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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 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.

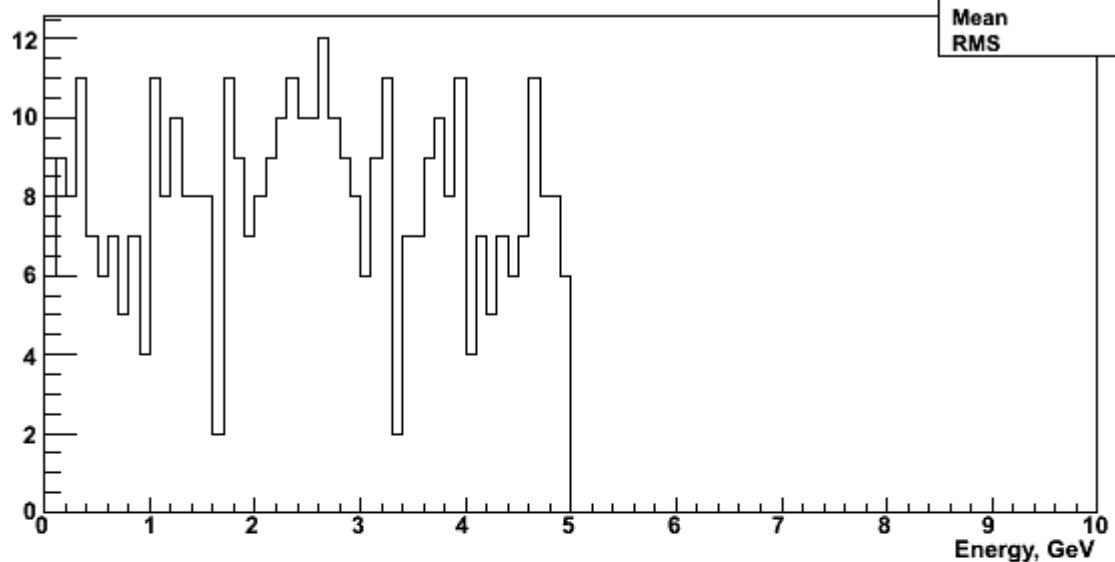
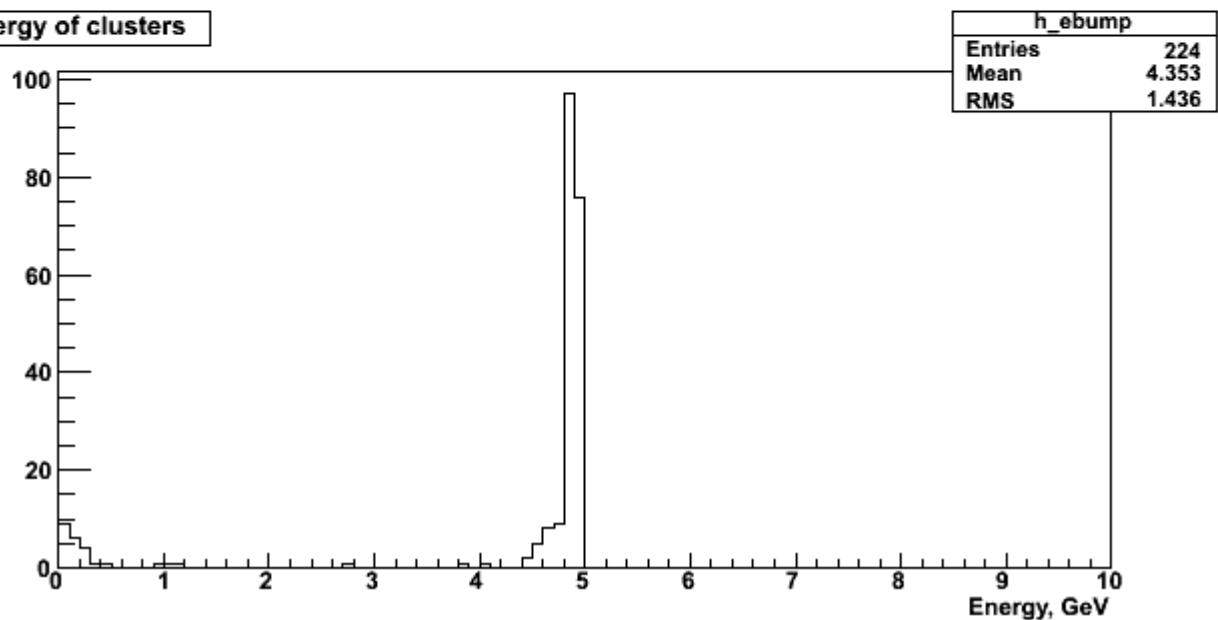
Best regards,  
Dima

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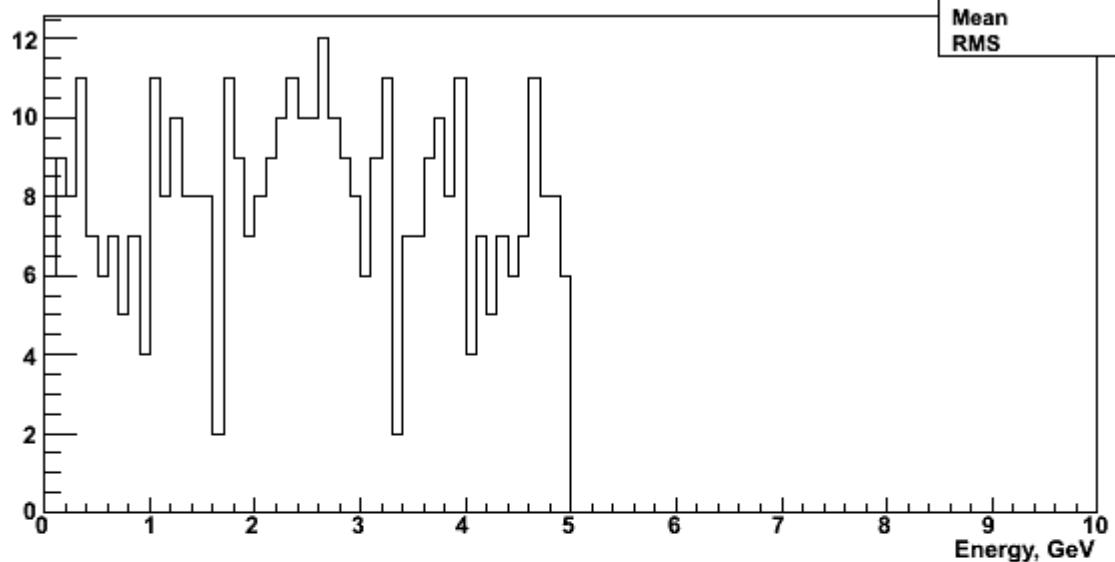
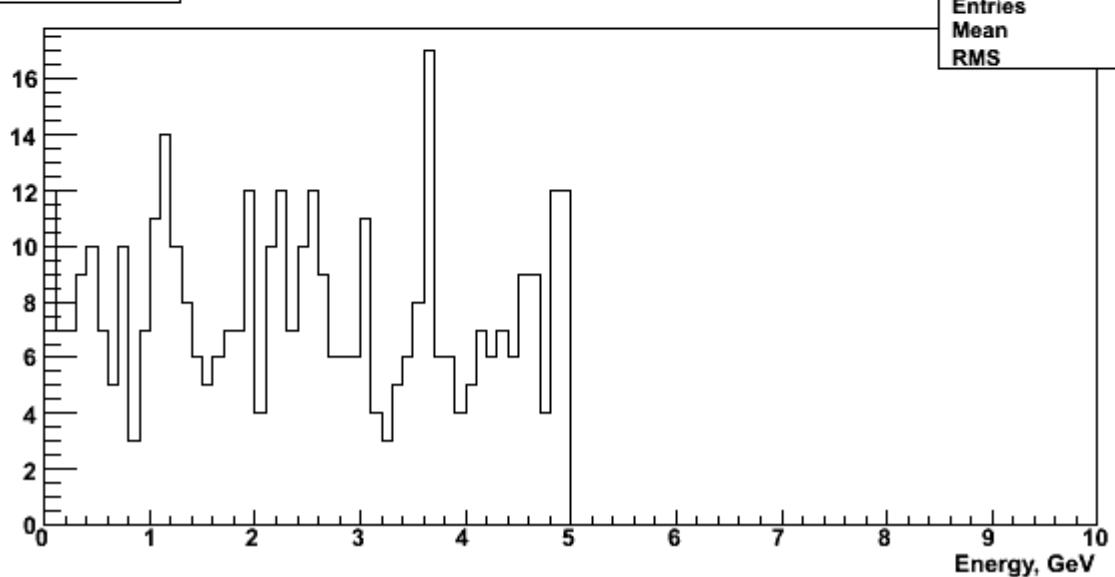
#### File Attachments

- 1) [egamma\\_cluster.png](#), downloaded 1539 times

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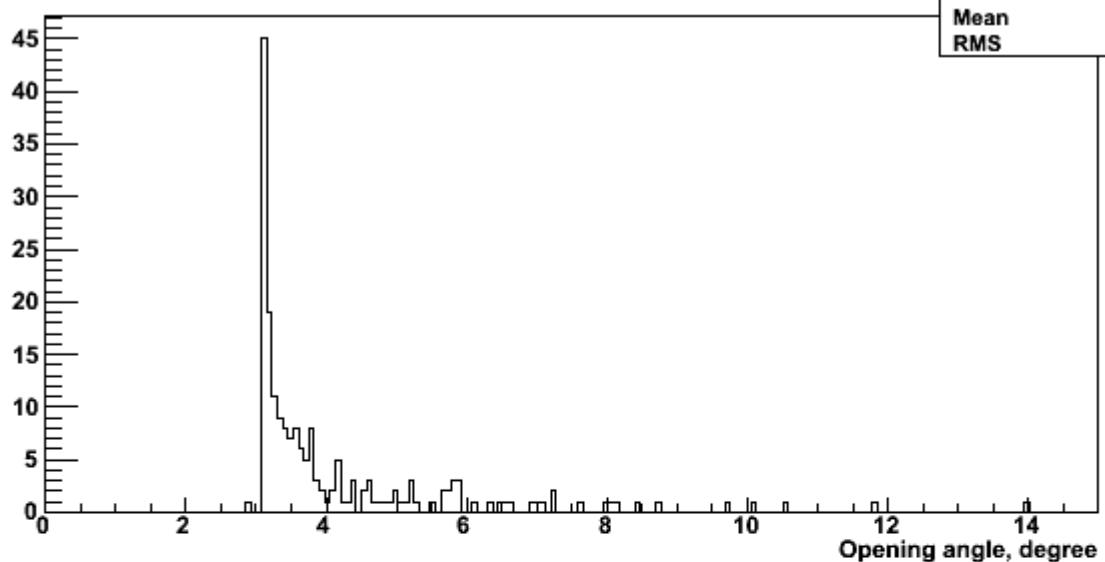
**Energy of  $\gamma$ 's (MC truth)****Energy of clusters**

2) [egamma\\_bump.png](#), downloaded 1538 times

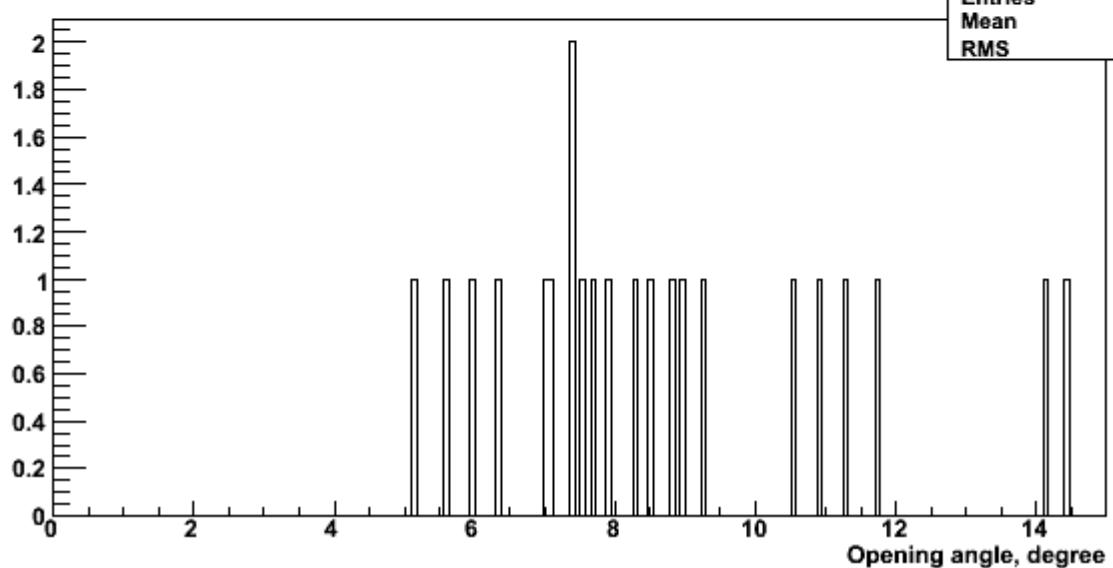
**Energy of  $\gamma$ 's (MC truth)****Energy of bumps**

3) [pi0\\_angle\\_cluster.png](#), downloaded 1527 times

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

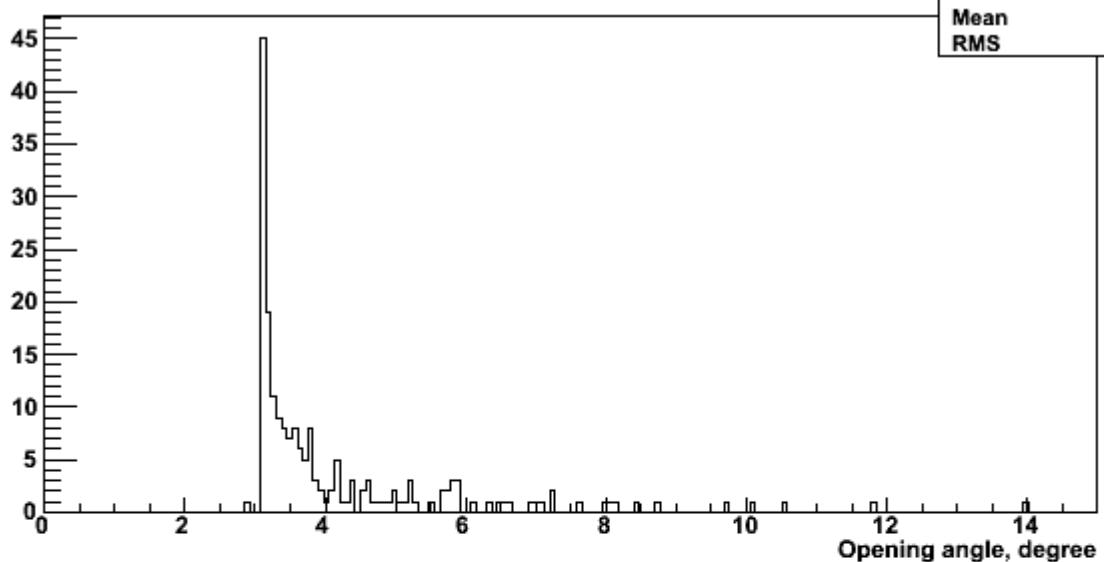


reconstructed opening angle of  $\pi^0$



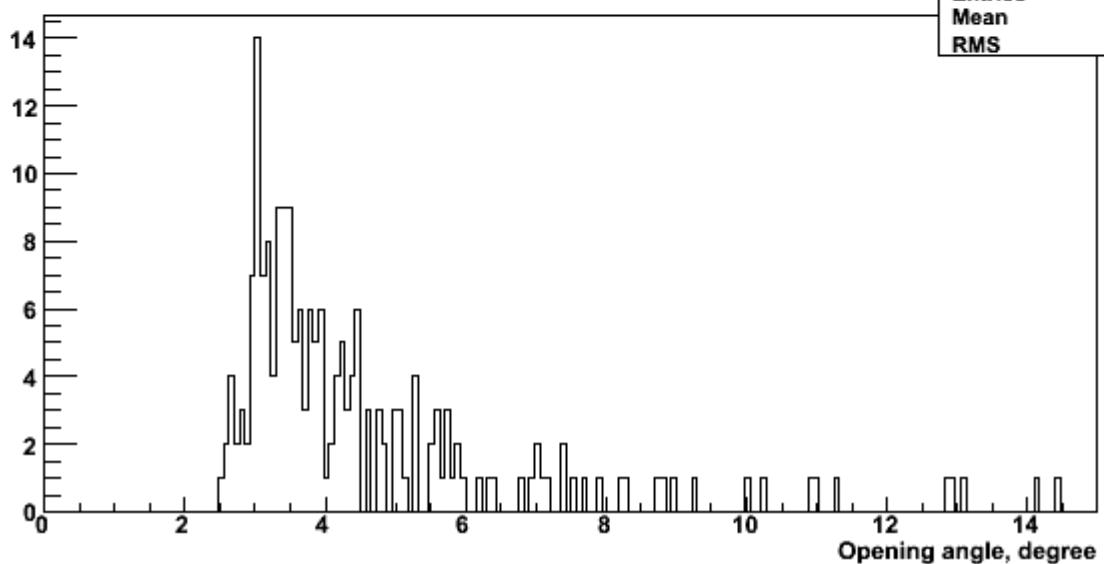
4) [pi0\\_angle\\_bump.png](#), downloaded 1465 times

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



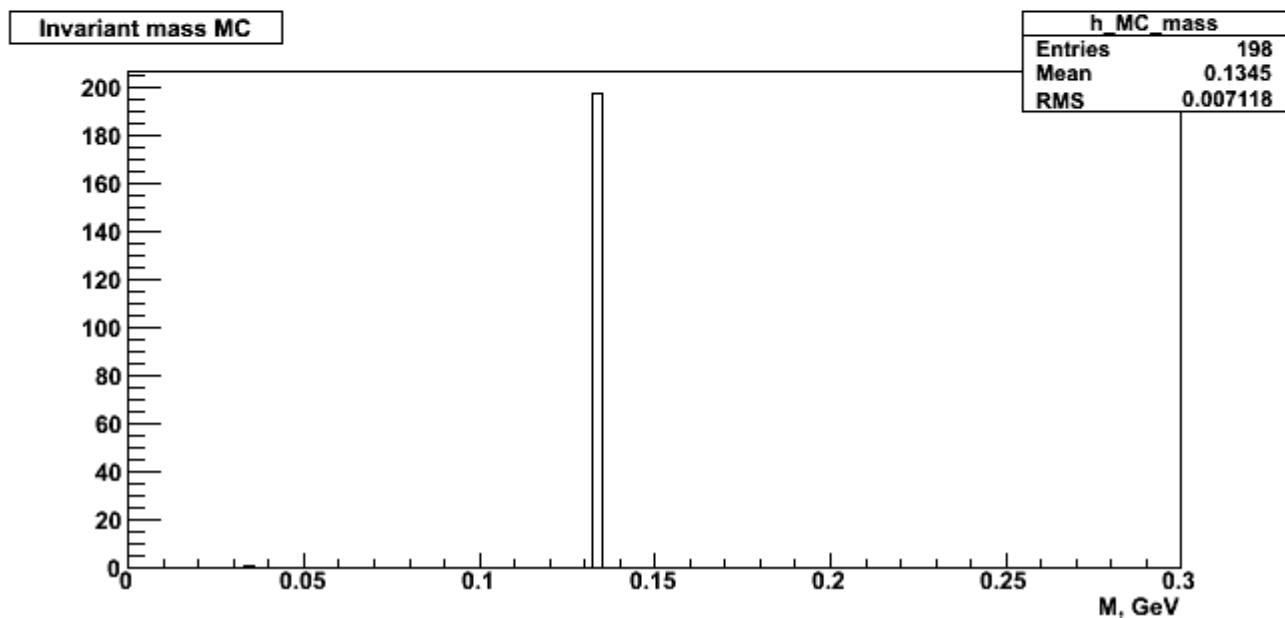
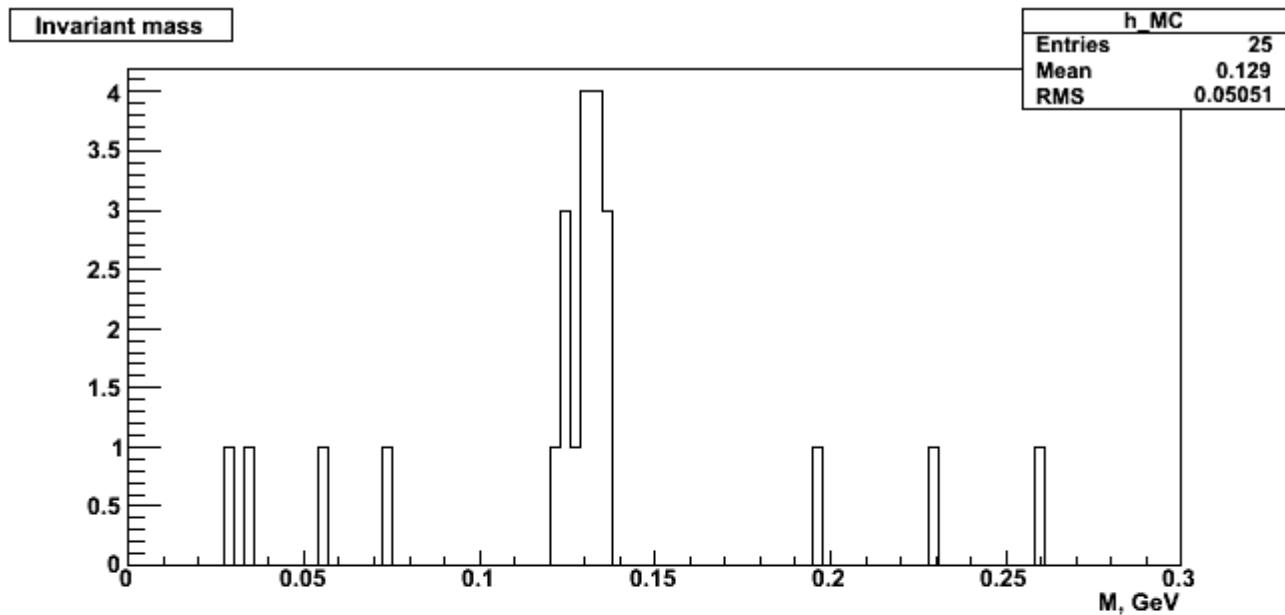
| h_MC_angle |       |
|------------|-------|
| Entries    | 198   |
| Mean       | 4.194 |
| RMS        | 1.709 |

reconstructed opening angle of  $\pi^0$

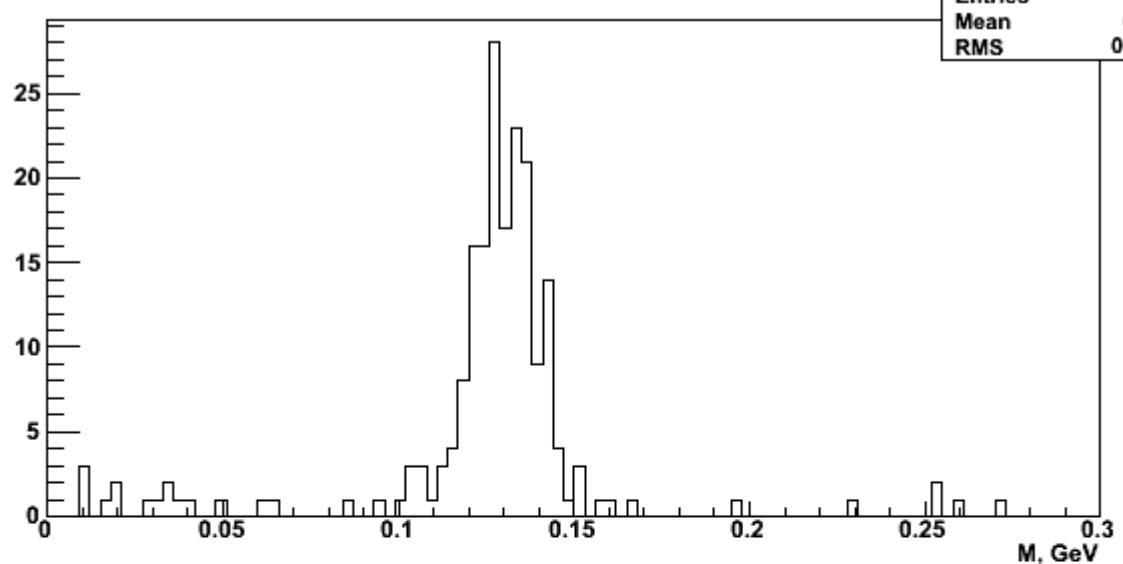


| h_angle |       |
|---------|-------|
| Entries | 203   |
| Mean    | 4.611 |
| RMS     | 2.241 |

5) [m\\_pi0\\_cluster.png](#), downloaded 1578 times



6) [m\\_pi0\\_bump.png](#), downloaded 1548 times

**Invariant mass****Invariant mass MC**