Subject: Tracking efficiency release/jan14
Posted by Klaus Götzen on Mon, 24 Feb 2014 14:13:57 GMT
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Hi,

as requested in the evo meeting I prepared the tracking efficiency on analysis level as 2D-plots for the separate species. In the lower right corner the efficiency is shown for theta vs. phi, for the other plots I cut out the well visible target pipe regions with abs(abs(phi)-90°)>4°, so that this doesn't tear down the average efficiencies.

As one can see, the efficiencies are quite flat for p vs. theta, and the average values are around 75%. The average value per species is shown in each plot in the upper right corner. The most homogenious but at the same time worst average values in the barrel region are found for muons. Interesting to note, that for muons the obligatory drop for theta<22 is not really visible.

Best,
Klaus

File Attachments

1) trk_eff_2d.gif, downloaded 696 times

Subject: Re: Tracking efficiency release/jan14
Posted by MartinJGaluska on Mon, 24 Feb 2014 15:10:59 GMT
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Hello Klaus,

I have just noticed that you seem to have included the very forward part to calculate the average tracking efficencies. One reason that the average efficiency might be measured lower than with previous versions of PandaRoot is a change in the FTS ideal tracking which leads to

I have changed the standard behavior of the FTS ideal tracking to make it behave more realistically by requiring a track found by the FTS tracking to have at least 5 FTS hits (compare to https://forum.gsi.de/index.php?t=msg&goto=15518). Previously, the FTS ideal tracker "found" all tracks that had at least 1 hit in the FTS.

As I said, from the FTS tracking point of view that behavior is more realisitic. However, currently there is only a tracking starting from STT + MVD and from FTS in the code. Both tracking algorithms find mostly distinct sets of tracks so that a merge is easily done. Hits from GEM are only added to tracks found by FTS and by STT + MVD, but there is no tracking starting from GEM being used in the current version of the code.

I was made aware of the drop in efficiency by Donghee in December and as a workaround implemented PndFtsTrackerIdeal::SetMinFtsHitsPerTrack(int); to set the number back to 1 to have an overall detector performance that is similar to before the changes in the FTS ideal

tracking. However, I did not change the default value of requiring at least 5 FTS hits.

I have just changed the default value to 1 to avoid possible problems and confusion, especially when the simulation campaigns will be executed and new results will be compared with old ones. At this point I suggest to use the value of 5 for standalone performance studies of the FTS only.

Maybe that was one factor that your efficiencies look worse than before, but in your talk this

affected (which is most probably not due to any FTS ideal tracking changes).

Kind regards,
Martin

Subject: Re: Tracking efficiency release/jan14
Posted by Klaus Götzen on Mon, 24 Feb 2014 20:40:30 GMT
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Hi Martin,

thanks for pointing that out. But as one can see in the plots, the efficiency levels for non-fts parts of phase space are also of the order of 80%. According to the STT-TDR for momenta around 1-2 GeV, there should be also values of 95% present in the central theta region (40° - 110°), which is not the case for plots shown.

Best,
Klaus

Subject: Re: Tracking efficiency release/jan14
Posted by Susanna Costanza on Tue, 04 Mar 2014 11:50:50 GMT
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Dear all,
I've reproduced (part of) the studies I've done for the TDR.

In particular, I've simulated different sets of 10000 muon single track events, generated at the I.P., with phi in (0., 360.) deg. The theta angular range has been scanned as follows:
- theta = 10, 12, ..., 24 deg in steps of 2 deg (+/- 1 deg)
- theta = 30, 40, ..., 150 deg in steps of 10 deg (+/-5 deg).
The events have been reconstructed (considering only the barrel detectors, not the ones in the forward region) and the Kalman fit has been performed only once; the tracks have then been back propagated with the PndPidCorrelator.
The momentum distributions have been fitted with a Gauss function in the range (mu-3sigma, mu+3sigma), as in the TDR.
The efficiency is calculated as the histogram integral divided by the number of generated tracks (blue curve). The red curve represents the efficiency "in peak", i.e. the number of tracks in the fitted range with respect to the total number of tracks (as in the TDR).

The results are shown in the two plots that are attached to the message: the results are comparable to the TDR ones.

Best regards,
Susanna

File Attachments
1) efficiency.png, downloaded 460 times
2) resolution.png, downloaded 417 times

Subject: Re: Tracking efficiency release/jan14
Posted by Klaus Götzen on Thu, 06 Mar 2014 15:36:00 GMT
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Dear Susanna,

thanks a lot for cross checking! Would be very important to find out where the discrepancy comes from though, maybe I'm doing wrong things.

Which momentum range did you consider, and which kind of macros did you use? I used the macros in macro/prod, which are basically the same than those in macro/run. I did my calculations based on the list I got from the PndAnalysis object on analysis level.

Best,
Klaus

Subject: Re: Tracking efficiency release/jan14
Posted by Susanna Costanza on Thu, 06 Mar 2014 17:11:42 GMT
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Dear Klaus,
sorry, I forgot to mention the particle momentum: it is 1 GeV/c (total momentum).

I used the jan14 pandaroot release (with apr13 external packages) and the macros in macro/run, up to the pid_complete.C macro. Then I used the information stored in the PidChargedCand branch.

Best regards,
Susanna
