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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  $p\bar{p} \rightarrow e^+e^-\pi^0$ . I did some simulations and tried to calculate the missing mass from the 4-vector ( $p\bar{p} + p - e^+ - e^-$ ). 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  $\pi^0$  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  $p\bar{p} \rightarrow e^+e^-$  (1000 events). Unfortunately, same problems appear. So, I compared for some events the values of  $p_x$ ,  $p_y$ ,  $p_z$  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  $p_z$  are OK but  $p_x$  and  $p_y$  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,  $p_x$  and  $p_y$  histograms of the reconstruction values show that there is a serious problem. Furthermore 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?  
attached below is a ppt presentation with the corresponding figures.

Greetings

Jérôme

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### File Attachments

1) [PANDA\\_reco\\_080209.ppt](#), downloaded 516 times

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