
Subject: Re: PndRecoMultiKalmanTask

Posted by [StefanoSpataro](#) on Wed, 17 Mar 2010 11:25:20 GMT

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In order to check PndRecoMultiKalmanTask, I run 500 kaon events at 500 MeV/c.

The following plot shows the reconstructed momentum distribution, under different particle hypothesis (MVD+TPC+GEM):

The red dotted line is the "real" value. You can see that the kaon hyp gives the best results, the pion/muon (almost identical) are missing the momentum of a bit, and have worse resolution, electrons and protons have very bad results.

From this plot it seems, then, that we need to refit properly the track with the correct particle hyp, at least at 0.5 GeV/c.

I have thought that maybe the χ^2/ndf distribution could be helpful trying to find the best particle hypothesis, then I have plotted χ^2/ndf for the same events:

You can see that:

- a) The distributions are almost the same, no clear difference between different particles, even if we have seen protons and electrons are very bad! I would expect a worse value for the wrong hypothesis
- b) the distributions are peaked at 0.5, and not at 1 ?
- c) Running 500 events, the code reconstructs 750 tracks, but there are almost 200 tracks with $\text{NDF}=0$. I can understand that they could be failures, but the track is filled and not empty, and they have "reasonable" momentum. I am wondering why NDF is 0 and why, eventually if bad, the tracks are not rejected. The flag of those tracks is always zero, then I suppose there is no propagation of fit "quality" in the genfit adapter.

Trying to summarize:

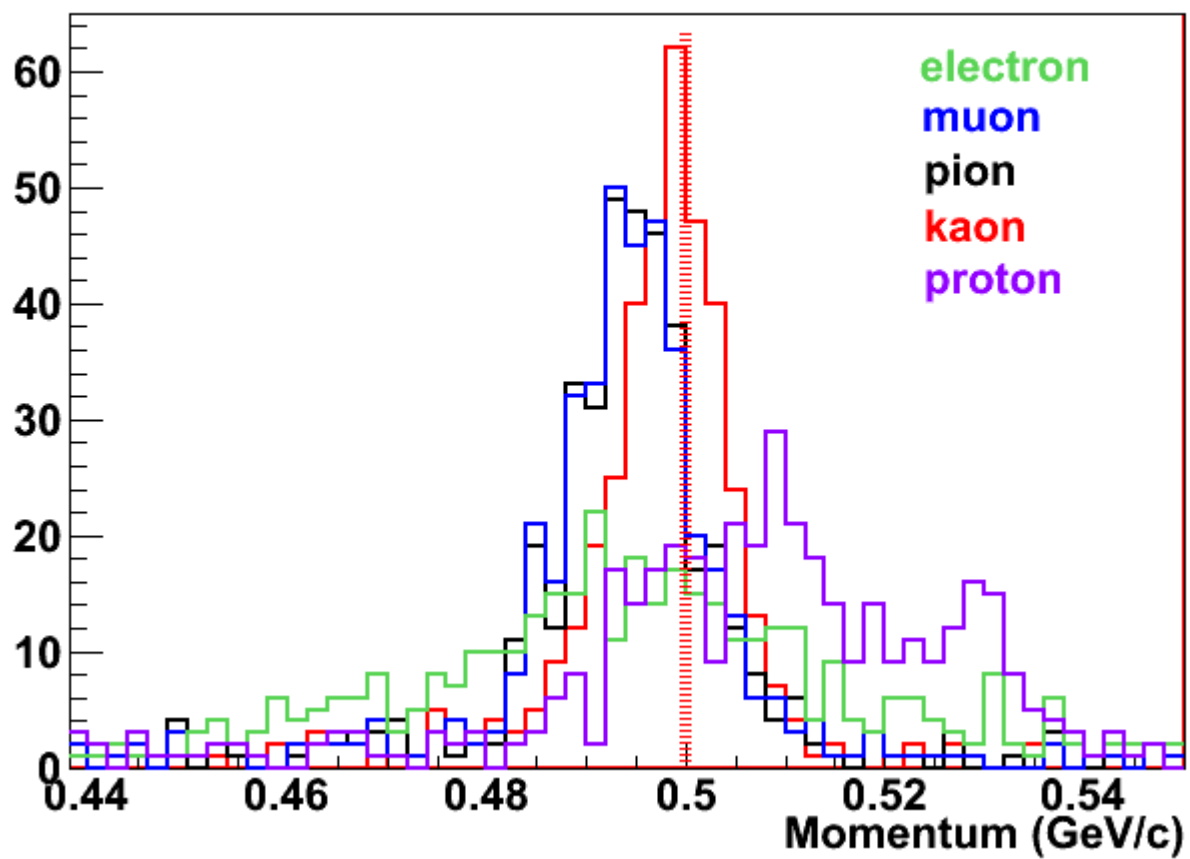
A wrong particle hypothesis provides bad resolution at 500 MeV, and this could also give problems in the correlation to the other pid detectors.

It is not clear to me how reliable is the χ^2 calculation from genfit, because of the wrong position, the absence of differences under different particle hypothesis and even the number of degrees of freedom equal to zero for tracks which seems almost good.

Comments from experts are welcome.

File Attachments

1) [mom_pid.gif](#), downloaded 776 times



2) [chi2ndf_pid.gif](#), downloaded 697 times

