Subject: Problem with reconstructed phi values
Posted by Jerome Boucher on Mon, 09 Feb 2009 14:06:41 GMT
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Hi,

Since few weeks, I'm working on the channel pbar p -> e+e-pi0. I did some simulations and tried to calculate the missing mass from the 4-vector (pbar + p - e+ - e-). Using the montecarlo values, everything is fine (total momentum, invariantmass, missing mass, etc.....). Using the reconstructed values, two bumps, one around -0.5GeV and the second one around 0.5 GeV, appear. But nothing around 0.140 GeV, where one expects the pi0 mass. I checked the total momentum and it seemed correct.

To be sure that I was not doing something wrong, I simulated the
psi(2s) decay like in the pandaroot tutorial in ferrara and I
obtained the same results as in the tutorial.

To simplify the study, I have simulated pbar p -> e+e- (1000 events). Unfortunatly, same problems appear. So, I compared for some events the values of px, py, pz and E written in the output.evt (coming from simpleEvtGen) with the one obtained after reconstruction. We pointed out, with Thierry, that the energy, the total momentum as well as pz are OK but px and py are not OK.

To look more carefully in this, I've simulated 1000 electrons with a 2GeV/c momentum, 20<theta<140, 59<phi<60 for both TPC and STT configuration using respectively run_sim_tpccombi_pgun.C and run_sim_sttcombi_pgun.C. Results are shown in the attached ppt. We can see that for both TPC and STT, montecarlo results are good. Also, px and py histograms of the reconstruction values show that there is a serious problem. Furthemore looking at phi angle (simulated between 59 deg. and 60 deg.), we can see that phi values obtained after reconstruction are far from the expected ones.

Did someone already cross check that the MonteCarlo values agree, within resolution, with the ones coming from reconstruction? Do you see any mistake in my argumentation/demonstration or did I forget something?
attched below is a ppt presentation with the corresponding figures.

Greetings
Jérôme

File Attachments

1) PANDA_reco_080209.ppt, downloaded 550 times

Subject: Re: Problem with reconstructed phi values
Posted by StefanoSpataro on Mon, 09 Feb 2009 14:12:10 GMT
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Hi,
if you are taking the values from lhetrack, that momentum is calculated at the last point of the tracking system. For this reason pz is fine, but not px and py.

In the tutorial (page 27) you can see the function to extrapolate the parameter at the vertex:

Float_t phic1 = tr1->ExtrapolateToZ(&mom1, &vertex1, 0.);

where tr1 is your lhetrack, &mom1 is a TVector3 of your momentum at the vertex (0 means z = 0).
Try to use that momentum, and let me know if you improve the results.

Subject: Re: Problem with reconstructed phi values
Posted by Jerome Boucher on Mon, 09 Feb 2009 15:28:55 GMT
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Hi Stefano,

Thank you very much, results are completely different and look nice.

Greetings

Jérôme

Subject: Re: Problem with reconstructed phi values
Posted by StefanoSpataro on Mon, 09 Feb 2009 15:30:21 GMT
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Good!
