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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  $\pi^0$ , we need not only energies of the bumps but also opening angle of  $\pi^0$ . And the bug in the calculation of bump position resulted in wrong opening angle and as a result in low efficiency of the merged  $\pi^0$  suppression.

The pictures below gives some demonstration of the bump splitting for 200 event, 5 GeV  $\pi^0$  generated in [30;60] degree theta range.

The following picture presents the MC Truth energy of gamma's from  $\pi^0$  decay and reconstructed energy of EmcClusters.

The same for EmcBumps

i.e. the energy distribution is reproduced.

The opening angle of  $\pi^0$  for MC Truth and EmcClusters

And reconstructed opening angle for EmcBumps

And finally  $\pi^0$  invariant mass for EmcClusters

and EmcBumps

i.e. without bump splitting only 10 % of  $\pi^0$  are reconstructed.

All the pictures are plotted with bump\_analysis.C macro.

Best regards,  
Dima

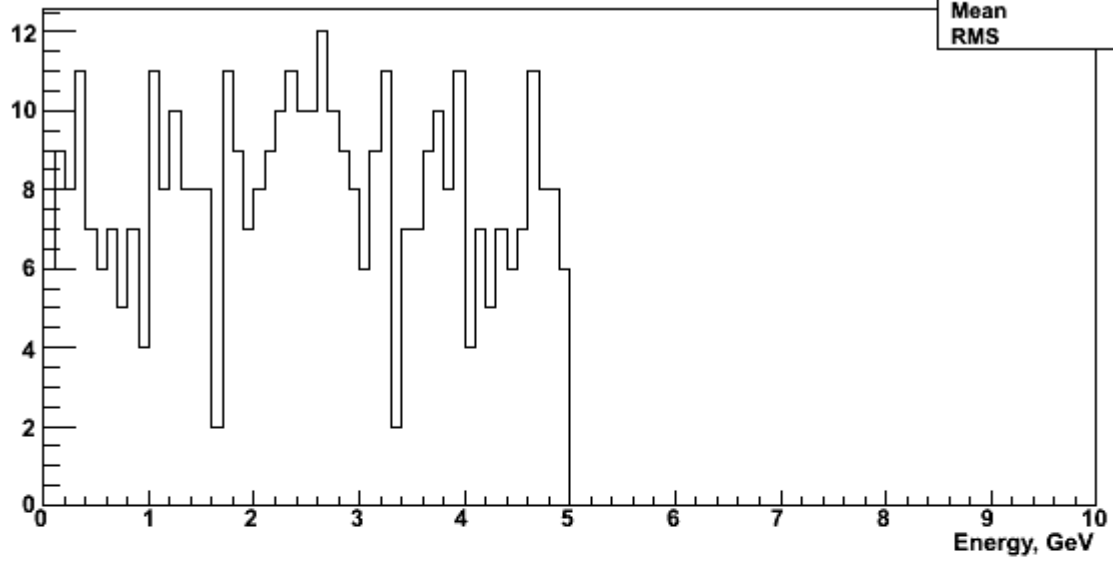
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## File Attachments

1) [egamma\\_cluster.png](#), downloaded 863 times

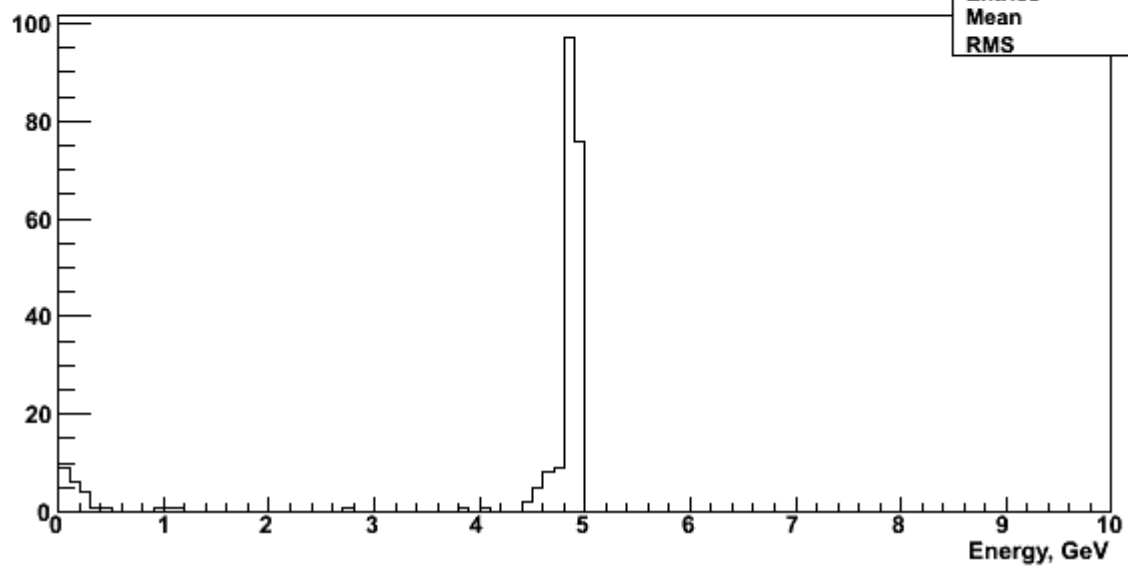
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Energy of  $\gamma$ 's (MC truth)



h_egamma	
Entries	398
Mean	2.491
RMS	1.402

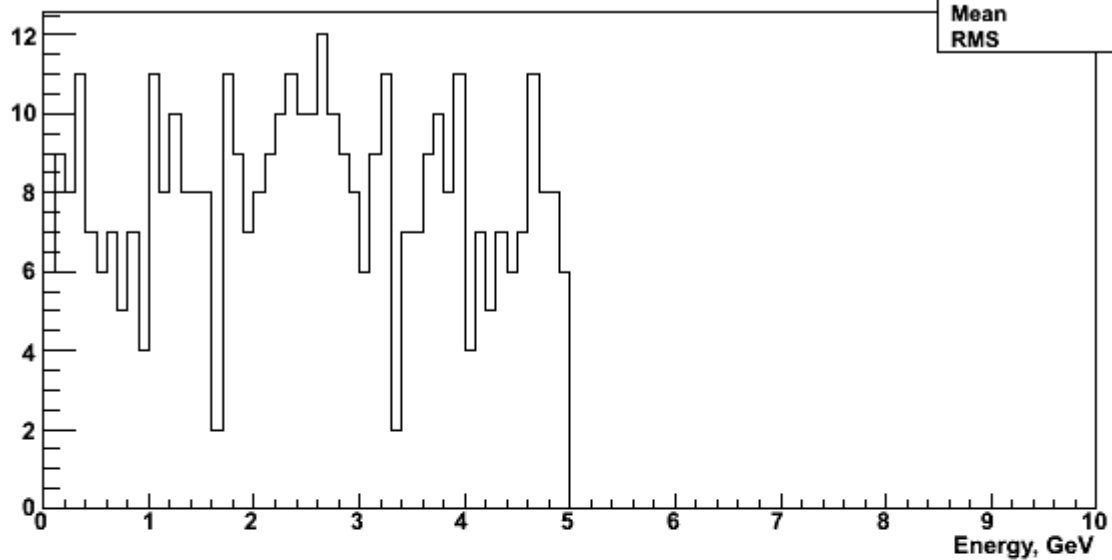
Energy of clusters



h_ebump	
Entries	224
Mean	4.353
RMS	1.436

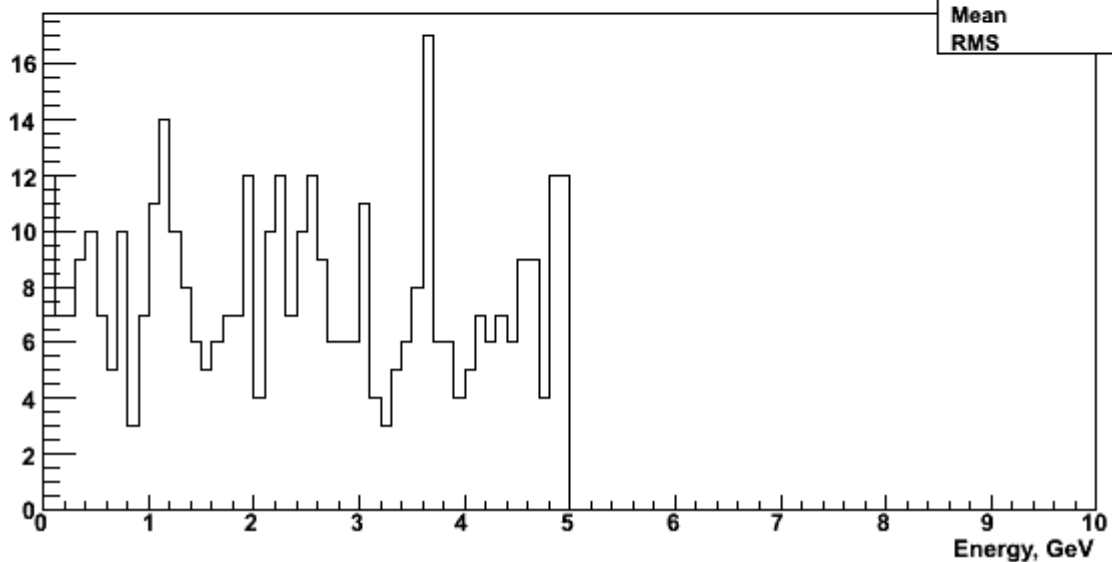
2) [egamma\\_bump.png](#), downloaded 856 times

Energy of  $\gamma$ 's (MC truth)



h_egamma	
Entries	398
Mean	2.491
RMS	1.402

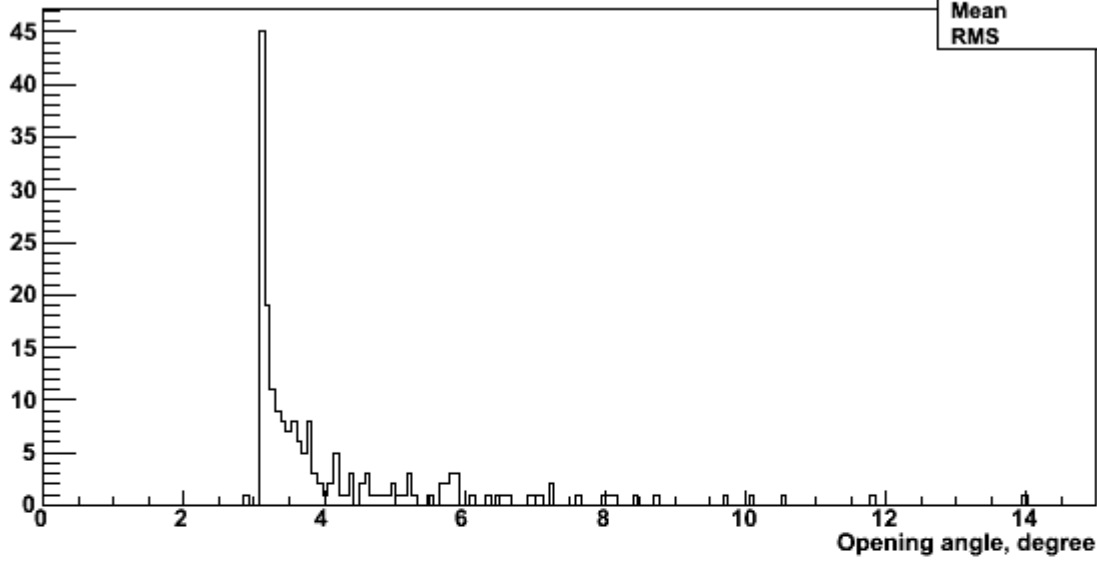
Energy of bumps



h_ebump	
Entries	392
Mean	2.448
RMS	1.467

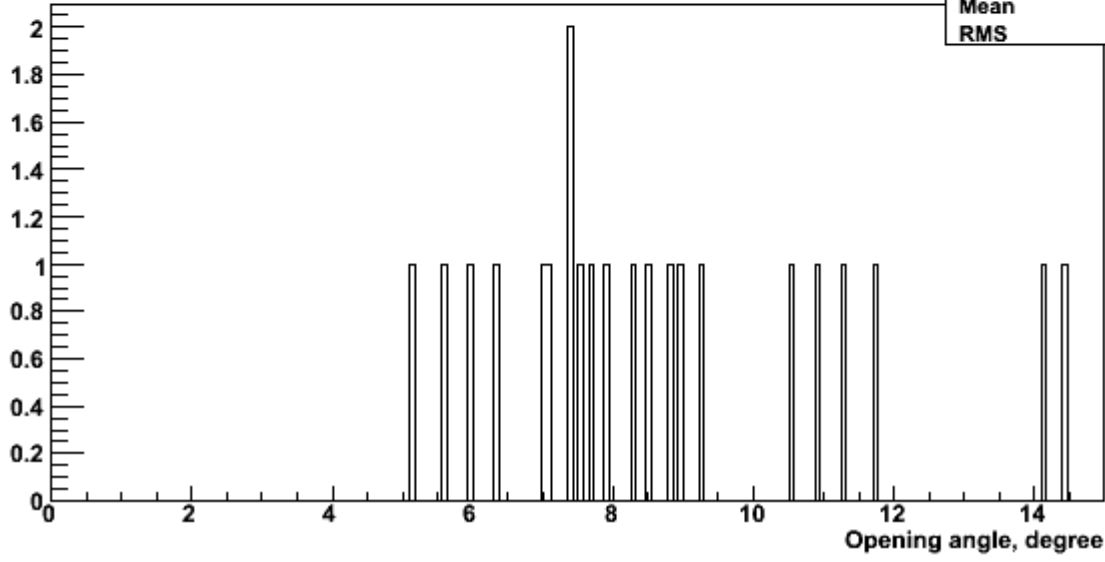
3) [pi0\\_angle\\_cluster.png](#), downloaded 845 times

MC truth: opening angle of  $\pi^0$



h_MC_angle	
Entries	198
Mean	4.194
RMS	1.709

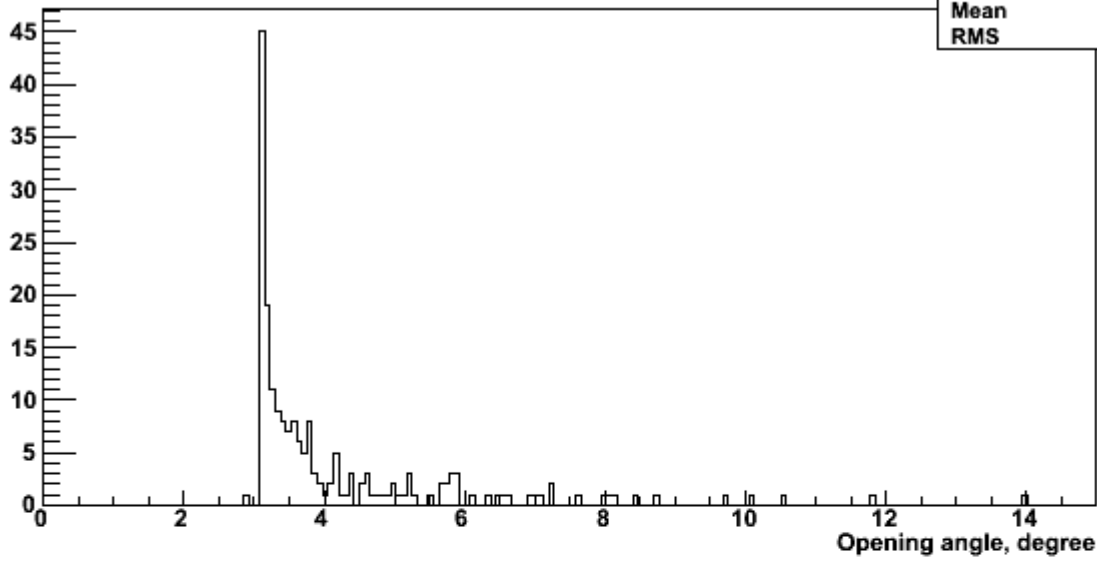
reconstructed opening angle of  $\pi^0$



h_angle	
Entries	25
Mean	8.725
RMS	2.47

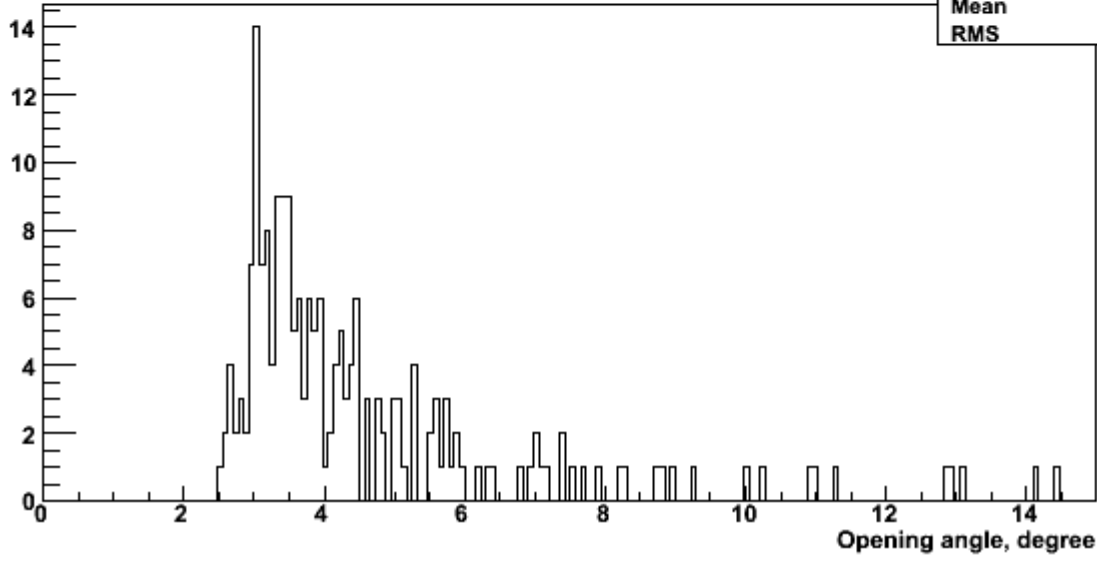
4) [pi0\\_angle\\_bump.png](#), downloaded 783 times

MC truth: opening angle of  $\pi^0$



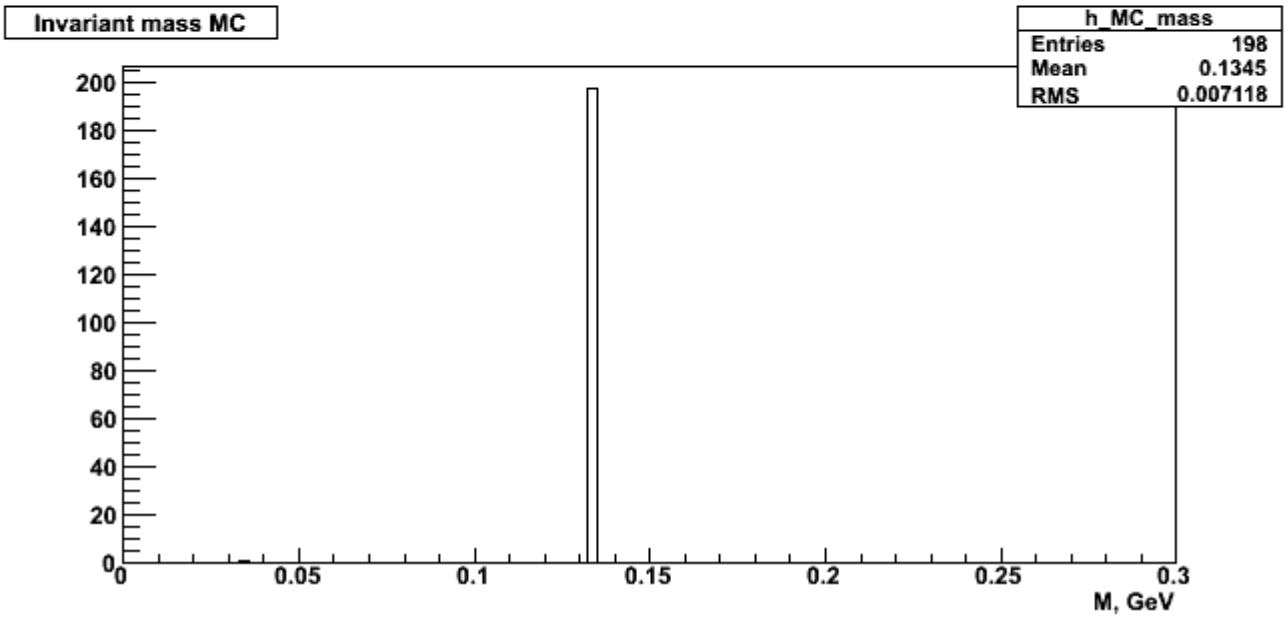
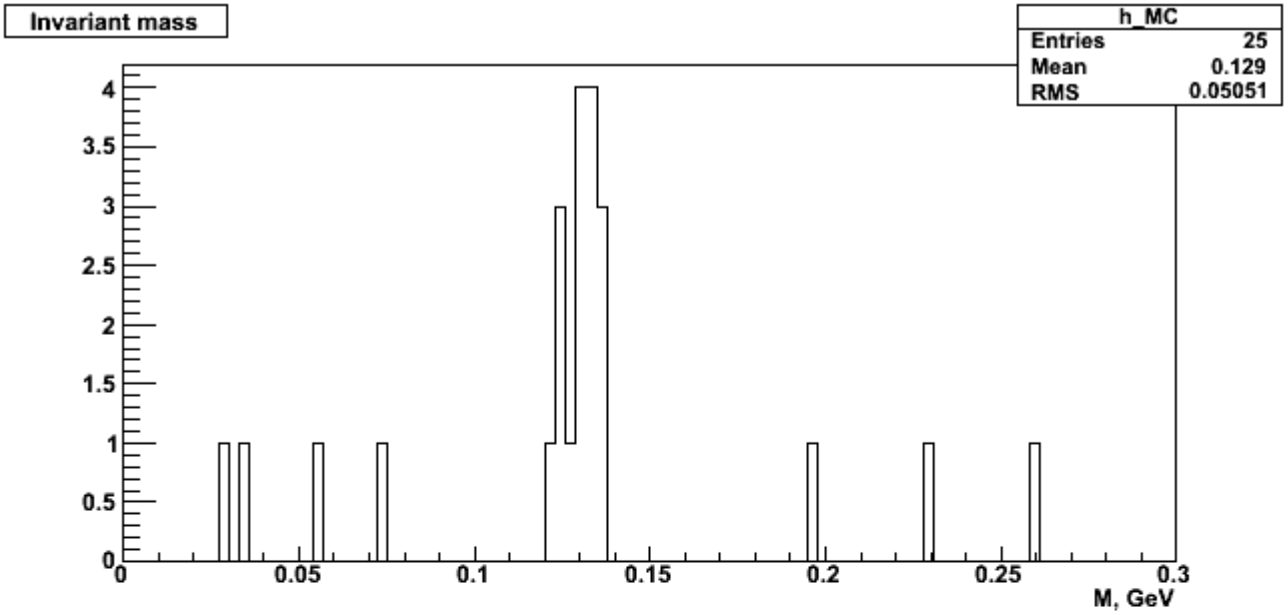
h_MC_angle	
Entries	198
Mean	4.194
RMS	1.709

reconstructed opening angle of  $\pi^0$



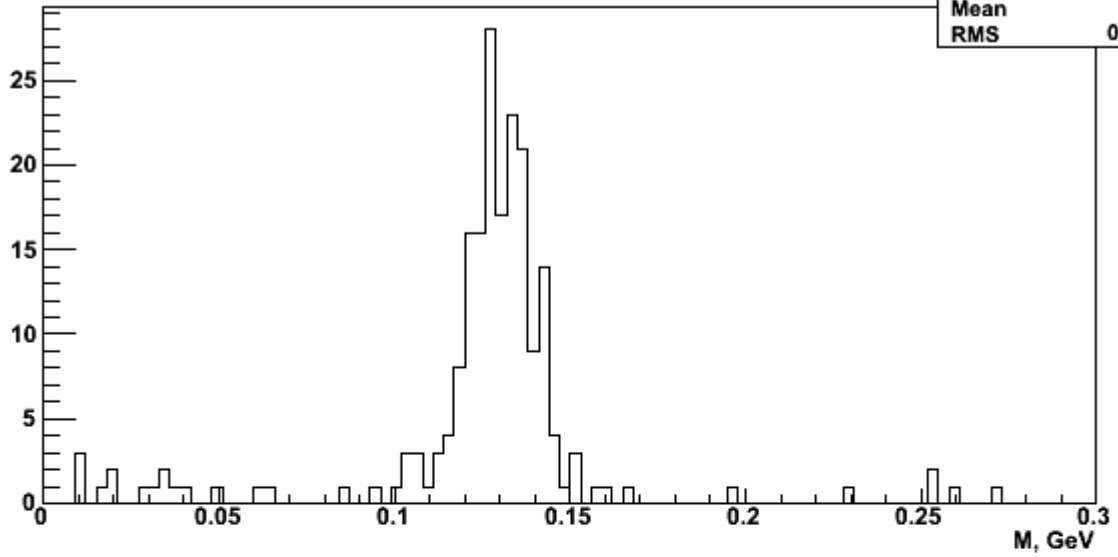
h_angle	
Entries	203
Mean	4.611
RMS	2.241

5) [m\\_pi0\\_cluster.png](#), downloaded 897 times



6) [m\\_pi0\\_bump.png](#), downloaded 885 times

Invariant mass



Invariant mass MC

