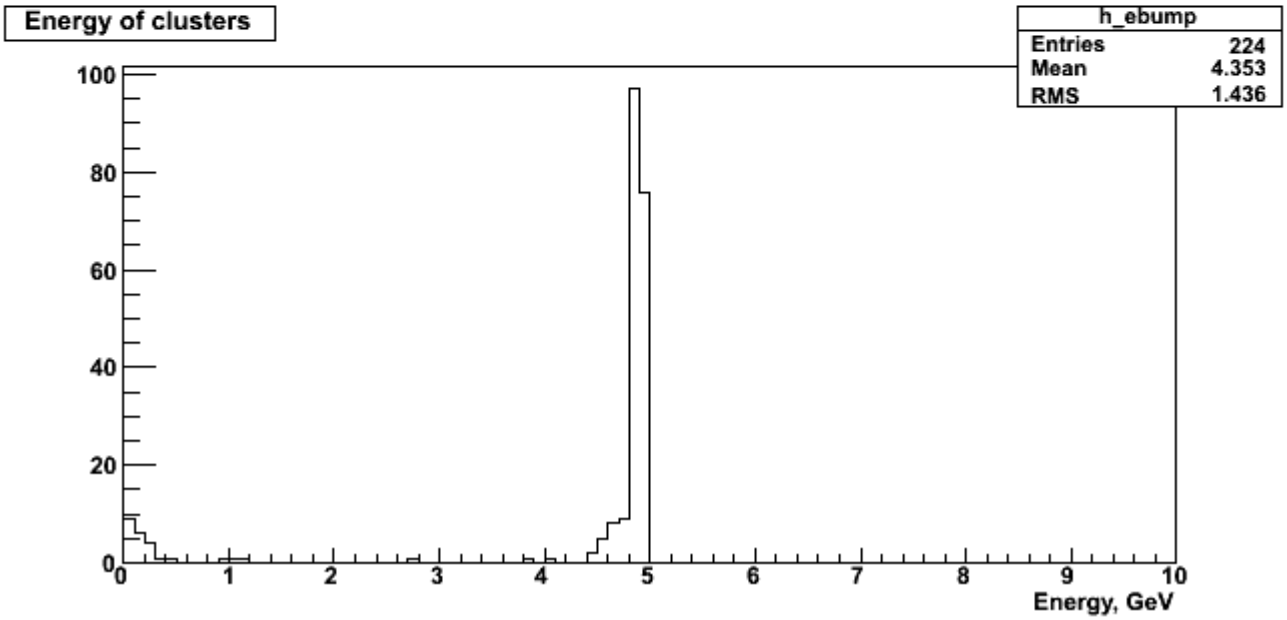
All the pictures are plotted with bump_analysis.C macro.

Best regards,
Dima

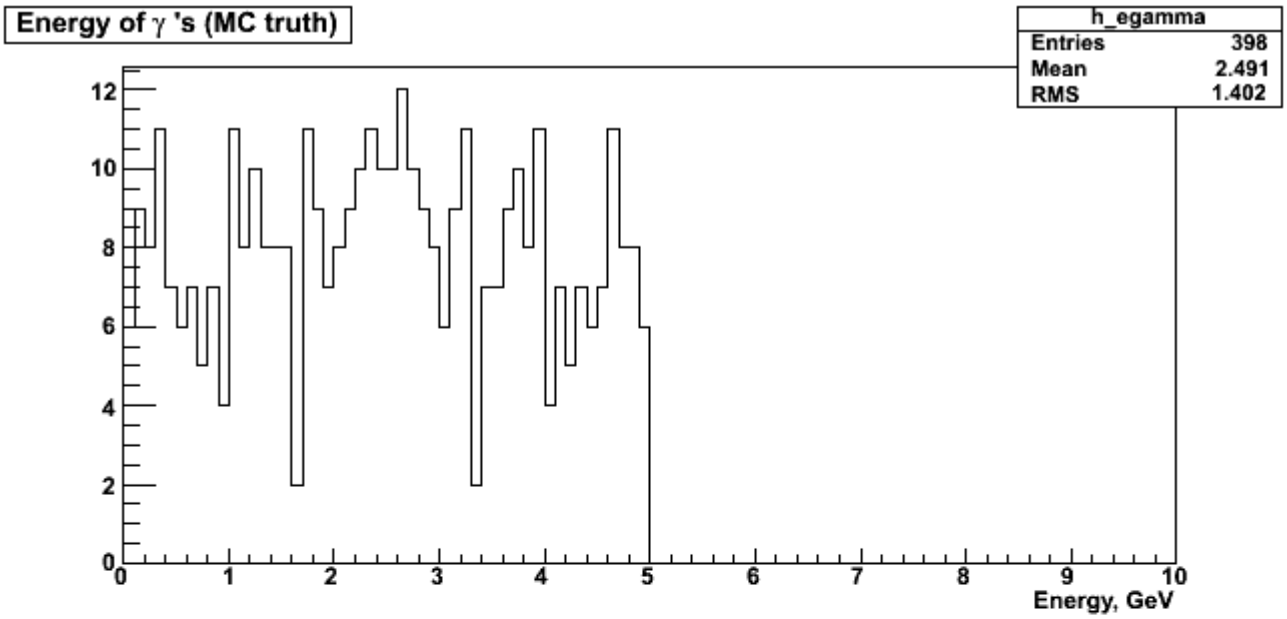
File Attachments

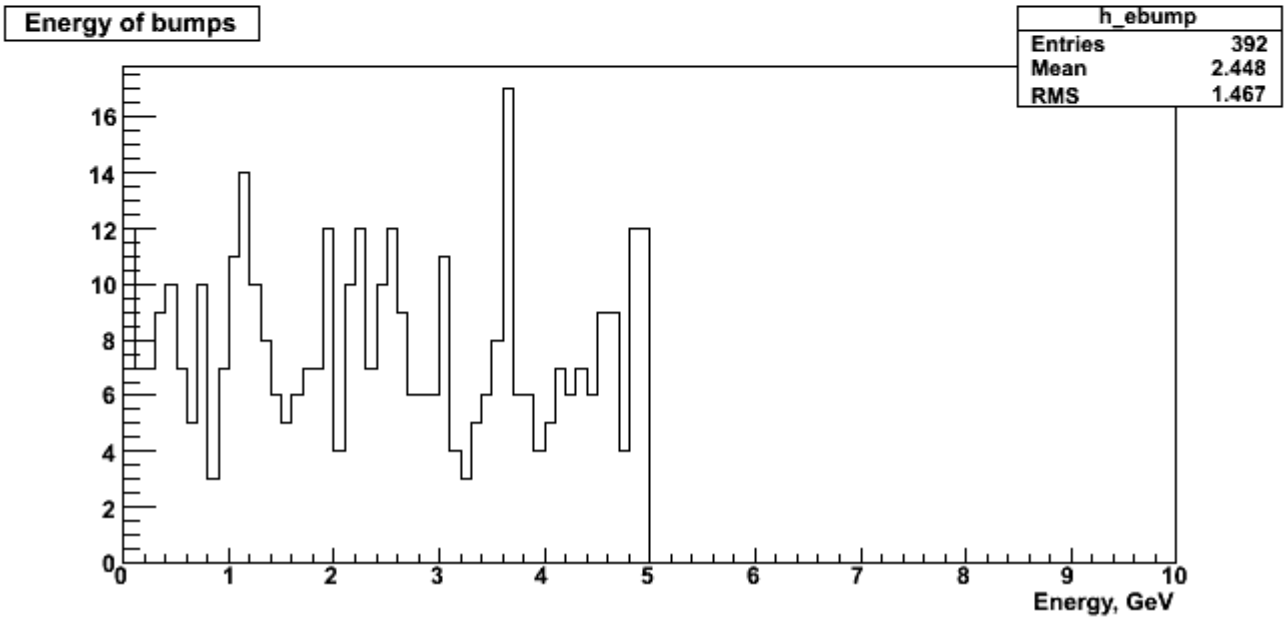
1) egamma_cluster.png, downloaded 1940 times



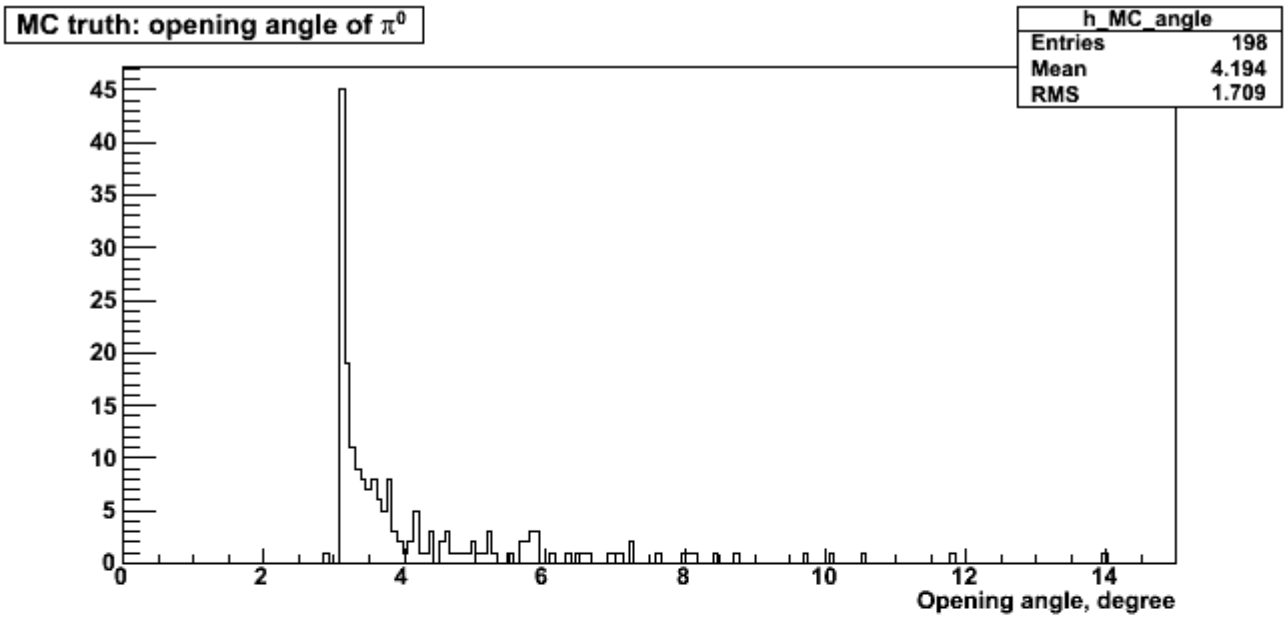


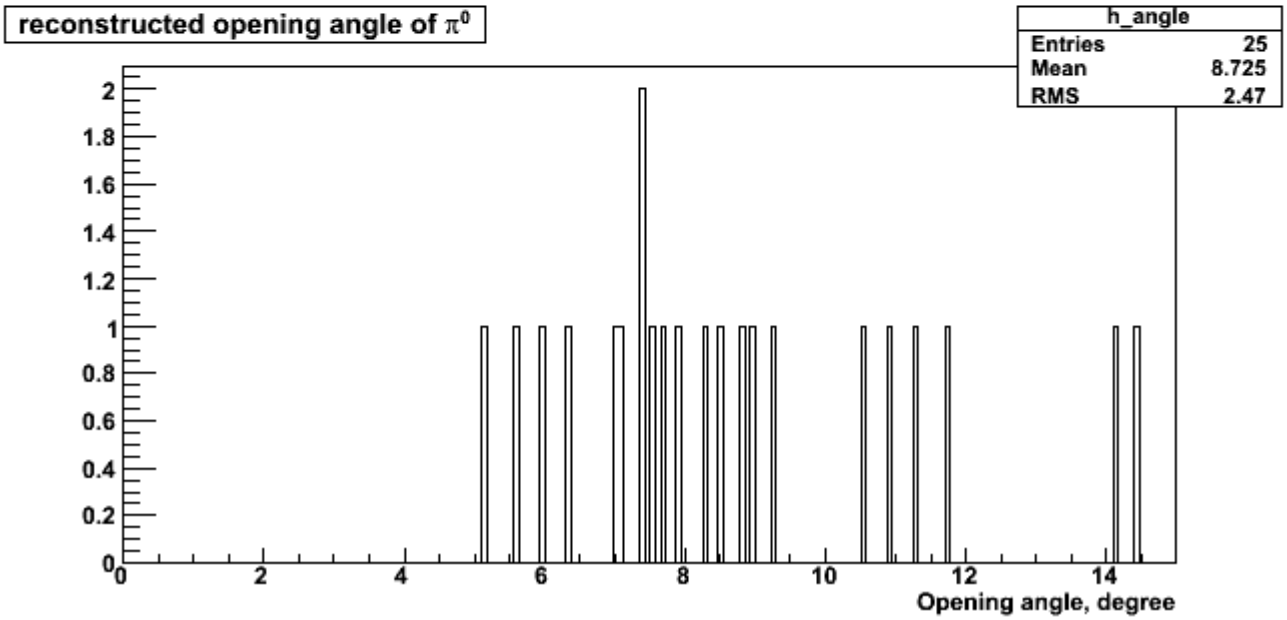
2) egamma_bump.png, downloaded 1952 times



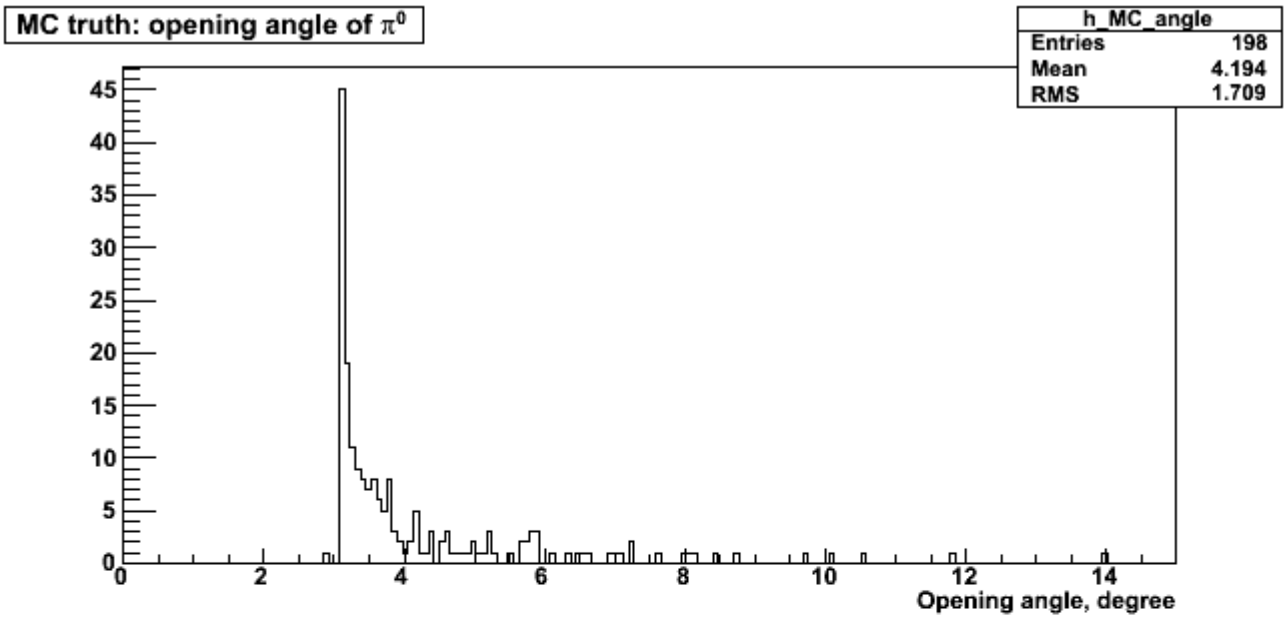


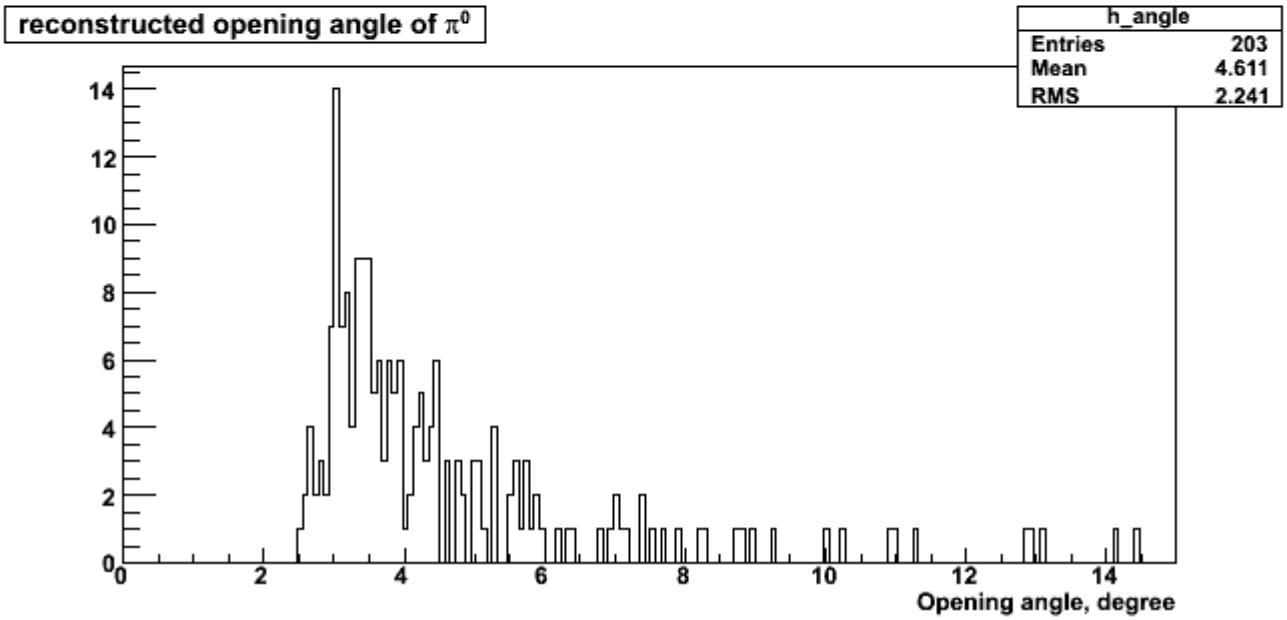
3) pi0_angle_cluster.png, downloaded 1971 times



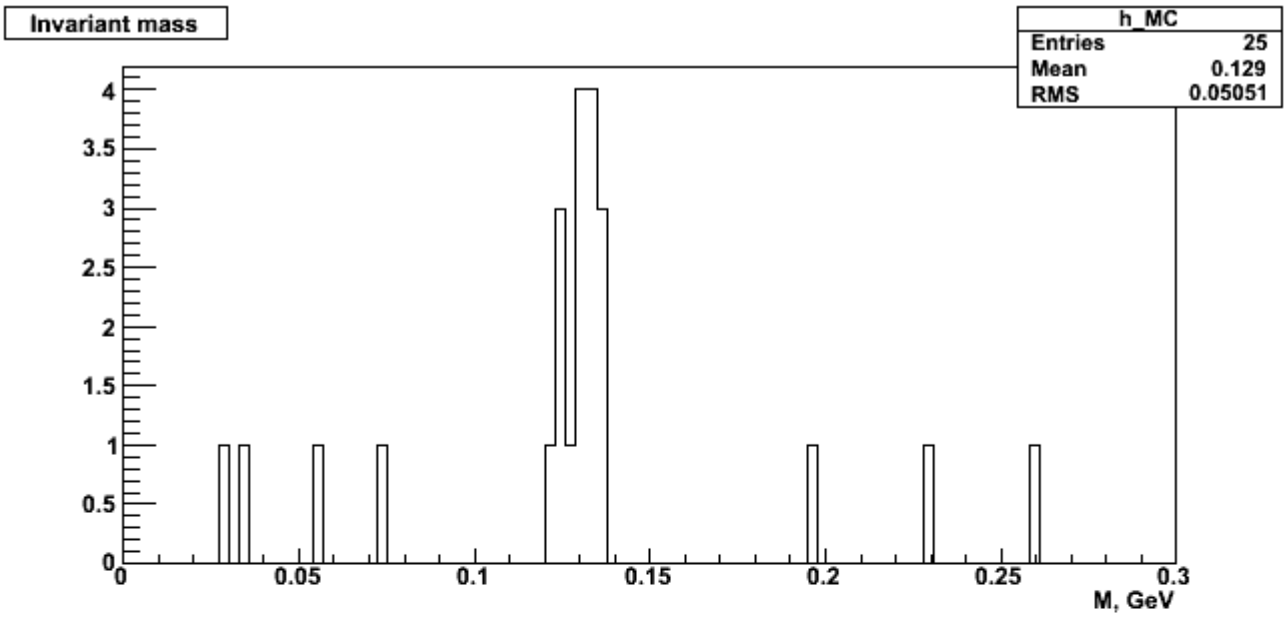


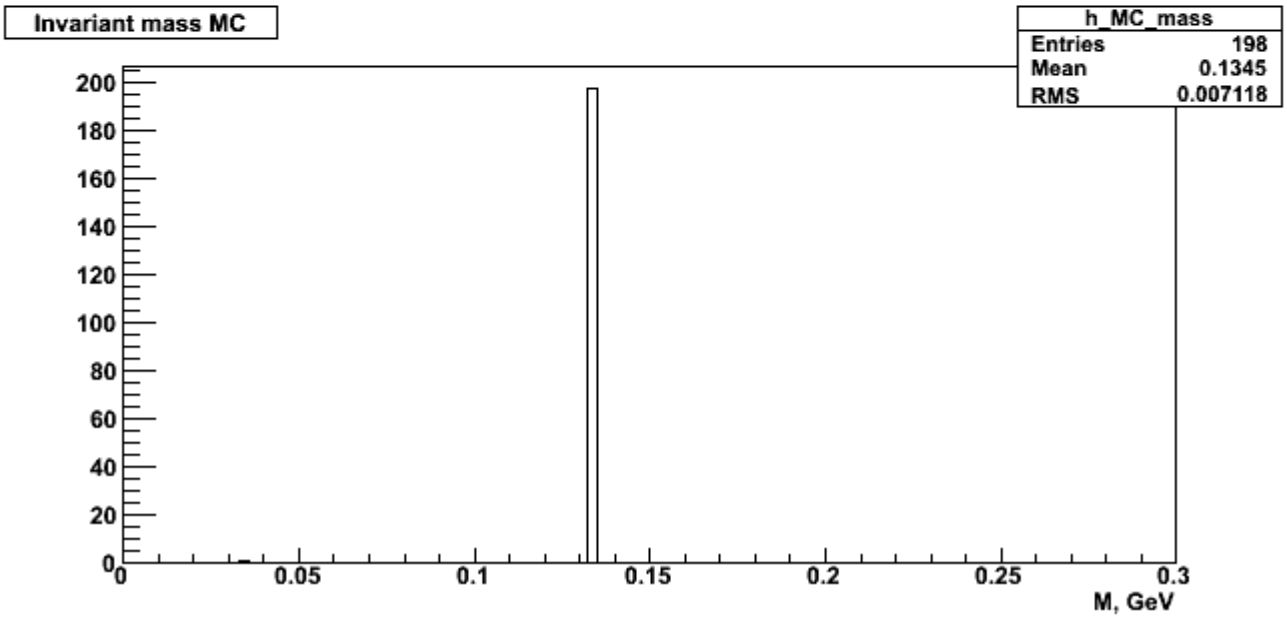
4) pi0_angle_bump.png, downloaded 1866 times



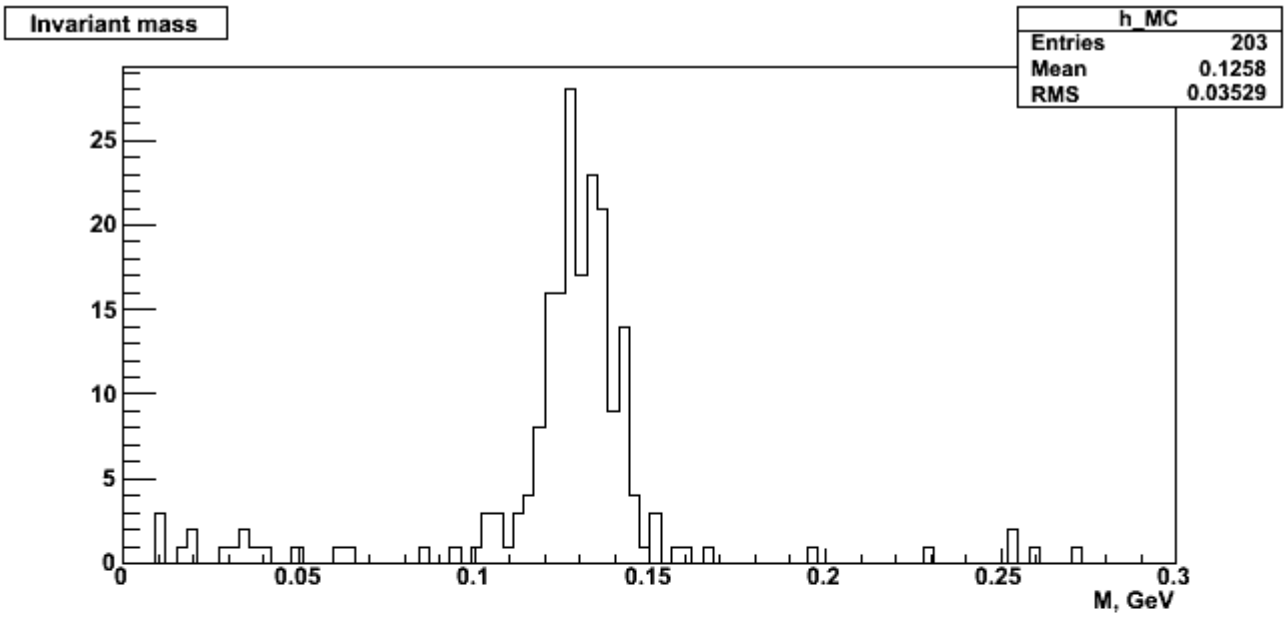


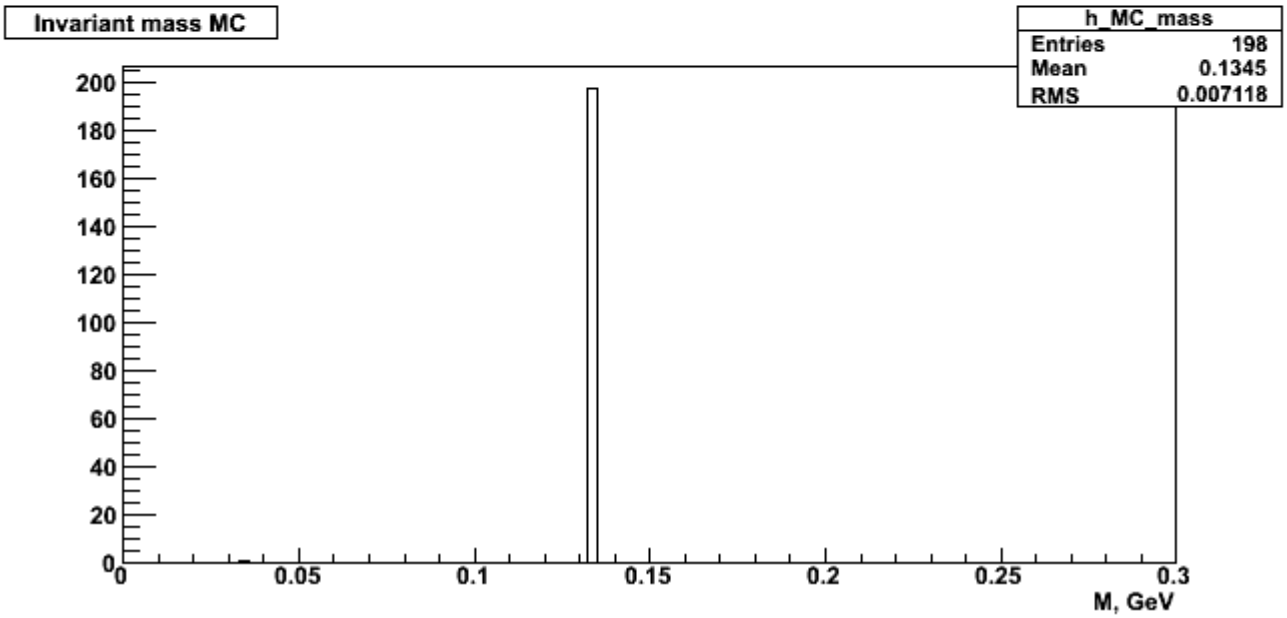
5) m_pi0_cluster.png, downloaded 1942 times





6) m_pi0_bump.png, downloaded 1928 times





Subject: Re: correction in emc bump splitting
Posted by Bertram Kopf on Tue, 13 Jan 2009 14:54:24 GMT
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Hi Dima,

great! So my question to you and especially to Irina: Is it now possible to obtain reasonable results for the gamma gamma studies which should go to the Physics Book?

Best regards,
Bertram.

Subject: Re: correction in emc bump splitting
Posted by Johan Messchendorp on Tue, 13 Jan 2009 22:16:05 GMT
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Dear all,

I am re-running the analysis part of the simulations for the gamma gamma studies at the KVI.... with the latest revision. This should not take too long, since I am only re-running a part of the simulation.

Johan.

Subject: Re: correction in emc bump splitting
Posted by Irina Brodski on Fri, 06 Feb 2009 11:58:59 GMT
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Dear all,

this correction improved the bump splitting for pi0-events, but i still have a problem with gamma gamma events and there is still a factor of 2-5 for the background above 3 GeV to suppress.
Here a little macro to explain.

Please please run it with:
root -l "Fehlersuche.C(\"gammagamma.root\",7.5298)"
root -l "Fehlersuche.C(\"pi0pi0.root\",7.5298)"

Many single gamma-clusters in the shashlyk are split in two.
Maybe someone can help me?
Thank you,
Irina

File Attachments
1) pi0pi0.root, downloaded 645 times
2) gammagamma.root, downloaded 640 times
3) Fehlersuche.C, downloaded 582 times

Subject: Re: correction in emc bump splitting
Posted by Dima Melnychuk on Fri, 06 Feb 2009 12:46:26 GMT
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Hi Irina,

Small correction to your post. From the data file gammagamma.root it looks like that some single gamma clusters are split into 2 bumps not in shashlyk but in forward endcap (slightly above 2 meters in Z direction) and there is no single event with clusters in shashlyk.

And it looks like that problem is related with what Bertram posted

http://forum.gsi.de/index.php?t=rview&goto=7833#msg_7833

I tried to solve it but still without success.

Dima

Subject: Re: correction in emc bump splitting
Posted by Bertram Kopf on Fri, 06 Feb 2009 14:05:51 GMT
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Hi Irina and Dima,
just one additional remark:

Dima Melnychuk wrote on Fri, 06 February 2009 13:46Hi Small correction to your post. From the data file gammagamma.root it looks like that some single gamma clusters are split into 2 bumps not in shashlyk but in forward endcap (slightly above 2 meters in Z direction) and there is no single event with clusters in shashlyk.

And it looks like that problem is related with what Bertram posted
http://forum.gsi.de/index.php?t=rview&goto=7833#msg_7833

Due to the fact that only events with |cos(Theta*)|<0.6 are considered, the shashlyk detector doesn't contribute at all. The reconstructed gamma hists either the barrel calorimeter or the forward endcap. The backward endcap is also important in order to see low energetic gammas originated from the pi0 background.

Best regards,
Bertram.

Subject: Re: correction in emc bump splitting
Posted by Irina Brodski on Fri, 13 Feb 2009 21:33:34 GMT
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Yes, Bertram is right. I mean the detektor part on a position of >200. This should be the endcup

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Subject: Re: correction in emc bump splitting
Posted by Johan Messchendorp on Thu, 19 Feb 2009 20:48:46 GMT
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Hi,

I started a new series of simulations with the older forward endcap design, as we discussed this afternoon. The jobs are in the queue. For Irina, the results will appear at kvip81 (once the jobs start running, though) at the location:

/daq/panda/simgg_feb09/....

Kind wishes,

Johan.