Subject: Question about PndLhePidTrack()
Posted by donghee on Thu, 14 May 2009 09:04:56 GMT
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Hello, panda trackers,

I have one question for PndLhePidTrack();
I'm looking for the reconstruction of electron from PndLhePidTrack. I'm following now the example of lhetrack in the macro.

In attached plot, you can find the comparison between generated electron and reconstructed one from PndLhePidTrack::GetP() function. Red histogram is generated, and Blue for reconstruction of negative charge.
The generated event is electron, photon, and proton.
Most of electrons are produced to the direction of backward spectrometer, i.e, theta > 130 degree.
I would like to understand why 2.5-3.5 GeV/c electron candidates are not reconstructed well.
I assumed that I don't take into account magnet field in reco procedure. It would be thankful if you can check my reco scripts, or can give an useful advice for this analysis, specially for electron reconstruction.

Thank you!

In the reco script, I introduce following lines.

Quote:
```
  // ------------------------------------------------------------------------
  // -----   LHETRACK  --------------------------------
  PndLheHitsMaker* trackMS = new PndLheHitsMaker("Tracking routine");
  trackMS->SetTpcMode(2);  // 0 OFF, 1 TpcPoint, 2 TpcCluster // TpcPoint smearing [cm], if negative no smearing
  trackMS->SetMvdMode(2);  // 0 OFF, 1 MVDPoint, 2 MVDHit     // MVDPoint smearing [cm], if negative no smearing
  fRun->AddTask(trackMS);

  PndTpcLheTrackFinder* trackFinder    = new PndTpcLheTrackFinder();
  fRun->AddTask(trackFinder);

  PndTpcLheTrackFitter* trackFitter    = new PndTpcLheTrackFitter("fitting");
  fRun->AddTask(trackFitter);

  PndLhePidMaker* pidMaker    = new PndLhePidMaker("pid");
  pidMaker->SetGeanePro(kFALSE);  // Switch ON Geane propagation
  pidMaker->SetDebugMode(kTRUE);  // Debug ntuples
  fRun->AddTask(pidMaker);
```

File Attachments

1) Momentum_electron_one.eps, downloaded 542 times

2) Theta_electron_one.eps, downloaded 571 times

Subject: Re: Question about PndLhePidTrack()
Posted by StefanoSpataro on Thu, 14 May 2009 12:43:08 GMT
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Hi,
if you ahve used the macros in tutorials/lhetrack, then everything should be fine.
I can see that most of your electrons are going to 150 degrees, and I am not sure on how much is the resolution there. In the central part the resolution at 3 GeV should be 6%, then I would expect something worse at 150°. Therefore, maybe it is just a problem of bad resolution at backward angles.

Subject: Re: Question about PndLhePidTrack()
Posted by donghee on Thu, 14 May 2009 12:55:53 GMT
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Dear Stefano and Panda trackers,

Thank you for your opinion.

I assumed now that my problem comes from the Magnet field, since GeanePro(kFALSE) was turned off in my reco process.
If I correctely understand, all reco hits are translated to the Geane propagation. And Geane Track repositoy including Magnet field must be used for tracking at reconstruction process.

But I have simply followed lhetrack example without GeanePro.
Quote:pidMaker->SetGeanePro(kFALSE); // Switch ON Geane propagation

Such case, probably magnet effect is not taken into account in the track reconstruction.

Could you give me some comment for this suspicious argument?

Best regards,
Donghee

Subject: Re: Question about PndLhePidTrack()
Posted by StefanoSpataro on Thu, 14 May 2009 12:58:43 GMT
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Hi,
SetGeanePro is used only for the extrapolation to PID detectors, not for omentum calculation.
lhetrack is doing a simple helix fit, without caring about materials and not costant field.
Then, it is not your problem.

Subject: Re: Question about PndLhePidTrack()
Posted by donghee on Thu, 14 May 2009 13:05:38 GMT
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Hi trackers,

Does anybody have something like tracking resolution depend on the momentum for each particles, specially for electron?
I would like to compare it with my result.

Where can I find such kind of reference?

Thank you!

Subject: Re: Question about PndLhePidTrack()
Posted by StefanoSpataro on Thu, 14 May 2009 13:26:49 GMT
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Hi,
this is the resolution plot for muons in tpc+mvd (the red line), but calculated and averaged in the theta range [20°, 140°]. One should see what is happening at those forward angles in more detail.

File Attachments
1) lhetrack_res.pdf, downloaded 436 times

Subject: Re: Question about PndLhePidTrack()
Posted by donghee on Thu, 14 May 2009 13:39:35 GMT
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Dear stefano,

Concerning you mentioned...
OK, then I can simply expect more few % of energy loss in the each detector session.

Quote:]without caring about materials and not costant field.

What is the meaning of "not constant field"?
There is a multiple magnet field, and lhetrack fitter use this field using map in the reco process.
Is it correct?

Thank you for your plot,
There is two option with point and cluster for TPC case.
From your plot, I have learned that I need to go point mode for tpc and mvd to get more better resolution.
Quote: trackMS->SetTpcMode(2); // 0 OFF, 1 TpcPoint, 2 TpcCluster // TpcPoint smearing

[cm], if negative no smearing
  trackMS->SetMvdMode(2); // 0 OFF, 1 MVDPoint, 2 MVDHit   // MVDPoint smearing [cm], if negative no smearing

Could you explain what is the difference of point and hit?
Thank you!

Subject: Re: Question about PndLhePidTrack()
Posted by StefanoSpataro on Thu, 14 May 2009 14:01:19 GMT
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Hi,
"Point" means using montecarlo points, and of course you have wonderful resolution. Hit means that youa re using points after full digitization and recontruction, then of course you have also noise and the resolution becomes worse, but more realistic.

lhetrack is a helix fit, so it assumes a constant value (2T) of field in the central region. There is no need for map, not in the helix approximation, not in the central tracker region.

Subject: Re: Question about PndLhePidTrack()
Posted by donghee on Thu, 14 May 2009 14:38:10 GMT
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Dear stefano,

If lhetrack fitter assume constant 2T magnet in the central region, how about endcap region? Is it still assumed constant magnet field for endcap region?

Is it possible to improve the resolution for large angle track, i.e., theta > 150 degree in the reconstruction level and tracking procedure?

Thank you!

Subject: Re: Question about PndLhePidTrack()
Posted by StefanoSpataro on Mon, 18 May 2009 06:34:20 GMT
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Hi,
LHETRACK uses only the central trackers, TPC/STT + MVD, where the field is almost constant. At the moemnt it is not using detectors from the endcap.
And, if you check the PANDA geometry, you can see that for theta > 150° we have not so much sensitive material, then the track reconstruction is difficult and the momentum resolution rather poor. But we suppose there will be not so many charged tracks on that part of the acceptance.

Therefore, why do you need a "good" tracking for those angles, where we should catch almost nothing?