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Subject: Try with no PID

Posted by [Alexandros](#) on Wed, 27 Sep 2017 07:48:17 GMT

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Hi,

This will be a long message.

I am trying to run simulation and analysis for the channel  $p\bar{p} \rightarrow D^0 \bar{D}^0 \rightarrow K^- \pi^+ K^+ \pi^-$

I want to run this with no PID at all.

I am running this, and without using PID, I fill my list with 4 candidates (minus1, plus1, minus2, plus2) since I have 4 charged tracks.

I use the "KaonAllMinus", "PionAllPlus", "KaonAllPlus", "PionAllMinus" for my 4 candidates.

Now the problem I have is the following: I am running 35000 events with EvtGen. The possible combinations for the  $D^0$  without PID should be:  $K^- \pi^+$  (the correct one) and  $K^+ \pi^-$  (the wrong one). There must not be other combinations since in the plot attached (Firstplot) you will see that there is a cut on the reconstructed mass at the limit of one pion and one kaon, thus no  $\pi^- \pi^+$  and subsequently  $K^- K^+$  are tried. In this way, I should get around 70000 (2 times the  $K \pi$  combinations)  $D^0$  mesons. What I get is 140000 events. So there is a double counting somewhere.

Now, I have also tried the same with "AllMinus", "AllPlus", "AllPlus", "AllMinus" for the minus1, plus1, plus2, minus2 candidates. There I would expect to have 4 times the combinations since besides the  $K^- \pi^+$  and the  $K^+ \pi^-$  now I also have  $\pi^- \pi^+$  and  $K^- K^+$ . I can see that since the lower limit now is at the two pion masses and the number of reconstructed  $D^0$  is  $4 \times 35000$  events. (Secondplot)

I have attached both plots and my analysis macro too.

Do you have any idea whether there is something wrong or whether I am doing something wrong?

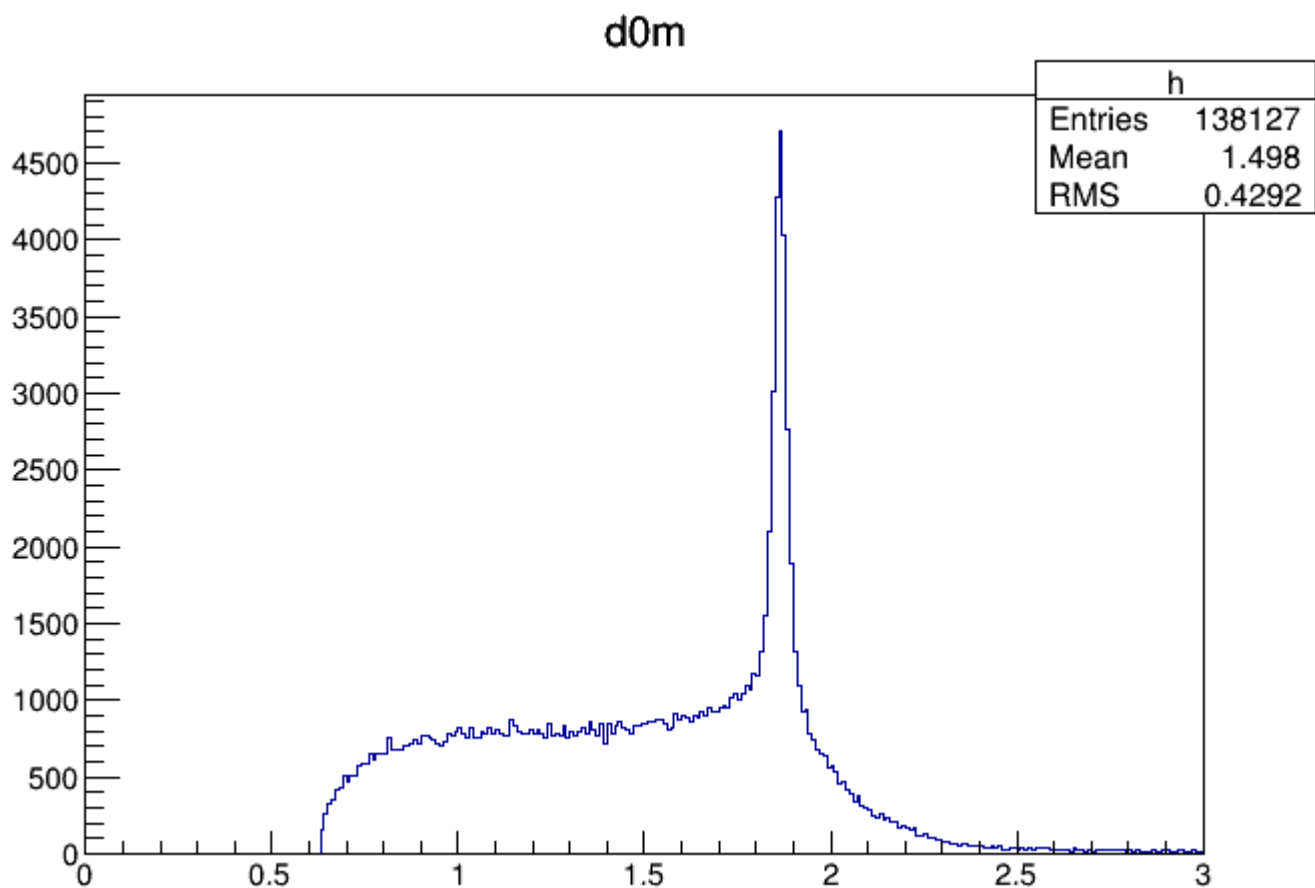
Thank you in advance.

Alex

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### File Attachments

- 1) [d0d0bar\\_analysis\\_last.C](#), downloaded 492 times
- 2) [Firstplot.png](#), downloaded 888 times



3) [Secondplot.png](#), downloaded 827 times

