Subject: eta_c reconstruction efficiency
Posted by Dima Melnychuk on Thu, 06 Oct 2011 10:01:38 GMT
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Hi,

I tried to localize the source of the problem with eta_c reconstruction efficiency and compared simulation with trunk version of pandaroot and then replaced only PndSttMvdTracking.cxx, PndSttMvdTracking.h to the version corresponding to july11 release, i.e PndSttMvdTracking.cxx (rev.12530) PndSttMvdTracking.h (rev. 12558).

Running simulation with 3000 events with trunk version I have efficiency 14.1%.

Mass distributions without any cuts:

and final plot after vertex fit

For the version with replaced PndSttMvdTracking efficiency is 26.2%
and mass distributions without any cuts:

and final mass plots after vertex fit:

Here the reconstruction efficiency is a factor 2 better.

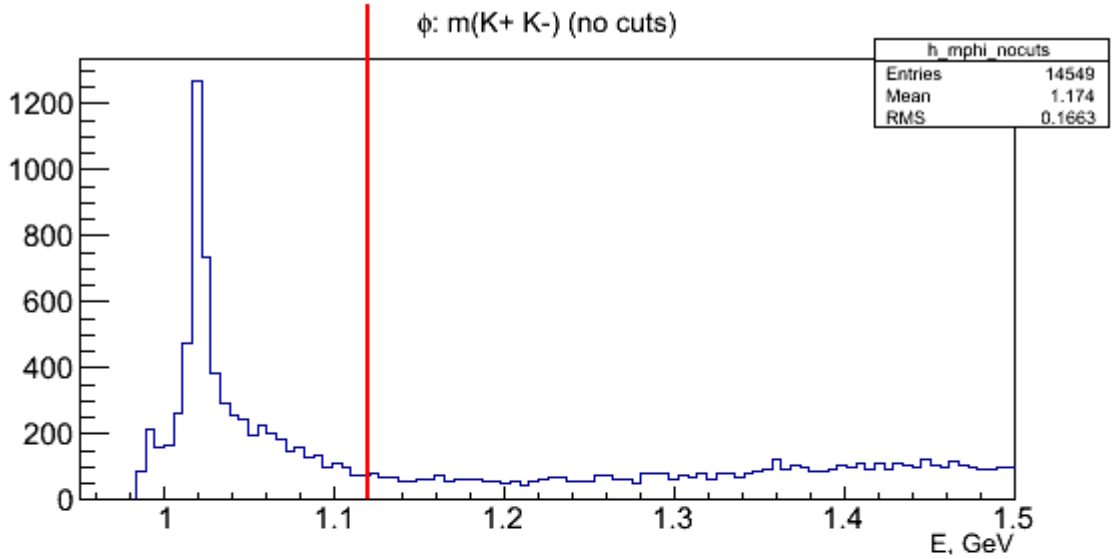
Reconstructed events are the same for both cases. Final eta_c mass distribution has double peak structure but it appears for both cases and I suppose it's a question of statistics.

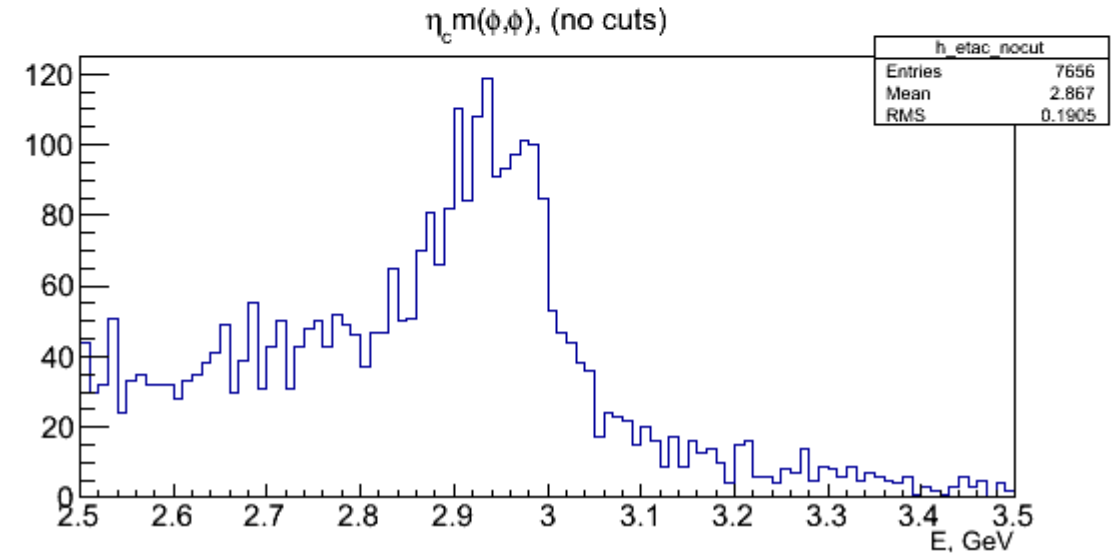
So as a conclusion the hole problem is related to PndSttMvdTracking class only. I will try to localize the problem further but the code is too big and I suppose that Gianluigi will be better at it than me.

Dima

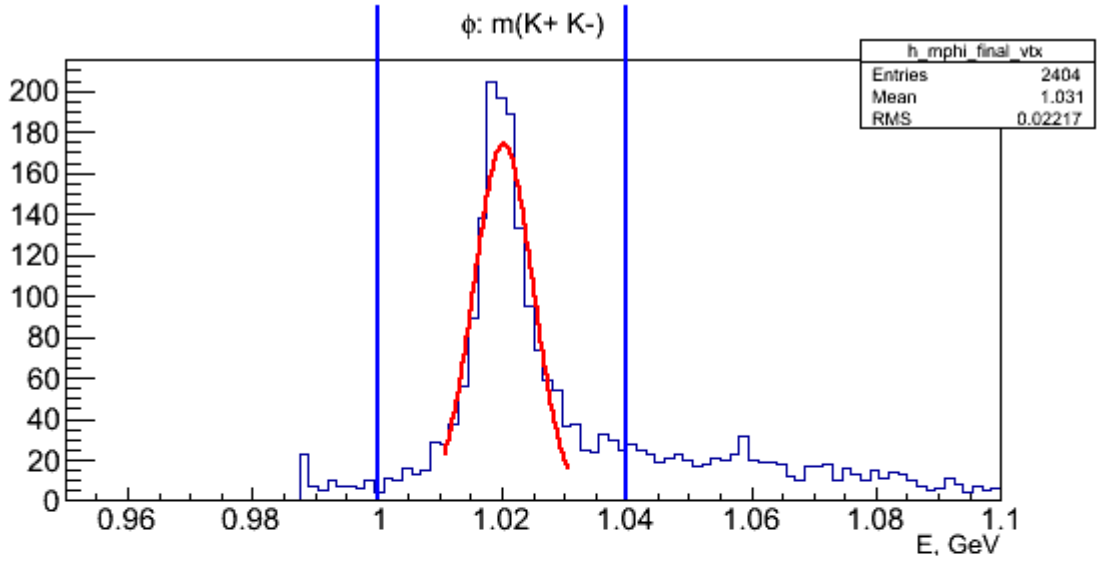
File Attachments

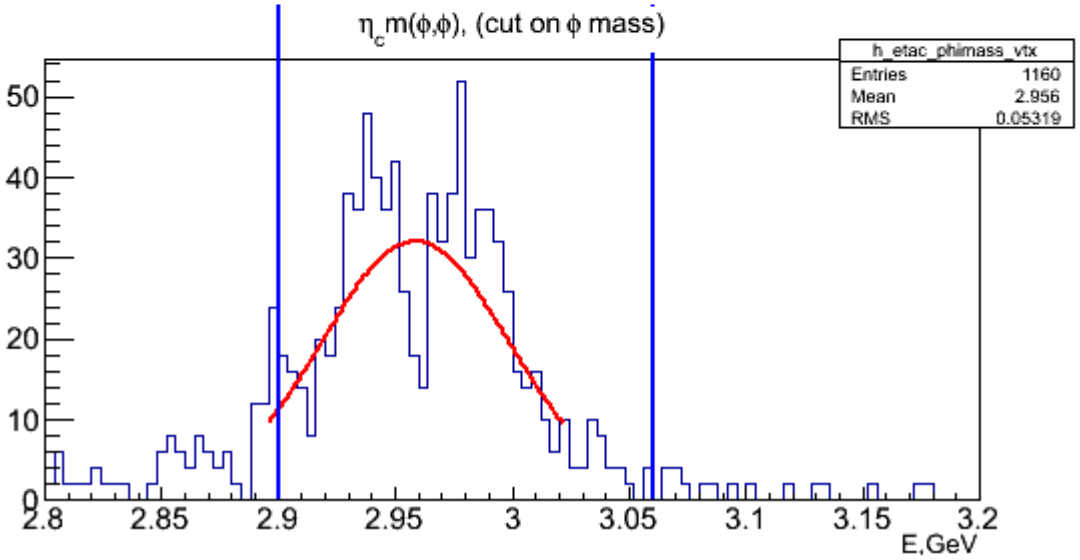
1) mass_nocuts_trunk.png, downloaded 796 times



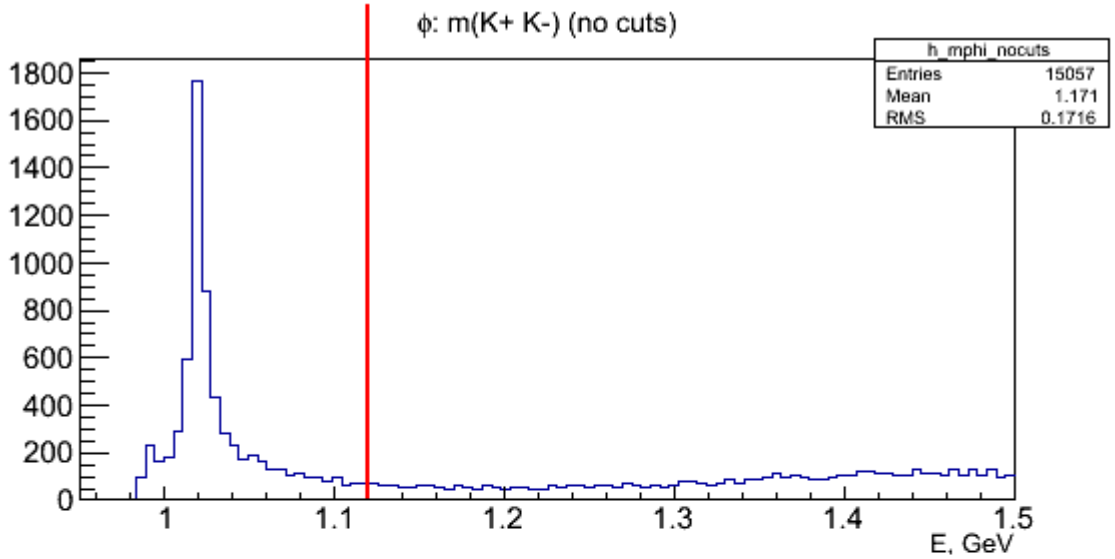


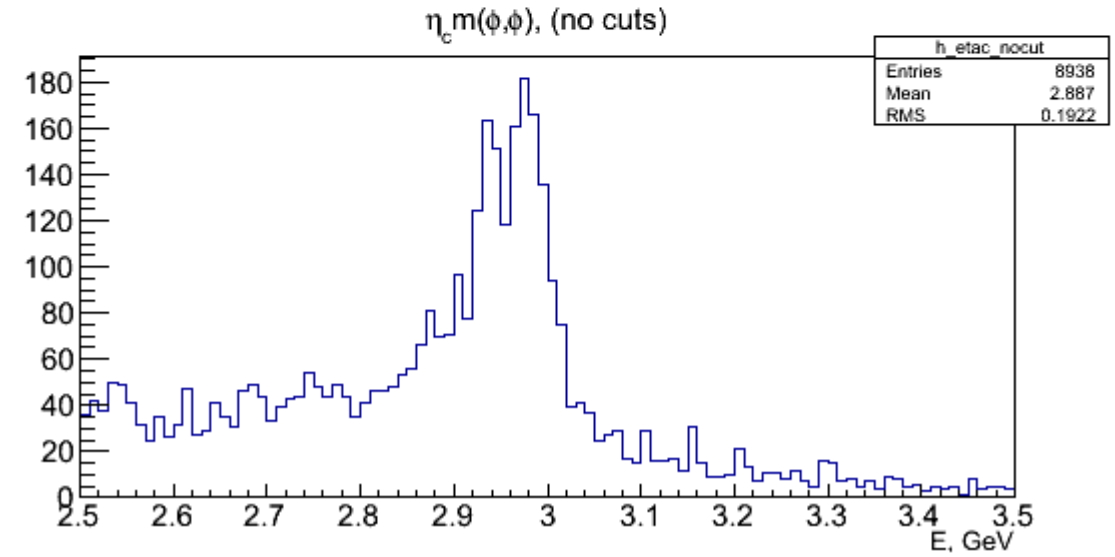
2) mass_final_trunk.png, downloaded 826 times



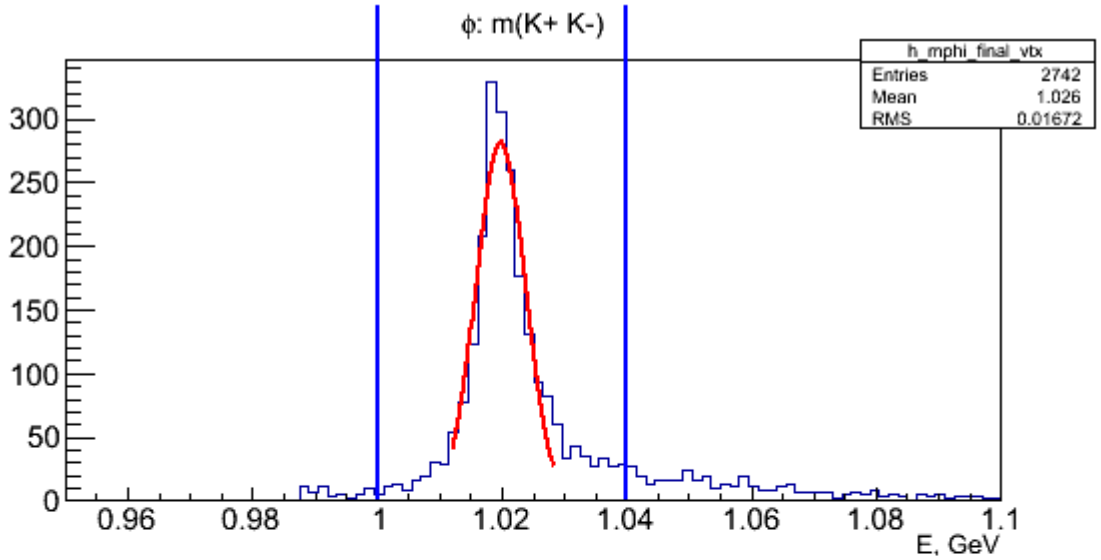


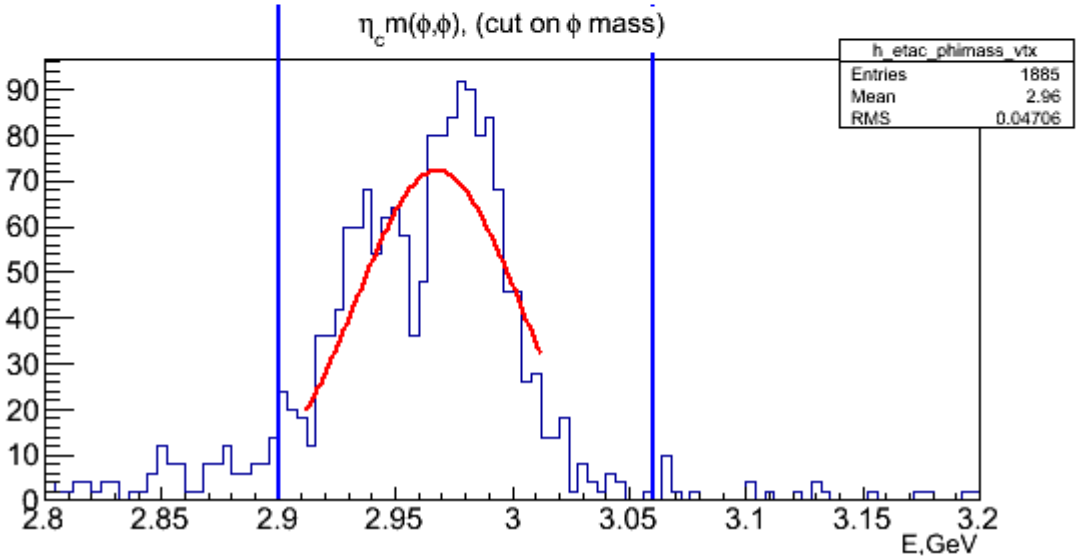
3) mass_nocuts_july11.png, downloaded 838 times





4) mass_final_july11.png, downloaded 851 times





Subject: Re: eta_c reconstruction efficiency
Posted by Lia Lavezzi on Fri, 07 Oct 2011 09:19:55 GMT
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Hi Dima,
I performed some test with the etac channel, both in july11 and aug11 releases.

I can confirm that the problem of the efficiency loss arises already after the reconstruction, so after the PR + Kalman step.

I attach here two files with the reco - MC momentum distributions for the primary tracks coming from etac: etacjul11.pdf and etacaug11.pdf. You can see that in aug11 there is the efficiency drop.

Unfortunately this was not visible with box generated muons @ 1 GeV/c (see boxgenjul11.pdf and boxgenaug11.pdf attached here).

So indeed the problem seems in the tracking part (I have to take back what I said at the last

tracking EVO)

Ciao,
Lia.

P.S.: forgot to mention: the purple number on the histos is the integral of the histo between the two dotted lines.

File Attachments

1) etacjul11.pdf, downloaded 327 times
2) etacaug11.pdf, downloaded 307 times
3) boxgenaug11.pdf, downloaded 302 times
4) boxgenjul11.pdf, downloaded 311 times

Subject: Re: eta_c reconstruction efficiency
Posted by Dima Melnychuk on Mon, 17 Oct 2011 15:24:34 GMT
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Hi,

Studying the problem with eta_c reconstruction efficiency I tried to look at (theta,p) distribution for the kaons that are not reconstructed with both july11, august11 release.
I generated 3000 events for both options.

Distribution for all kaons looks like:

I consider kaon as not reconstructed if there is no reconstructed track MC matched to it.

For july11 release:

For the trunk release:

Number of entries are smaller for the second case, which should partially explain the drop in efficiency.

And since the generated events are the same the difference between two histogram:

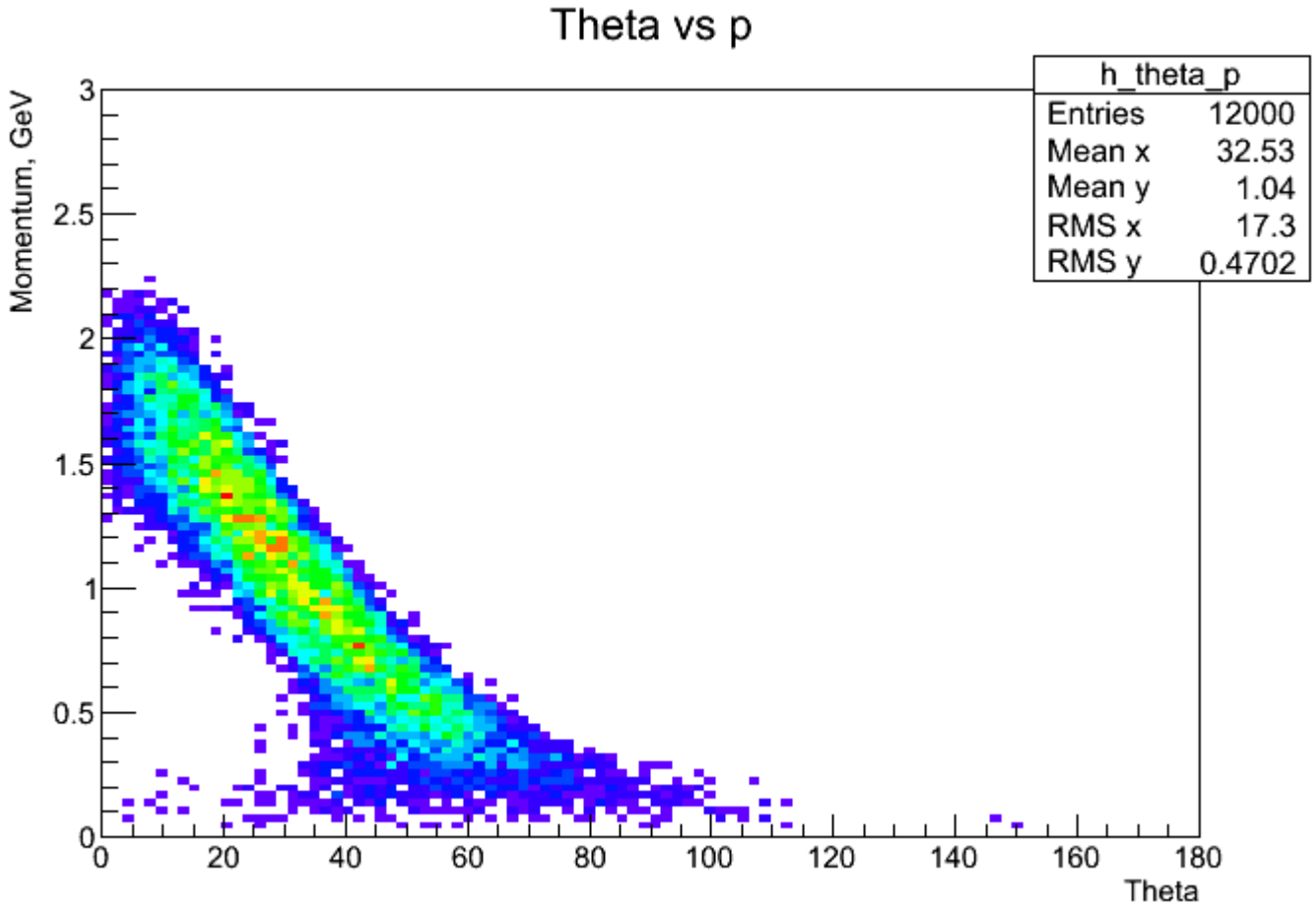
Here the kaons which were reconstructed in july11 release and are not reconstructed in trunk are green and blue. In principle they are distributed over all kinematic range with some concentration below 20 degree. And there is a number of tracks (red) which are recontructed in trunk and were not reconstructed in july11 and they a are in the lower momentum range.

May be it could be helpful somehow for Gianluigi to identify the source of the problem?

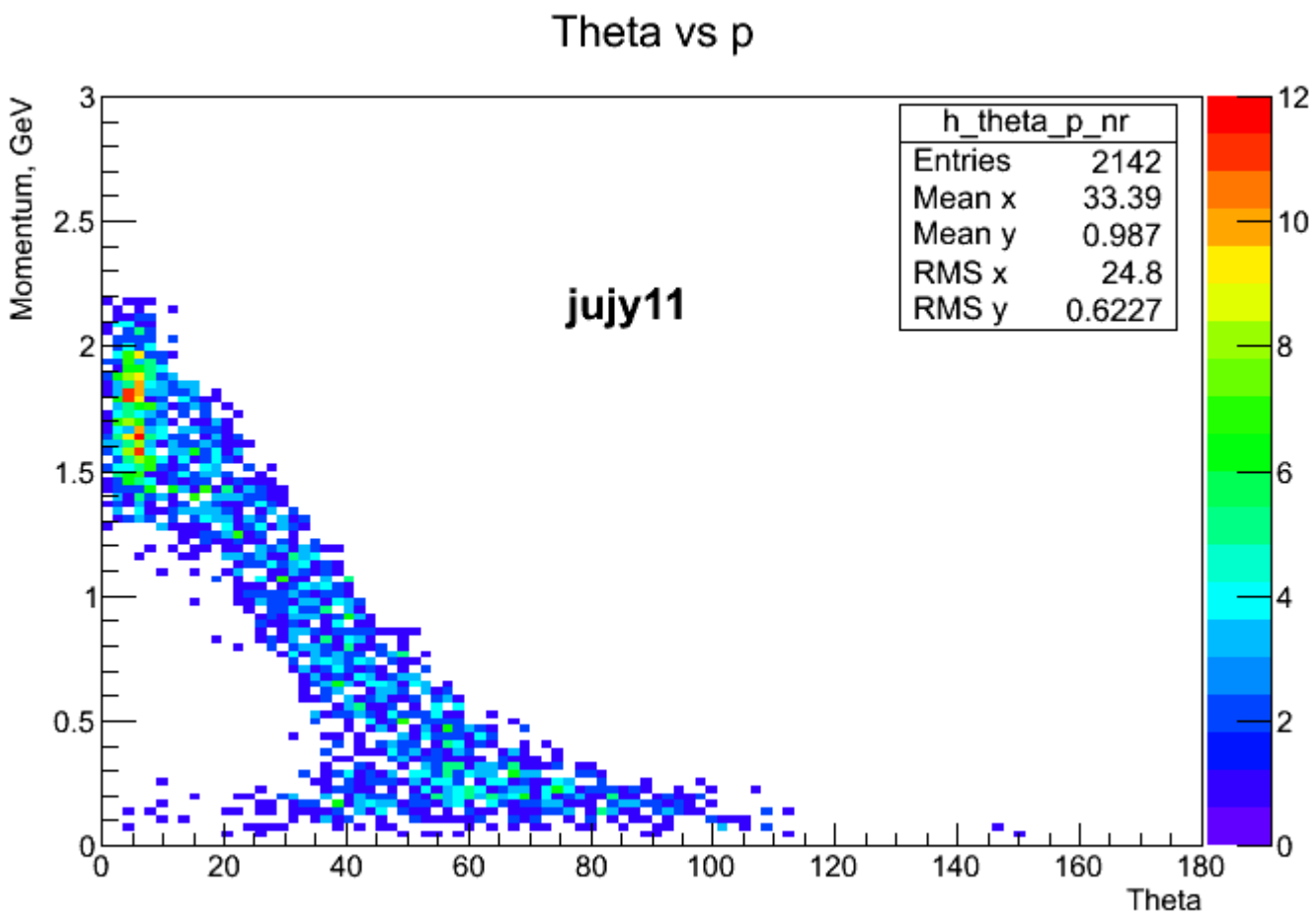
Dima

File Attachments

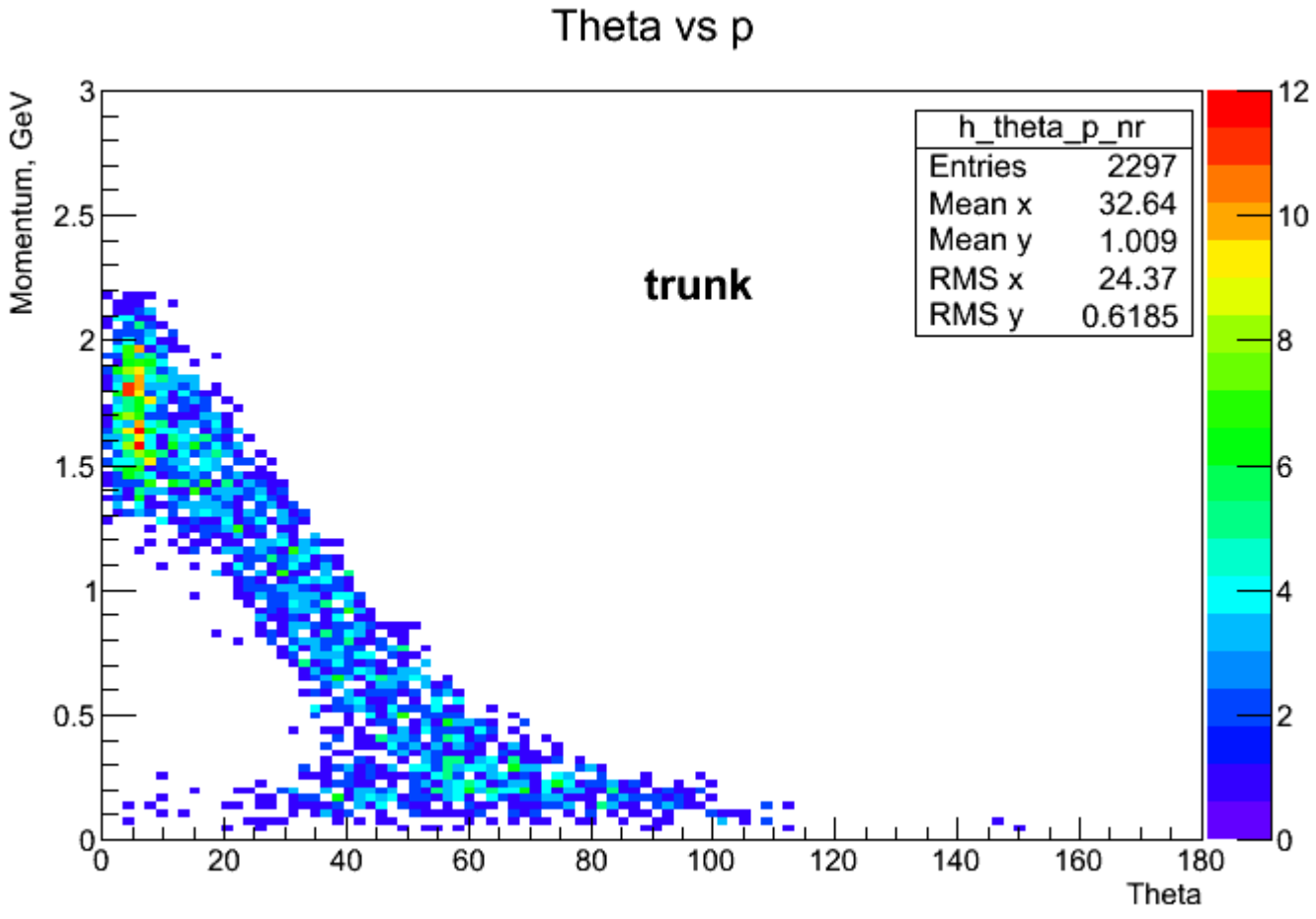
1) theta_p.png, downloaded 655 times



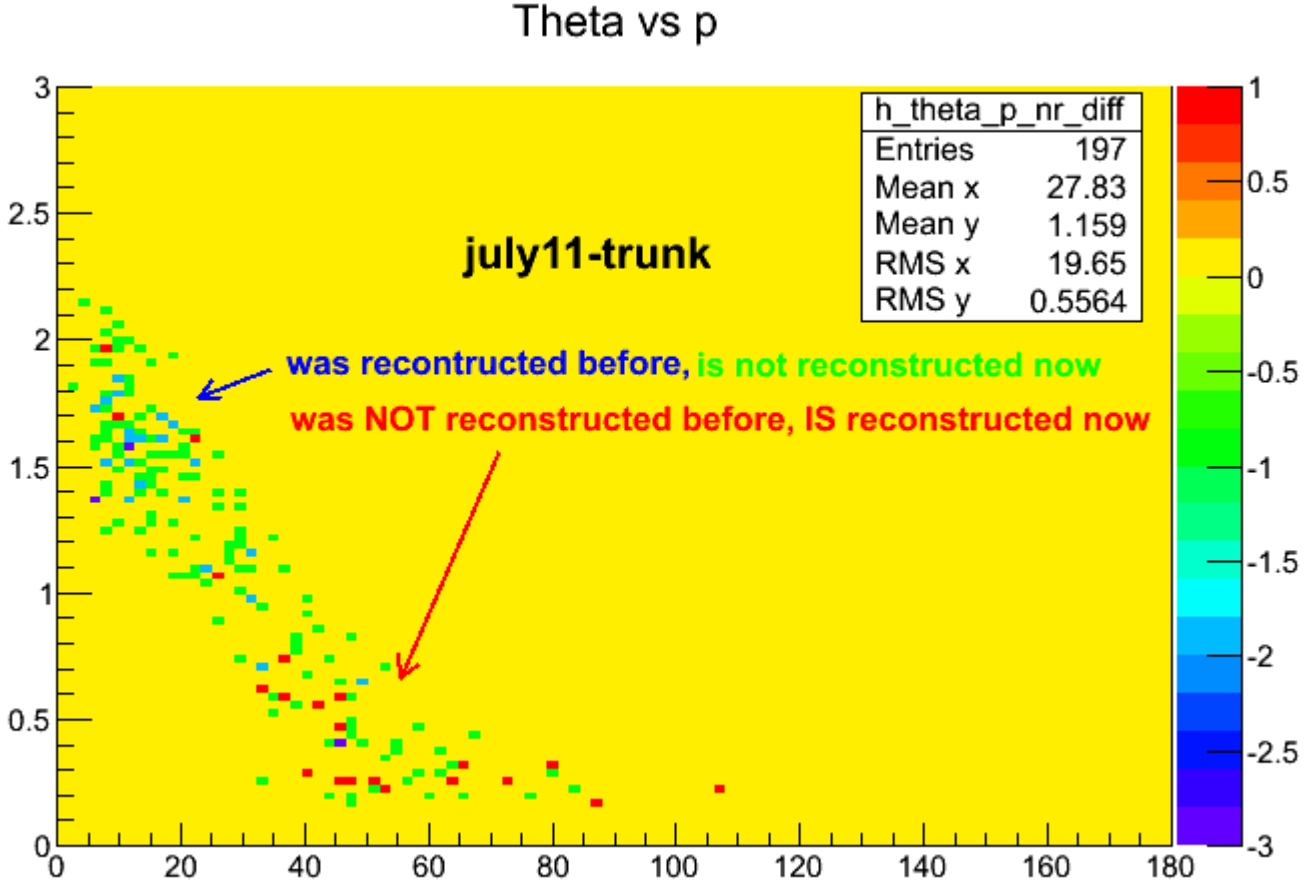
2) theta_p_july11.png, downloaded 660 times



3) theta_p_trunk.png, downloaded 657 times



4) theta_p_july_trunk.png, downloaded 663 times



Subject: Re: eta_c reconstruction efficiency
Posted by StefanoSpataro on Wed, 19 Oct 2011 16:07:05 GMT
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Dear all,
I have started also to investigate the problem of the eta_c efficiency loss.
For this I have run the simulation chain up to SttMvdTracking, w/o genfit, using the trnk PndSttMvdracking.* and comparing with the july11 version.
The followings are the invariant mass distributions for eta_c and phi, with trunk and july11:

You can see there are no differences.

After, I run the same but also genfit:

Here the difference is evident, even if the kalman code is exactly the same for the two options.

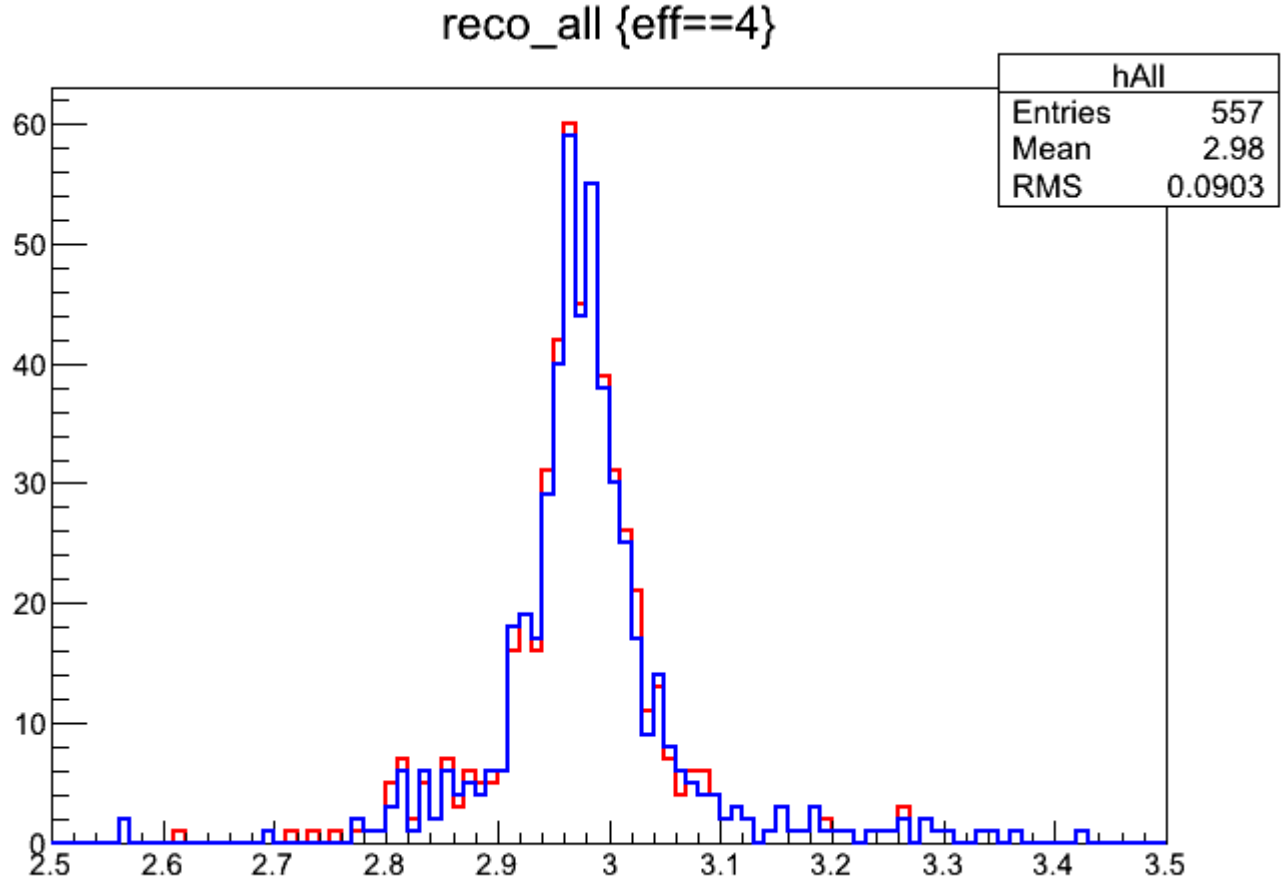
I suspected it was connected with the montecarlo id hypothesis of the mctrackassociator, and I have run genfit using the standard muon hyp:

The same. The problem does not depend on the mc id part.

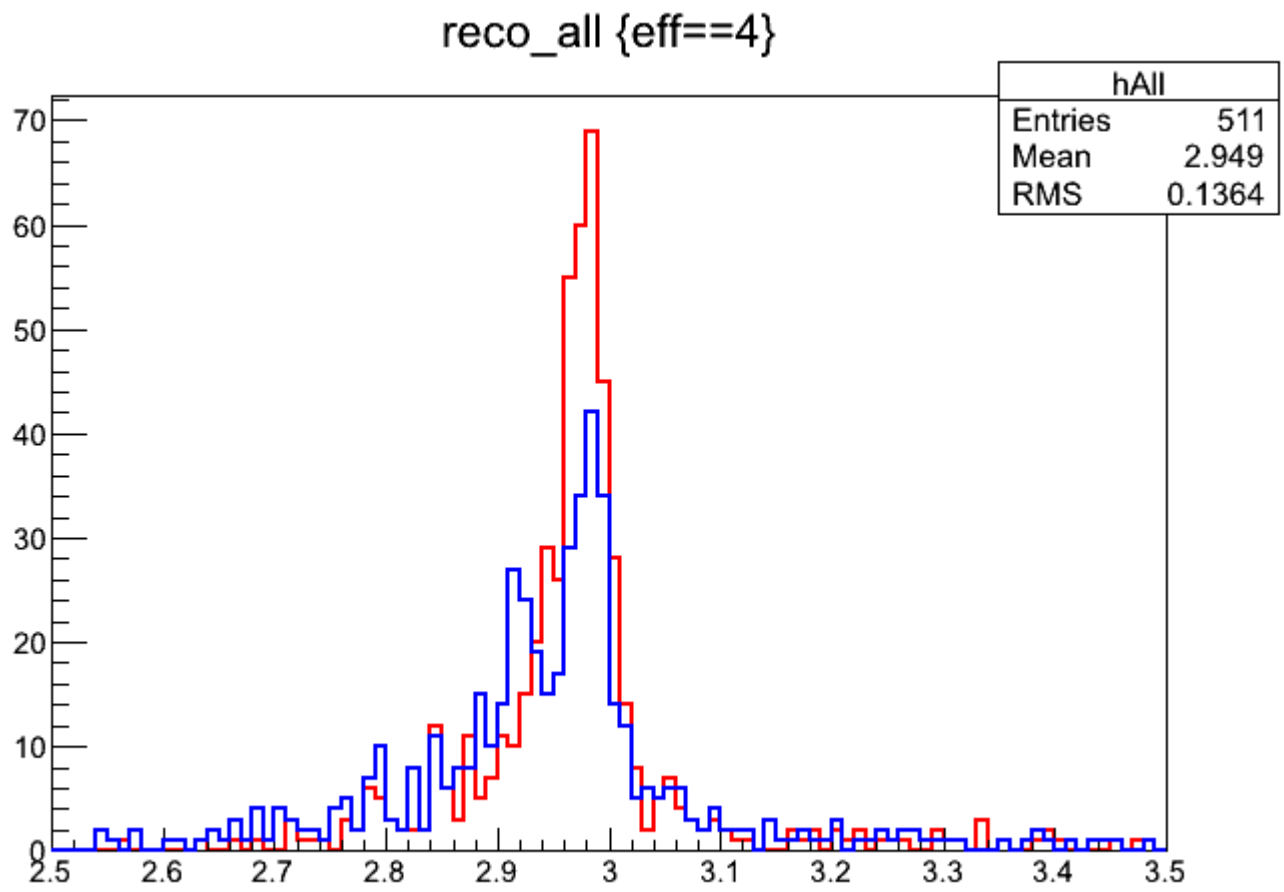
My guess:
the STTMVD pattern recognition part is fine, it provides nice peaks w/o the kalman. The kalman does some mess with the latest code. Considering that the kalman starts from the track parameters at the first point (which should be fine according to the first plots) and from the trackcand, I suspect that in the latter SttMvdTracking there is some mess with the TrackCand object.

File Attachments

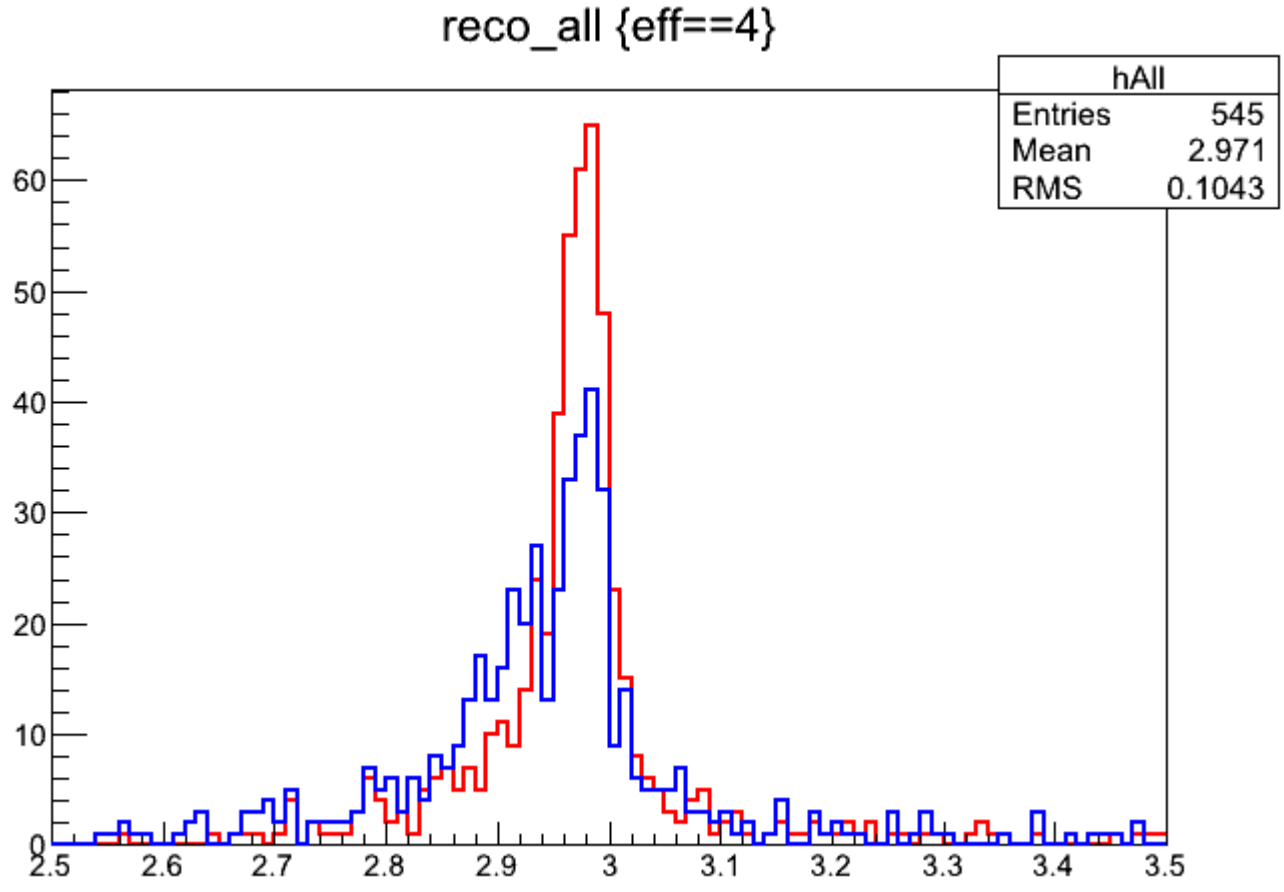
1) etac_sttmvd.gif, downloaded 726 times



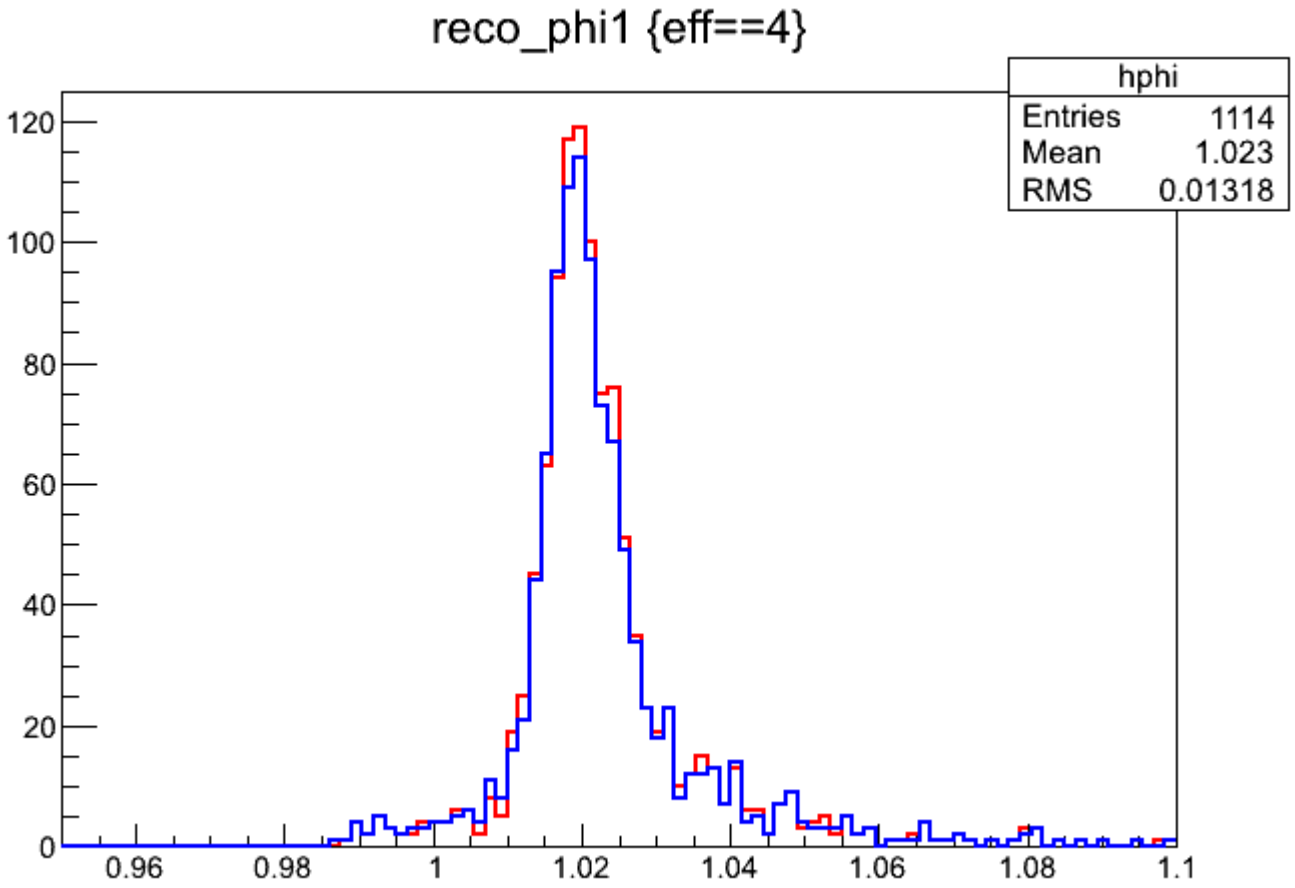
2) etac_sttmvdgen.gif, downloaded 736 times



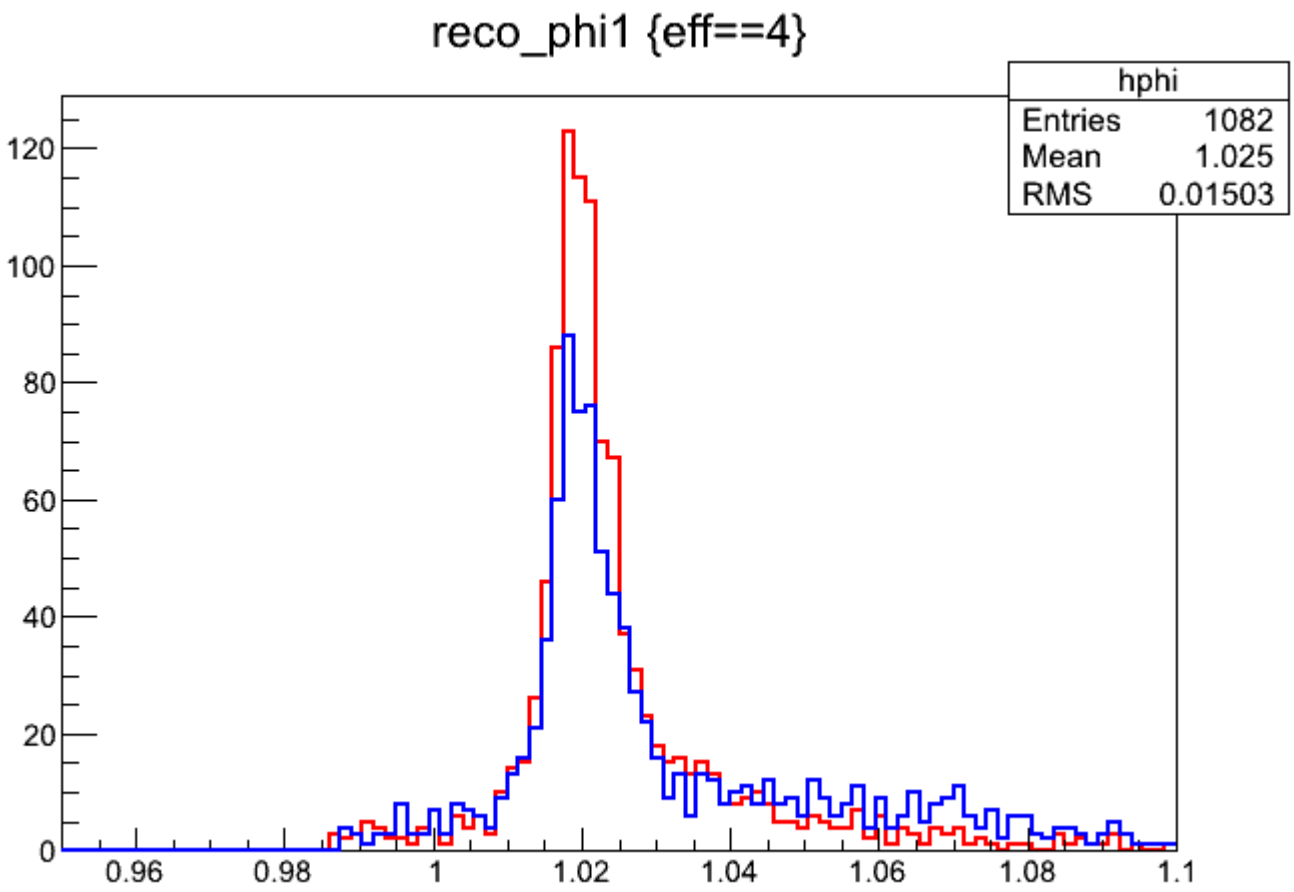
3) eta_sttmvdgen_nomc.gif, downloaded 731 times



4) phi_sttmvd.gif, downloaded 721 times



5) phi_sttmvdgen.gif, downloaded 739 times



6) phi_sttmvdgen_nomc.gif, downloaded 730 times