
Subject: Lhe tracking results: reconstruction error for transverse momenta ≤ 1 GeV/c, all five particles

Posted by [David Pohl](#) on Tue, 23 Nov 2010 17:09:32 GMT

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Hallo everybody,

I just want to show you some results for the reconstruction error of the transverse momentum. The following simulation parameters are used:

- Panda Root trunk version, revision 10334
- Geant3
- Boxgenerator with vertex (0,0,0)
- $\theta = 60^\circ$, $\phi = 0:360^\circ$
- one primary track per event, only primary tracks are taken into account in the analyses
- $1e4$ events
- Lhe tracking package: ideal track finder + helix prefit + kalman task with correct particle hypothesis
- MVD+TPC+GEM tracking detectors, new MVD geometry: Mvd-2.1_AddDisks_FullVersion
- used particles: electrons, pions, myons, kaons and protons
- transverse momenta: 0,1; 0,2; 0,3; 0,4; 0,5; 0,6; 0,7; 0,8; 0,9; 1 GeV/c

The following plot shows the relative reconstruction error $\frac{||pt_{MC}| - |pt_{reco}|}{|pt_{MC}|}$ in percent:

Every point is a Gausfit for the reconstructed transverse track momentum. The error bars are the sigmas of the fits.

Some examples are attached to this message.

One can see that the reco error for protons@300MeV/c pt and for kaons@200MeV/c is bad. The reason is a failed kalman fit.

This I already mentioned in the thread 'GENFIT for transverse momenta < 200 GeV/c strange?!'.

Also there was no track reconstruction for kaons and protons with a momentum <200MeV/c possible.

I think the low momentum particles stuck in the detector material and do not create enough hits?

Another interesting thing is a systematic offset of the reconstructed momentum for electrons:

All offsets should be around zero. Especially this is not the case for lower momenta. Do you have an explanation for this?

By the way the kalman output for electrons doesn't look better than the helix prefit.

greetings
David

File Attachments

- 1) [trackrecoerror_graph.jpg](#), downloaded 508 times
 - 2) [trackrecoerrorabs_graph.jpg](#), downloaded 473 times
 - 3) [pt_reco_tpc_400_myons.pdf](#), downloaded 204 times
 - 4) [pt_reco_tpc_200_electrons.pdf](#), downloaded 211 times
 - 5) [pt_reco_tpc_400_electrons.pdf](#), downloaded 221 times
 - 6) [pt_reco_tpc_300_protons.pdf](#), downloaded 207 times
 - 7) [pt_reco_tpc_200_kaons.pdf](#), downloaded 206 times
 - 8) [pt_reco_tpc_100_myons.pdf](#), downloaded 211 times
 - 9) [pt_reco_tpc_600_protons.pdf](#), downloaded 218 times
 - 10) [pt_reco_tpc_800_electrons.jpg](#), downloaded 502 times
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