Subject: Lhe Tracking: Kalman Task with STT, worse results
Posted by David Pohl on Sun, 05 Dec 2010 13:04:00 GMT
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Hallo everybody,

when I compare the results after the Kalman Task for the STT and TPC I get worse results with the STT code
according to the reconstruction efficiency and the momentum resolution.

The following parameters have been used:

- Panda Root trunk version, revision 10334
- Geant3
- Box generator: myons with vertex (0,0,0)
- theta = 60°, phi = 0:360°
- 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+STT or MVD+TPC+GEM tracking detectors, new MVD geometry: Mvd-2.1_AddDisks_FullVersion
- STT helix hits are taken
- transverse momentum: 200MeV/c -> total momentum 230.94MeV/c

STT, 86% reconstruction efficiency, sigma 3MeV/c, background after Kalman

The strange thing here is that the Kalman produces a lot of background. The dispersion is larger
than 3*sigma of the helix prefit. One can even do a cut on the difference between helix prefit and
Kalman result to enhance the fit quality. This is to my mind a strong evidence that something in the
Kalman code for the STT does not work properly!

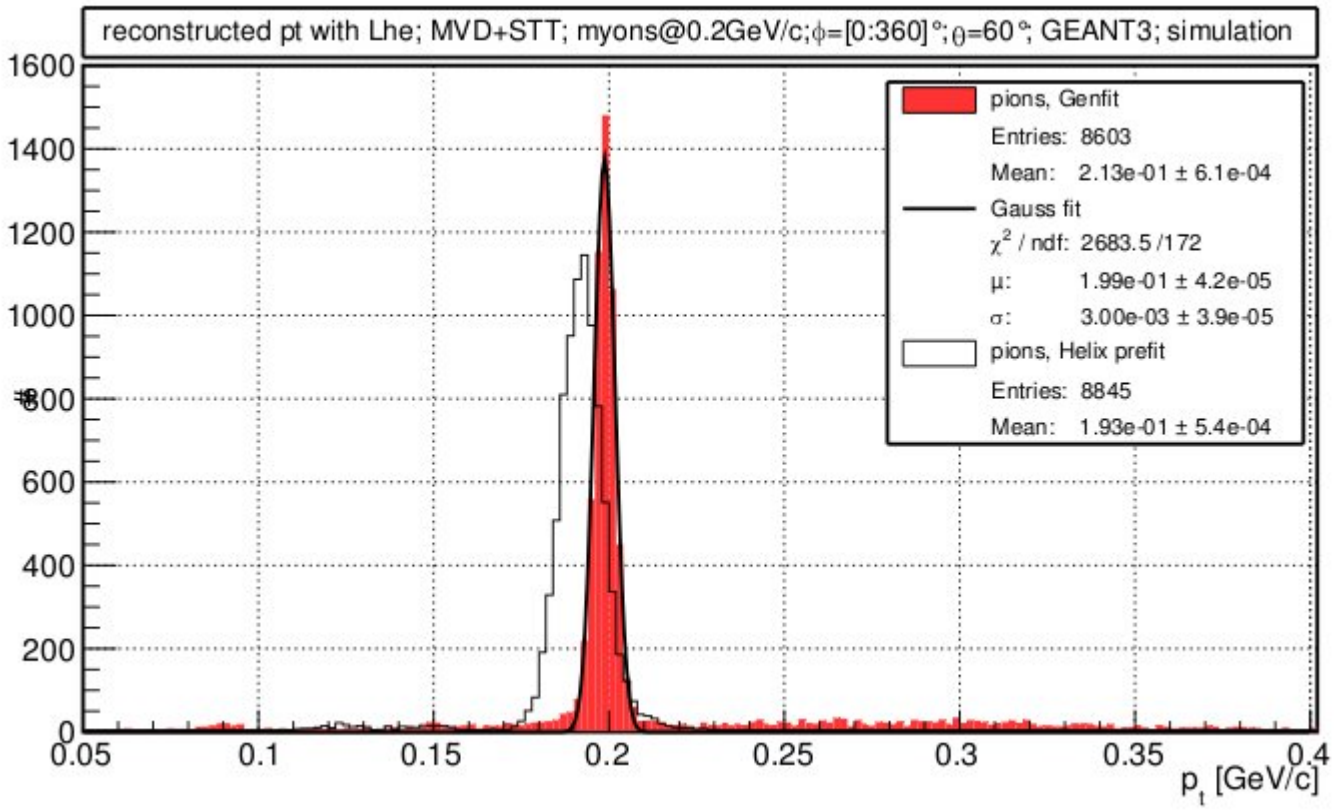
TPC, 93% reconstruction efficiency, sigma 2MeV/c

So I wonder if I do something wrong or this is just normal behavior. The smaller reconstruction efficiency is due to
the Helix fit in the STT? Right? But I still do not understand why the results after the Kalman filter look so much different.

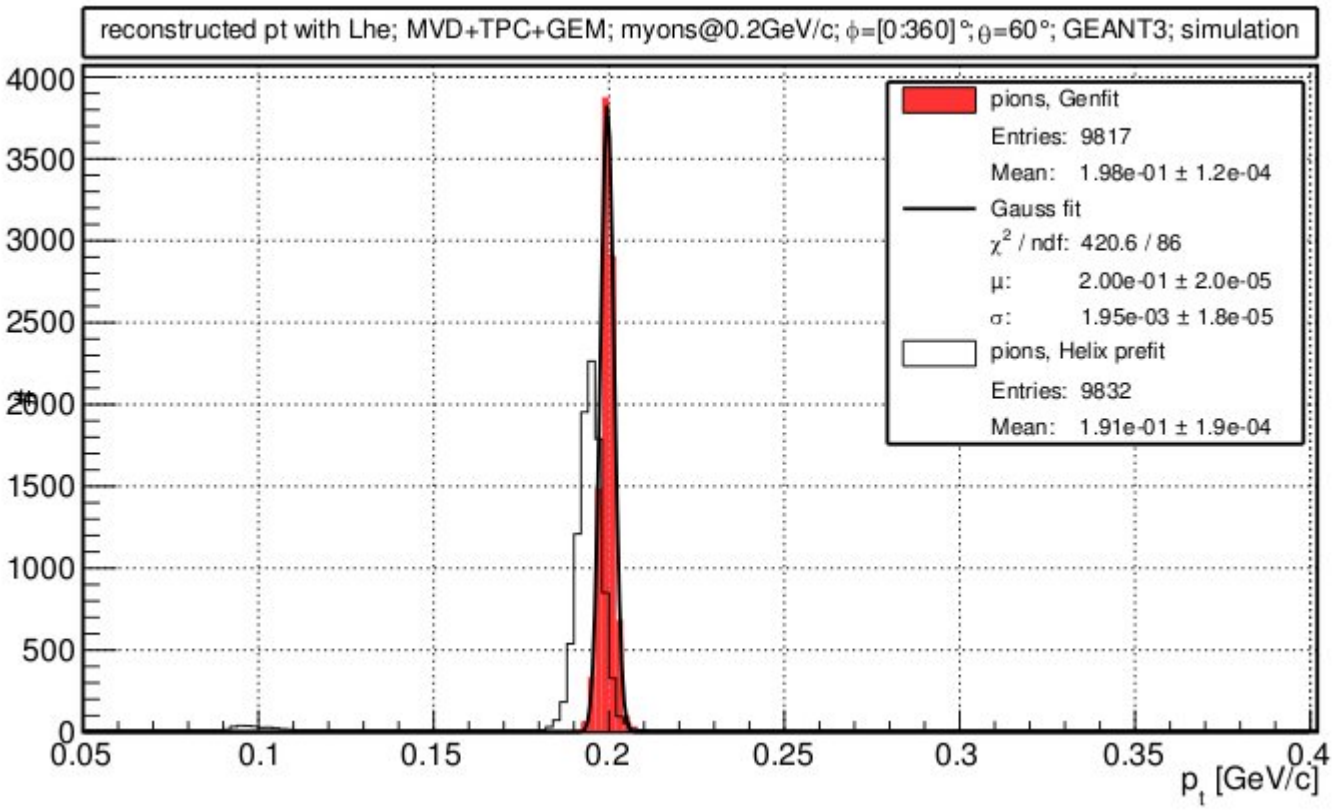
greetings
David

File Attachments

1) pt_reco_stt_200.jpg, downloaded 1747 times



2) pt_reco_tpc_200_myons.jpg, downloaded 1807 times



Subject: Re: Lhe Tracking: Kalman Task with STT, worse results
Posted by StefanoSpataro on Sun, 05 Dec 2010 20:15:05 GMT
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It is known that LHE performances for STT are poorer than with TPC, and reported in many talks.
If you want to check the kalman response independently from LHE, you should try to use the ideal track finder. Or you can try the new STT+MVD track finder from Gianluigi, plugging it as seed of the kalman task.

Hope it helps.

Subject: Re: Lhe Tracking: Kalman Task with STT, worse results
Posted by David Pohl on Mon, 06 Dec 2010 10:32:38 GMT
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Hallo Stefano,

thank you for your response. I used the ideal track finder.
Now I am confused. That means that I already checked the
Kalman response independently from LHE? Idependently from
LHE means without Lhe track finding? Or why do you suggest
do use the ideal track finder?

I am also interested in the talks reporting this. Can
you send me some links where to find them or name the
panda meeting where they have been presented?
Thank you in advance.

Subject: Re: Lhe Tracking: Kalman Task with STT, worse results
Posted by StefanoSpataro on Mon, 06 Dec 2010 11:33:05 GMT
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Hi,
first of all I think it is important to check not only p/pt but even theta, because the two fits are separated at the pattern recognition stage.

In case of STT ideal track finder, depending on the mode, you are using helix hit coming from the STT stand-alone pattern recognition, coming from points of closest approach of the helix toi the wire. IF something bad is happening there, i.e. wrong track or wrong helix fit, then you will also see it in the lhe ideal track finder. Maybe you could try to use SetSttMode(5), but this means to use an "ideal" helix hit coming from MC.

About the reports, go to panda INDICO, and check my talks the computing sessions of:

March 2009
June 2010

or the tracking session (G.Boca) of August 2010.

Subject: Re: Lhe Tracking: Kalman Task with STT, worse results
Posted by Lia Lavezzi on Mon, 06 Dec 2010 11:57:38 GMT
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Hi David and Stefano,
just a remark: to check the Kalman independently from LHE in the STT, please use SttMode = 4.

If you use SttMode = 4 it means you are using the points coming from MC as input for the track finding. Moreover if you use the LHE ideal you should be able to connect each hit to each track.

Then, when you make the Kalman on the found track you use the information from the detector (the isochrone) and nomore the mc info, so the Kalman is "real".

Keep in mind, however, that even if you use SttMode = 4, you load in input of the LHE track finder the helix hit array coming from the local reconstruction of the STT, so the problem of the double step in STT reconstruction (local + LHE) is still there.
You will not use all the MCpoints in STT, but only the MCpoints connected to those hits which are inside the helix hit array.
What you avoid is to use the reconstructed hit (helix hit) of the STT, which may be badly reconstructed, in the LHE.

I suggest (as Stefano did) to use Gianluigi' s mvd + stt pattern recognition instead of LHE!

Cheers,
Lia.