Subject: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Tue, 21 Jun 2011 22:13:34 GMT
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Hi all,

I have analyzed 10000 eta_c events with latest version of both STT and TPC reconstruction code.

First coming to STT. The low reconstruction efficiency of 10% persists after using corrected version of MVD, so the drop of efficiency have another origin and I have a suspect here.

But my main remark here is the low efficiency is not related to analysis macro but to small amount of event with 4 or more reconstructed charged candidates.

And plot of invariant mass of phi and eta_c

Coming to TPC I want to mention that I finally managed to run complete reconstruction chain till the rho analysis.

My version of TPC reconstruction macro /macro/run/tdrct/eta_c/run_reco_tpc_evt.C contains PndGFTrackToPndTrackConvertorTask task which convert GFTrack to PndTrack and I want here once more to ask to commit latest version of this task to svn (I don't have write access to GenfitTools directory). The file is attached. And to be more specific, maybe Stefano will commit it?

Obtained efficiency with TPC is even lower than with TPC (below 5%), which is also related to small number of events with 4 or more reconstructed charged candidates. And here I can quote the number of lost eta_c related to geometrical acceptance. In 67% of events at least one of the kaons is outside the range 140>theta>20 degree.

And invariant mass resolution:

looks comparable with STT results.

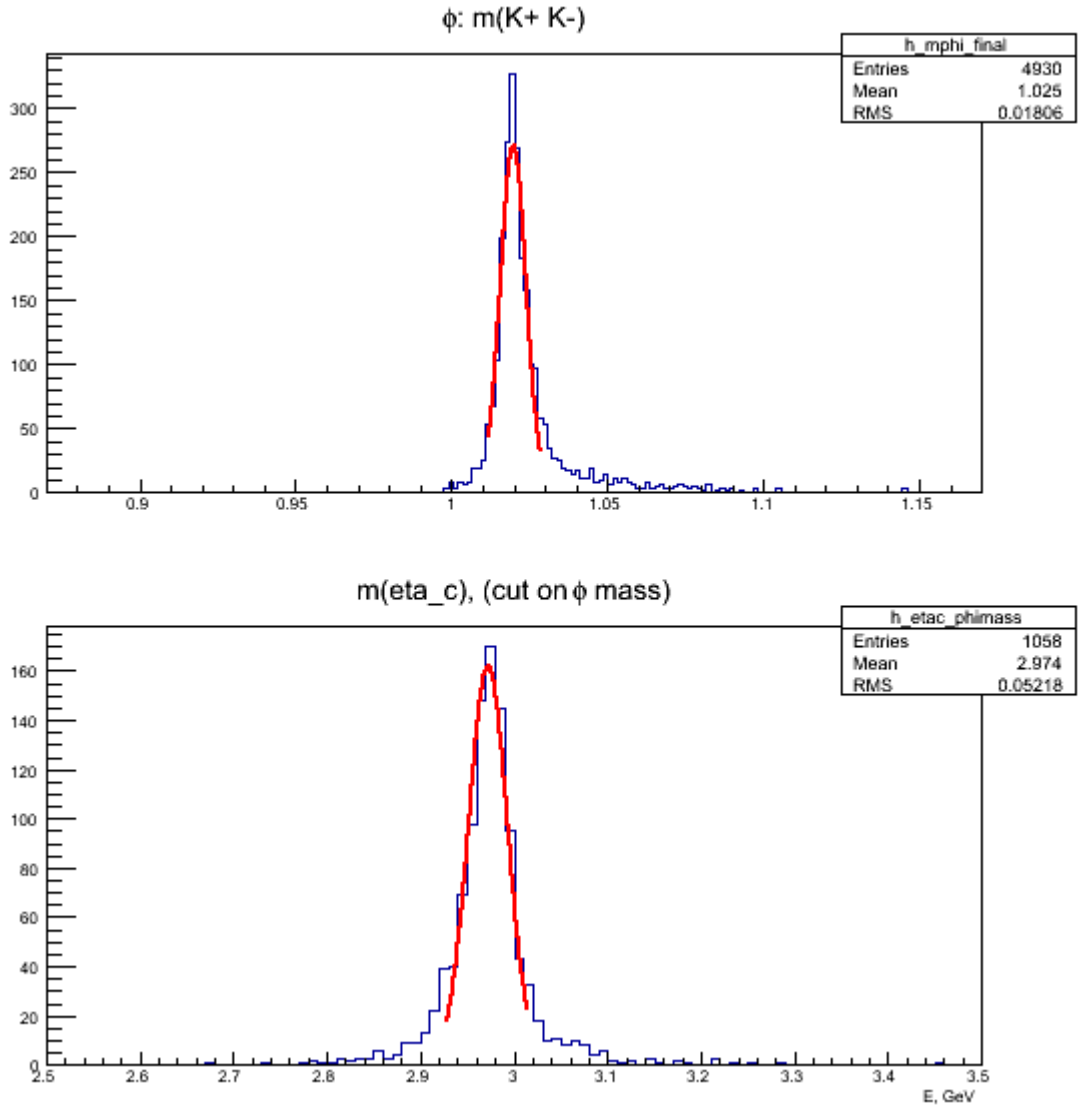
Trying to identify the source of low efficiency I compared the number of reconstructed track and number of charged candidates used for rho analysis. And this number appears to be lower by factor 2-3 (I checked it for TPC). So PndPidCorrelator, which creates charged candidates from PndTracks reject somehow significant amount of tracks. And I see that Stefano modified this class 5 days ago and approximately after that I observed drop of eta_c reconstruction efficiency with STT. So could Stefano look what could go wrong there?

Best regards,

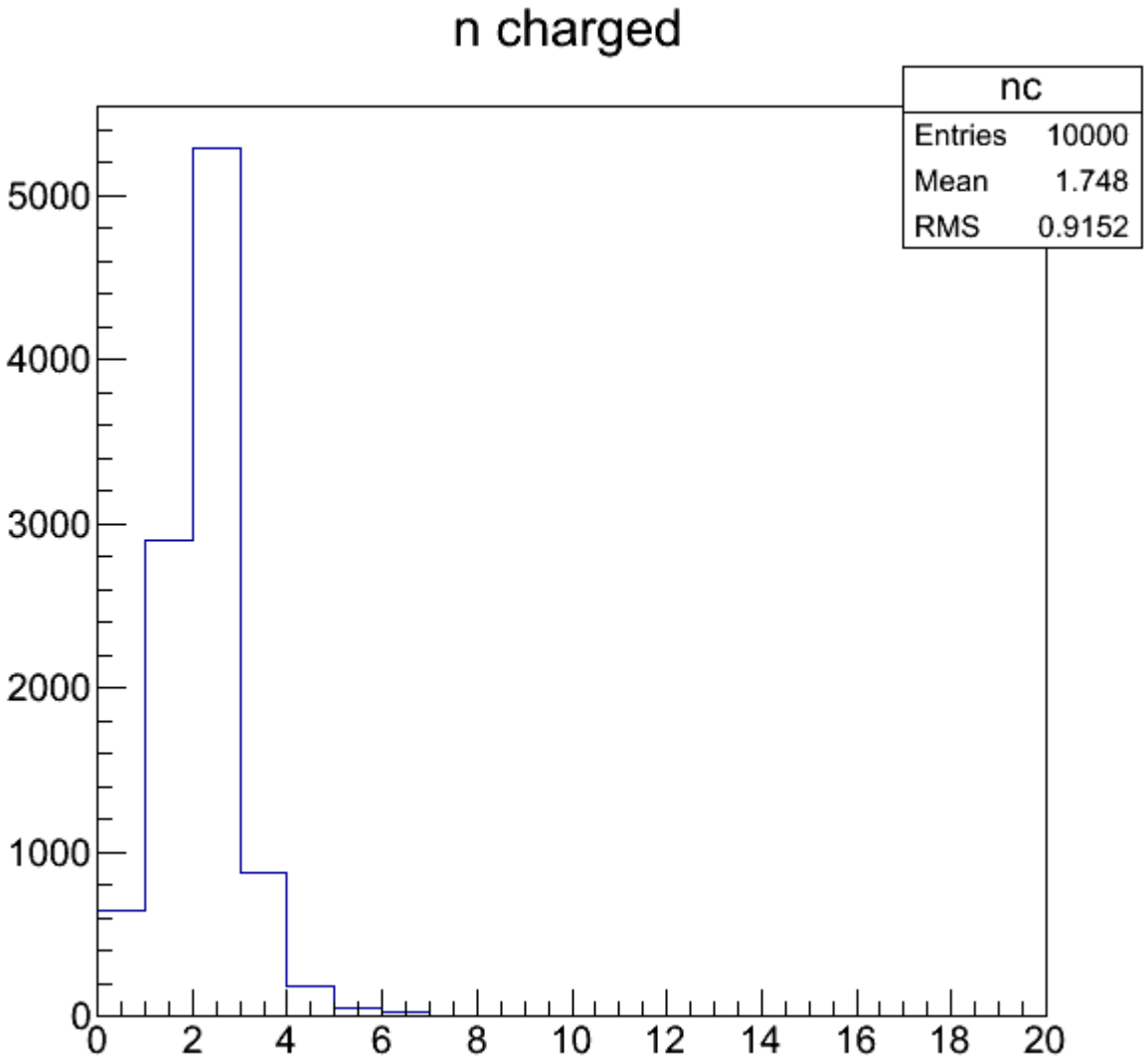
Dima

File Attachments

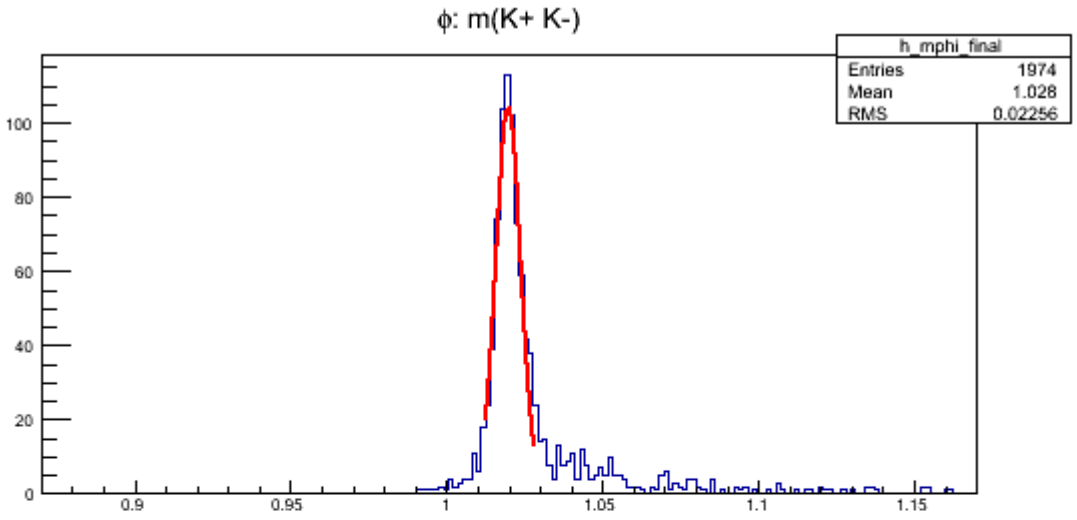
1) final_stt.png, downloaded 1092 times

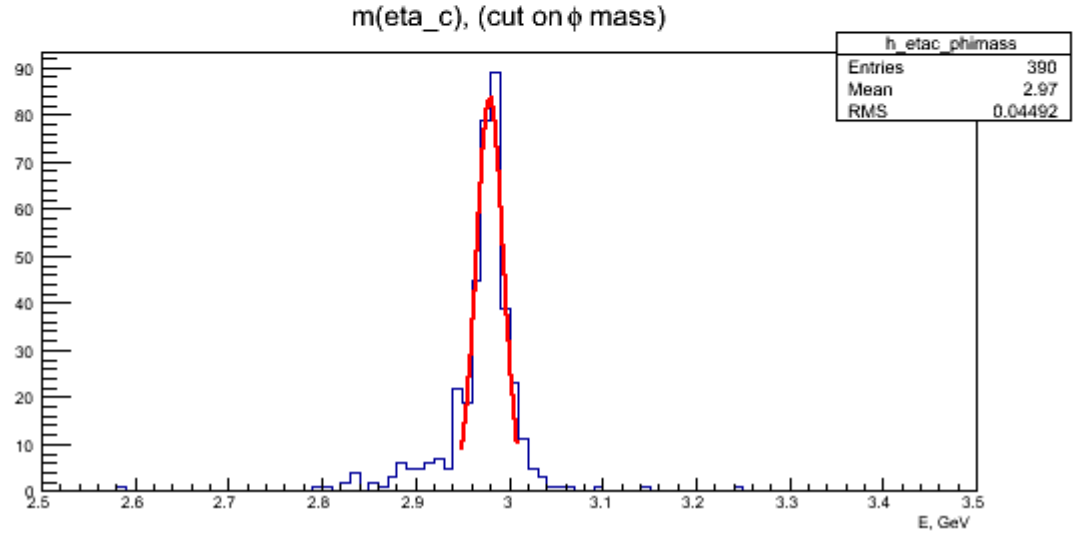


2) nc_stt.png, downloaded 1029 times

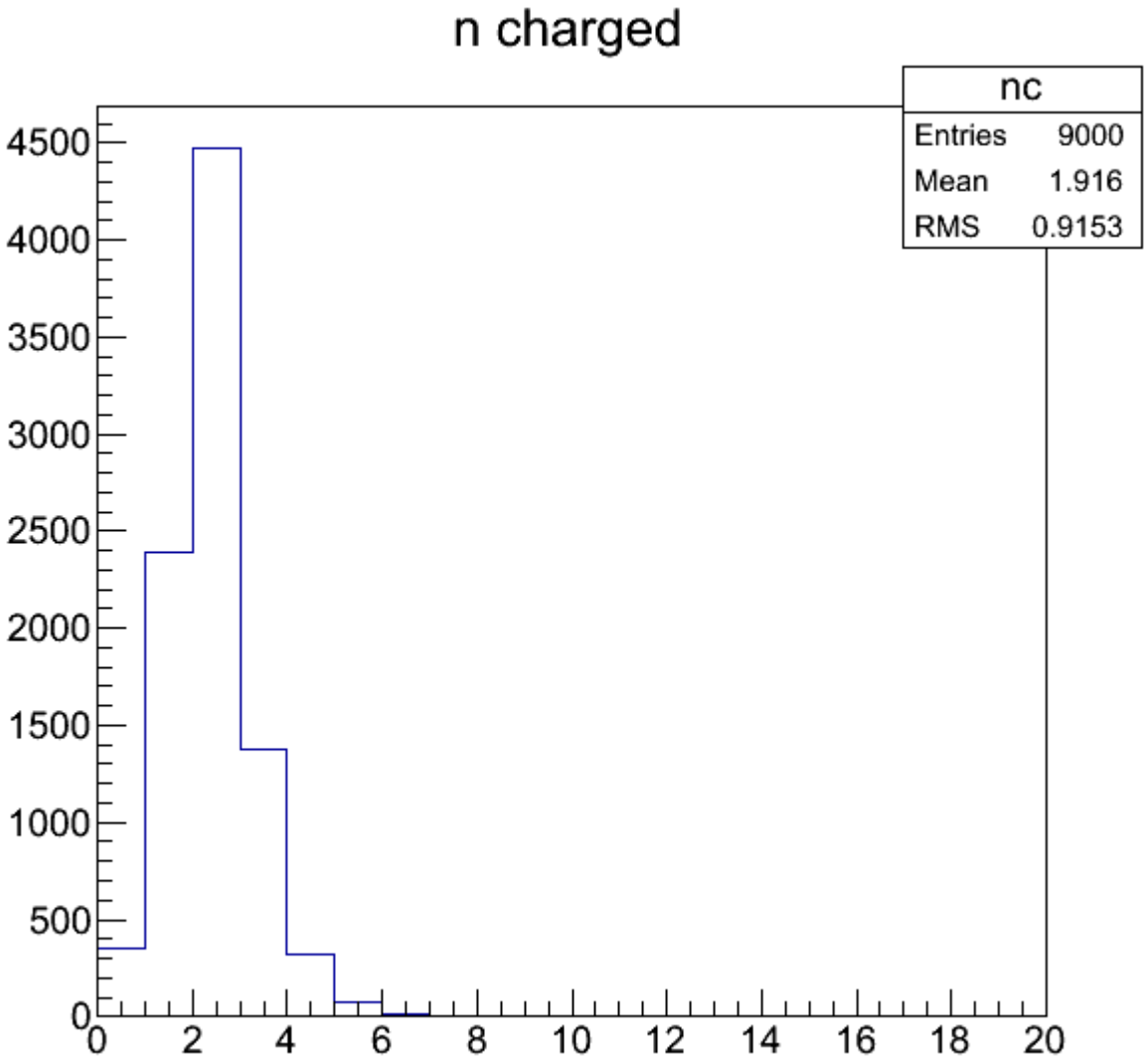


3) final_tpc.png, downloaded 1111 times





4) nc_tpc.png, downloaded 1105 times



5) PndGFTrackToPndTrackConvertorTask.cxx, downloaded 392 times

---

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johan Messchendorp on Tue, 21 Jun 2011 22:32:13 GMT
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Hi Dima,

PndGFTrackToPndTrackConvertorTask .... now updated in trunk.

j.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Wed, 22 Jun 2011 06:55:04 GMT
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Hi Dima,
Could you please try with a small sample and the previous correlator version?
Just to be sure, in theory my changes should have no effects on the reconstruction.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Felix Boehmer on Wed, 22 Jun 2011 10:37:58 GMT
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Hi Dima,

I will try to look into the macros in the weekend to find out what goes wrong. The efficiencies you report are much too low, I will have to see what's going on there.

Cheers

Felix

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Wed, 22 Jun 2011 23:07:33 GMT
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Hi Stefano,

I should confirm that indeed previous correlator version doesn't change reconstruction efficiency.

But my another statement still remains true, that PndPidCorrelator produces for TPC 2-3 times less charged candidates than number of input tracks.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Mon, 27 Jun 2011 11:57:07 GMT
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Hi,
I have tried to run some events using your reco macro w/o MCTrackAssociator (which does not work with tpc), but I have the following crash:

GEANE propagation failed
in line: 305 in file:
/home/spataro/may11/pandaroot/GenfitTools/trackrep/GeaneTrackRep/GeaneTrackRep.cxx
with fatal flag 0
GFException thrown with excString:
GeaneTrackRep: PROTECT AGAINST LOW MOMENTA
in line: 178 in file:

/home/spataro/may11/pandaroot/GenfitTools/trackrep/GeaneTrackRep/GeaneTrackRep.cxx
with fatal flag 0
RKTrackRep::RKutta ==> momentum too low: 2.38612 MeV
GFException thrown with excString:
RKTrackRep::Extrap ==> Runge Kutta propagation failed
in line: 997 in file:
/home/spataro/may11/pandaroot/GenfitTools/trackrep/RKTrackRep/RKTrackRep.cxx
with fatal flag 0
PndTpcRiemannTrackingTask::Exec; Event Number: 131
RKTrackRep::setPDG particle -22 not known to TDatabasePDG -> abort

I don't know which code is using RKTrackRep, instead of GeaneTrackRep, and why -22 is used as pid hypothesis! I think we should use a standard hyp for the kalman and not the MC one, i.e. pion or muon.

I don't know hot to proceed after this crash, help from experts is required.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Mon, 27 Jun 2011 13:04:23 GMT
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Just to be more precise, the crash comes from PndTpcRiemannTrackingTask (I have commented out all the other tasks).

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Felix Boehmer on Mon, 27 Jun 2011 13:12:28 GMT
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Hi,

I will have a look at it asap.

Cheers

Felix

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Mon, 27 Jun 2011 13:16:48 GMT
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This is the output of the tpcriemanntask if i set the DEBUG to 1:

pdg: 211 charge: 3.000

MC pid pdg: -11 charge: 3.000
charge corrected MC pid pdg: -11
 center of track TVector3 A 3D physics vector (x,y,z)=(12.483792,3.663404,0.000000)
(rho,theta,phi)=(13.010211,90.000000,16.354474)
 Radius of track [cm]: 3.778
 Dip of track [deg]: 46.17
 seed values:
  start position: TVector3 A 3D physics vector (x,y,z)=(14.202656,7.027931,25.054993)
(rho,theta,phi)=(29.645572,32.311851,26.327688)
  momentum [GeV]: 0.03149
  p_perp [GeV]: 0.02272
  direction: TVector3 A 3D physics vector (x,y,z)=(0.642457,-0.328217,-0.692476)
(rho,theta,phi)=(1.000000,133.826418,-27.061496)
  winding: 1
  invertedTrack: 0
  pdg id: -11
Tracklet 3 nhits = 48
pdg: 211 charge: 3.000
MC pid pdg: 22 charge: 0.000
charge corrected MC pid pdg: -22
 center of track TVector3 A 3D physics vector (x,y,z)=(1.549914,37.385460,-0.000000)
(rho,theta,phi)=(37.417574,90.000000,87.626011)
 Radius of track [cm]: 37.18
 Dip of track [deg]: 24.07
 seed values:
  start position: TVector3 A 3D physics vector (x,y,z)=(-15.273078,4.230596,35.533201)
(rho,theta,phi)=(38.907239,24.037374,164.517430)
  momentum [GeV]: 0.5482
  p_perp [GeV]: 0.2236
  direction: TVector3 A 3D physics vector (x,y,z)=(-0.363711,0.184549,0.913047)
(rho,theta,phi)=(1.000000,24.070050,153.096469)
  winding: 1
  invertedTrack: 1
  pdg id: -22
RKTrackRep::setPDG particle -22 not known to TDatabasePDG -> abort

maybe it could help somehow.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Mon, 27 Jun 2011 15:54:45 GMT
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Hi Stefano,

I want just to comment that from my side running 10 times 1000 event I didn't have such crush.

But I have a question here concerning MCTrackAssociator.
If it doesn't work with TPC can I still use in analysis macro MC based PID?

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Mon, 27 Jun 2011 16:05:12 GMT
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The MCTrackAssociator is not using the enum, while tpc reco code is still using it.
I can try to write a dummy MCTrackAssociatorEnum which uses the old enum. But this will be only a temporary fix.

I could also try to change tpc reco code in order to use the correct code and not the enum, to be compatible with the rest of the code, but for this I need to ask the OK from tpc developers.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Mon, 27 Jun 2011 16:14:40 GMT
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Hi Dima,
please update the package PndMCMatch and try to use PndMCTrackEnumAssociator. It should work... please let me know your feedback.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Tue, 28 Jun 2011 11:24:45 GMT
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Hi,
I have tried with a different sample, 500 events under eta_c folder, and I have seen:

1966 charged candidates
2865 PndTrackPostFitComplete tracks
2410 PndTrackPostFitComplete with flag>0.
1995 PndTrackPostFitComplete with flag>0. & p>0.1 & p<15

The remaining 1995-1966 missing candidates should be tracks were the back extrapolation to beam axis has failed.

Everything fine to me for what concerns the pidcorrelator.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johannes Rauch on Tue, 26 Jul 2011 14:20:27 GMT

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Hi,

I just noticed that the number of tracks in the "n charged" histogram is much too low.

I simulated 10 events and get 57 GFTracks. But in the "n charged" histogram there are only 15 tracks.

Also the PndPidCorrelator produces a lot of error messages, where propagation seems to go wrong.

I think we have problems with the PndPidCorrelator.

Could someone please take a look into it?

cheers,

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Tue, 26 Jul 2011 14:52:43 GMT
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Have you read my old message about low momentum values in tpcriemanntracks, two weeks ago? The correlator does not correlate tracks with p<100 MeV and p>10 GeV, for both tpc and stt. All the missing candidates are coming from very low momentum tracks.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Tue, 26 Jul 2011 15:34:51 GMT
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Concerning error messages from PndPidCorrelator, it really could be the place where tracks are lost.
With ideal pid in PndTpcRiemannTrackingTask I see the message from PndPidCorrelator

-W- PndPidCorrelator::GetTrackInfo :: Failed backward propagation

in average twice per event.

Whereas in case of specific particle hypothesis (pion or kaon) I see the same message 1 in 5 events.

This message is coming from PndPidTrackInfo.cxx and here tracks are rejected independent on momentum cut, actually this part of code is executed after cut on momentum.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johannes Rauch on Tue, 26 Jul 2011 15:43:18 GMT
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Ah sorry, I haven't read this.

But I just fixed a little bug int the MVD correlator Task, there the RKTrackRep was not correctly copied and just GeaneTrackRep was used.

And I just tested with RK as cardinal Rep and there efficiencies seem to go up.

I just commited a new version of the RiemannTrackingTask, where Geane is no longer set as cardinal rep.

Dear Analysers, could you please check the efficiencies with the new versions?

regards,

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Elisa Fioravanti on Wed, 27 Jul 2011 09:16:37 GMT
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Hello,

I would like to test the efficiency in the multipion analysis with the new version.
I run the macro run_sim_tpc_evt.C
in the folder /macro/run/tdrct/npipi/

but I have this error:

```
 ====== EMC 2)::  ConstructASCIIGeometry() ===
 ============================================
PndEmcReader: EMC geometry file ==
/home/fioravanti/fairsoft/pandaroot/geometry/emc_module12.dat
Emc module = 1
********
Emc module = 2
********

 ====== EMC::  ConstructRootGeometry() m3a ===
 ============================================
File name = /home/fioravanti/fairsoft/pandaroot/geometry/emc_module3new.root

 ====== EMC::  ConstructRootGeometry() m4a ===
 ============================================
fgeoName3::  /home/fioravanti/fairsoft/pandaroot/geometry/emc_module4_StraightGeo24.4
.root
File name Bw1=  /home/fioravanti/fairsoft/pandaroot/geometry/emc_module4_StraightGeo24.4
.root
```

PndMdt::ConstructGeometry : No good MDT Barrel definition

And then root exits.
Could someone update the right macro to use?

thanks
elisa

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Wed, 27 Jul 2011 09:42:46 GMT
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Hi Elisa,

I assume that this problem is related to recent modifications of MDT classes. So if you use the trunk version of mdt you probably should use mdt geometry instead of

```
  PndMdt *Muo = new PndMdt("MDT",kTRUE);
  Muo->SetBarrel("fast");
  Muo->SetEndcap("fast");
  Muo->SetMuonFilter("fast");
  Muo->SetMdtMagnet(kTRUE);
  Muo->SetMdtMFIron(kTRUE);
  fRun->AddModule(Muo);
```

the definition as in macro/mdt/sim_muo_dub.C

```
  PndMdt *Muo = new PndMdt("MDT",kTRUE);
  Muo->SetMdtMagnet(kTRUE);
//  Muo->SetMdtMFIron(kFALSE);
  Muo->SetMdtCoil(kTRUE);
  Muo->SetBarrel("muon_TS_barrel_strip_v1_noGeo.root");
  Muo->SetEndcap("muon_TS_endcap_strip_v1_noGeo.root");
  Muo->SetForward("muon_Forward_strip_v1_noGeo.root");
  Muo->SetMuonFilter("muon_MuonFilter_strip_v1_noGeo.root");
  fRun->AddModule(Muo);
```

To be honest I didn't try it by myself, I use previously generated simulation data and repeat only from digitization stage.

But here I have a question to Johannes, if the modified padplane file comes to simulation or digitization stage?

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC

Posted by Dima Melnychuk on Wed, 27 Jul 2011 10:12:40 GMT
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Hi Elisa,

I have just thought that proper solution for the moment would be not to modify simulation macro but to modify the revision of mdt directory to the state before the update, i.e. 12752.

I.e. within mdt directory /pandaroot/mdt
type:
svn update -r 12752
and recompile.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Wed, 27 Jul 2011 10:19:43 GMT
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Hi,
These tracks are skipped when geane backward extrapolation fails. This means that track parameters are wrong and cannot be back propagated... Maybe the track is not going to the inner part but outwards, this shoul happenin particular for secondaries... Not our case then. I think the output in momentum of theriemann tracks should be checked carefully.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Wed, 27 Jul 2011 10:26:24 GMT
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And one more correction concerning mdt directory

The proper revision to go back is 12733,

i.e.
pandaroot/mdt$ svn update -r 12733

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Elisa Fioravanti on Wed, 27 Jul 2011 10:26:59 GMT
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Hello Dima,

thanks for your reply.
I have tried with svn update -r 12752 and I re-compiled but I have this error:

[57%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdt.cxx.o
[57%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtMagnet.cxx.o
[58%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtCoil.cxx.o
[58%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtMuonFilter.cxx.o
[58%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtMFIron.cxx.o
[58%] Building CXX object mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtGeoConstructorFast.cxx.o
/home/fioravanti/fairsoft/pandaroot/mdt/MdtMC/PndMdtGeoConstructorFast.c xx:34: error: no
‘void PndMdt::ConstructGeometryFast()’ member function declared in class
‘PndMdt’
make[2]: *** [mdt/CMakeFiles/Mdt.dir/MdtMC/PndMdtGeoConstructorFast.cxx.o] Error 1
make[1]: *** [mdt/CMakeFiles/Mdt.dir/all] Error 2
make: *** [all] Error 2

Instead, if I change the sim macro in this way:

```
  PndMdt *Muo = new PndMdt("MDT",kTRUE);
  Muo->SetMdtMagnet(kTRUE);
//  Muo->SetMdtMFIron(kFALSE);
  Muo->SetMdtCoil(kTRUE);
  Muo->SetBarrel("muon_TS_barrel_strip_v1_noGeo.root");
  Muo->SetEndcap("muon_TS_endcap_strip_v1_noGeo.root");
  Muo->SetForward("muon_Forward_strip_v1_noGeo.root");
  Muo->SetMuonFilter("muon_MuonFilter_strip_v1_noGeo.root");
  fRun->AddModule(Muo);
```

everything works,
now, what is the best solution to run the simulation?

thanks a lot
Elisa

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Elisa Fioravanti on Wed, 27 Jul 2011 10:29:52 GMT
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Hello Dima,

now the simulation seems to work!

Thanks a lot
Elisa

Subject: Re: Update on eta_c reconstruction with STT and TPC

Posted by Johannes Rauch on Wed, 27 Jul 2011 10:56:14 GMT
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Hi Dima,

Quote:But here I have a question to Johannes, if the modified padplane file comes to simulation or digitization stage?

the padplane file affects only digi and reco.

cheers

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johannes Rauch on Wed, 27 Jul 2011 13:26:04 GMT
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Hi,

I just run the eta_c macros for 100 events, and we have an efficiency of ~30% if we use only tpc (i.e. without MVD and GEM correlators).
If I add the MVD correlator I only find ~ 15 eta_cs.

So we definetly have a problem with our MVD and GEM correlators and are investigating!

cheers,

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Elisa Fioravanti on Wed, 27 Jul 2011 13:27:22 GMT
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Hello everybody,

I would like to say that I'm running, for pi+pi- analysis, the reconstruction macro for the TPC, available into svn (update of pandaroot done this morning),
(macro/run/tdrct/npipi/run_reco_tpc_evt.C)

and I have al lot of this message:

in line: 305 in file:
/home/fioravanti/fairsoft/pandaroot/GenfitTools/trackrep/GeaneTrackRep/G eaneTrackRep.cxx
with fatal flag 0
GFException thrown with excString:
GEANE propagation failed

best,

Elisa

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johannes Rauch on Thu, 28 Jul 2011 14:30:32 GMT
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Hi,

I worked on the MVD and GEM correlators and checked in new versions. The cuts are now in cm, so I updated all macros accordingly!

Please update (macros, tpc, externals(genfit and RKTrackRep)). Efficiencies for eta_c should now be around 30%.

regards,

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Thu, 28 Jul 2011 21:25:54 GMT
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Hi Johannes,

I can only confirm that with 2000 events statistics eta_c reconstruction efficiency with TPC is around 30% as you have written. And mass distributions looks also good.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Thu, 28 Jul 2011 22:03:37 GMT
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Does it mean we could update july11 on the grid and rerun tpc jobs?
Which packages should be updated? Only tpc or maybe also something else?
Are there big differences with stt efficiency? Unfortunately I do not have these numbers with me.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Thu, 28 Jul 2011 22:36:57 GMT
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Hi Stefano,

I also would like to clarify the question of data production on GRID.

But comming to TPC vs STT efficieny.
TPC efficiency = 28.9% (using vertex fit)
STT efficiency with GRID data =26.4% with all tracks and 23.7% with requirement of at least one STT hit in track.

STT efficiency with latest trunk version (2000 events) = 15.6%
(with requirement of at least one STT hit).
But I have no idea if the work on STT code is finished?
So I suppose that STT signal data should also be reproduced but the question is if to reproduce them together with TPC or later?

For TPC data reproduction in addition to tpc directory, genfit and RKTrackRep in GenfitTools/trackrep should be updated to rev 370 and updated tpc reco macros should be used.

And coming to the question of reconstruction of fully mixed events. I do not know how realistic is to expect to produce them by 5-7 August (the date when the GRID will be off), but without knowing when the code will be ready, there is still the question if the available DPM data should be used or they also needs to be reproduced. At least for TPC there were recent modifications related to clustering, which is the part of digitization, and I suppose TPC expert should define how important they are for DPM data which will be used for mixing.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Fri, 29 Jul 2011 07:17:23 GMT
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About Dpm events, they should be redone anyway.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johan Messchendorp on Fri, 29 Jul 2011 08:24:38 GMT
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Hi,

It would be good, if we could start some production over the weekend.
I will try to connect to the internet as much as I can (will travel to Barcelona today),
just let me know when (and what!) to update (in) the july11 release and the grid software.

Greets,

Johan.

Subject: Re: Update on eta_c reconstruction with STT and TPC

Posted by StefanoSpataro on Fri, 29 Jul 2011 08:47:04 GMT
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Probably it would be good f also the secondary problem with tpc detector would be fixed, in order to use ideal pid for tpc Riemann (at least, I suppose that is the problem)

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Gianluigi Boca on Fri, 29 Jul 2011 12:33:49 GMT
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Hi Dima,
I was still working on the Cleanup code for Stt in the last days.
Maybe you run with some non-final version and that's the cause of this sudden 15.6% efficiency.

So last night I put the final version (...yes, right) of the Stt PR+Cleanup code in svn. I hope the efficiency for Stt returns to the previous values.

Also I updated all the analysis Macros (run_reco_stt_evt.C and
run_reco_stt_mix.C) for all the physics channels (eta_c,
llbar, npipi, psi3770) by adding the following line necessary
to activate the Cleanup code :

```
SttMvdTracking->Cleanup();
```

Please notice that in the non-mixing Macros (run_reco_stt_evt.C)
this line is COMMENTED OUT for the time being, because I would like to see if possible, if there are problems with the various analysis and no Cleanup.

If everything is fine, then activating the Cleanup should be beneficial even for the non-mixed events (it rejectes spurious tracks) even though I would expect a bit of a lowering in the reconstruction efficiency.

Lia has also updated the run_reco_stt_evt.C and run_reco_stt_mix.C adding the task of the extrapolation to the Gem region.
She is also checking the last details today. By tonight let's say at 20:00 all the Macro should be ready and can be used on the Grid. She will send aroung a message on the Forum when dona.

Tschuess an alle

Gianluigi

Dima Melnychuk wrote on Fri, 29 July 2011 00:36Hi Stefano,

I also would like to clarify the question of data production on GRID.

But comming to TPC vs STT efficieny.
TPC efficiency = 28.9% (using vertex fit)
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(with requirement of at least one STT hit).
But I have no idea if the work on STT code is finished?
So I suppose that STT signal data should also be reproduced but the question is if to reproduce them together with TPC or later?

For TPC data reproduction in addition to tpc directory, genfit and RKTrackRep in GenfitTools/trackrep should be updated to rev 370 and updated tpc reco macros should be used.

And coming to the question of reconstruction of fully mixed events. I do not know how realistic is to expect to produce them by 5-7 August (the date when the GRID will be off), but without knowing when the code will be ready, there is still the question if the available DPM data should be used or they also needs to be reproduced. At least for TPC there were recent modifications related to clustering, which is the part of digitization, and I suppose TPC expert should define how important they are for DPM data which will be used for mixing.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Fri, 29 Jul 2011 13:03:27 GMT
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Hi,

I have several additional comments concerning eta_c reconstruction efficiency.

1. First comment is related to worse reconstruction efficiency for STT.
I used the rev. 12894, which includes the latest commit from Gianluigi available in svn from the 27.07 23:15.
It didn't include latest update from Lia, which only affected PndSecondaryTrackFinder.cxx.

For data which I produced yesterday with the trunk the mass distribution for eta_c and phi without any cuts look like:

whereas for the data on grid

So the left tail for eta_c distribution increased significantly, but it's still possible that it's a statistical fluctuation.

Especially looking at the final plots for new data:

and grid data:

they are very similar. So I could expect that with higher statistics, efficiency still could increase.

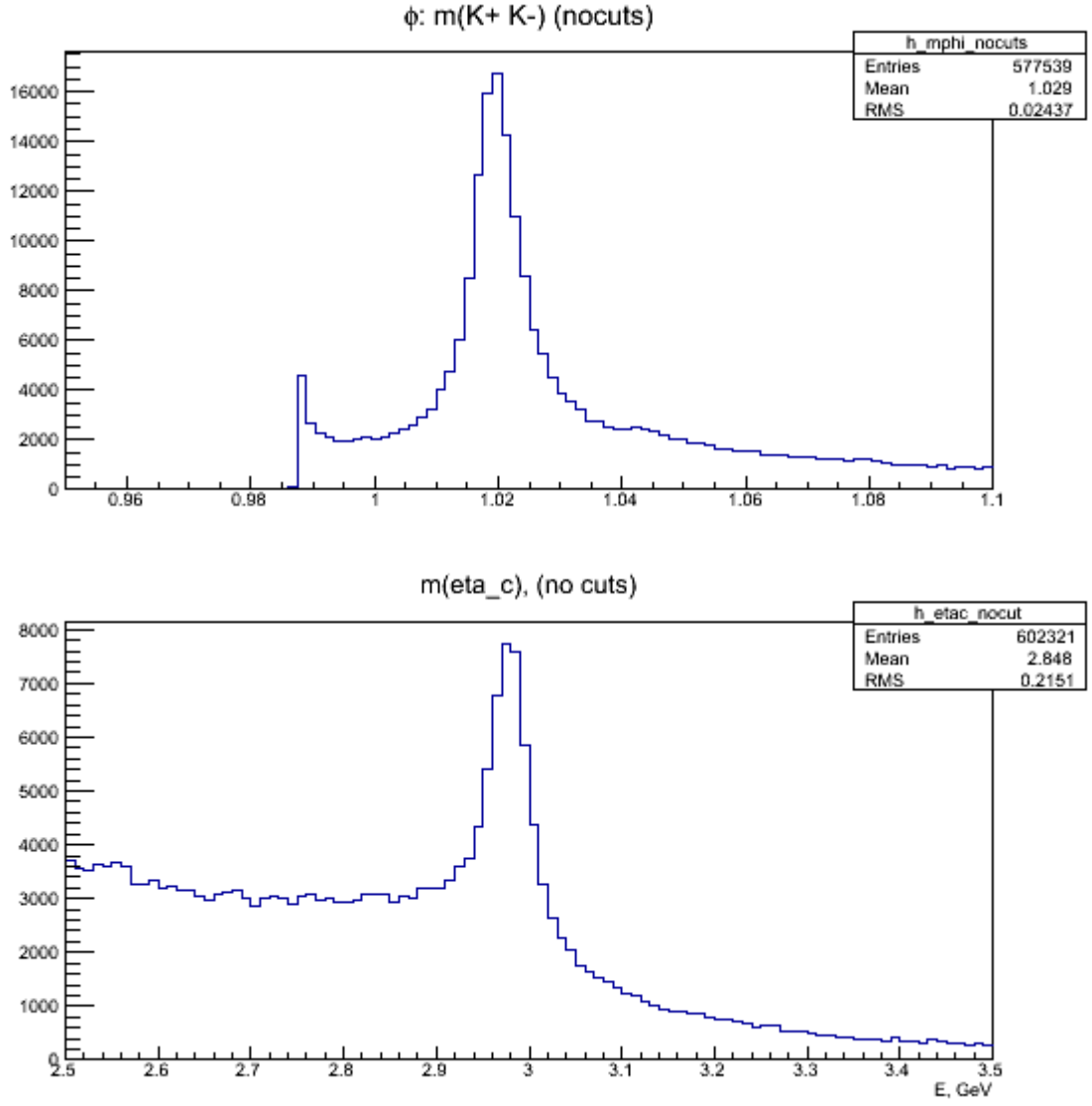
2. Second comment is related to ideal pid for tpc Riemann. I checked eta_c reconstruction with both pion and kaon hypothesis in riemann and results are very close (here the mass cuts are slightly tighter then for efficiency reported in previous post), i.e
Efficiency | sigma(eta_c) | sigma(phi)
pion:
27.04% | 11.74 MeV | 3.61 MeV
kaon:
27.29% | 11.94 MeV | 3.55 MeV

So using working ideal pid wouldn't change the results much.

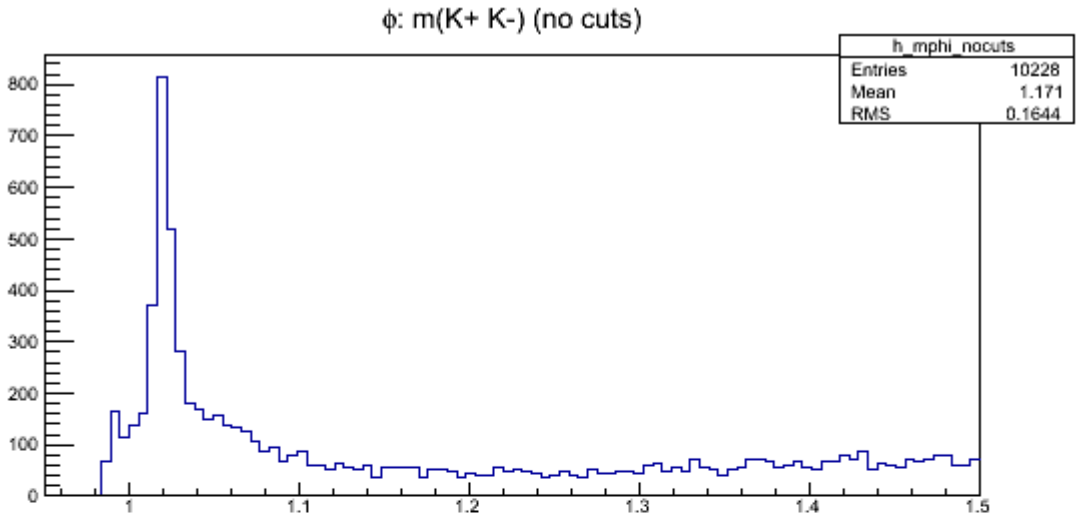
Dima

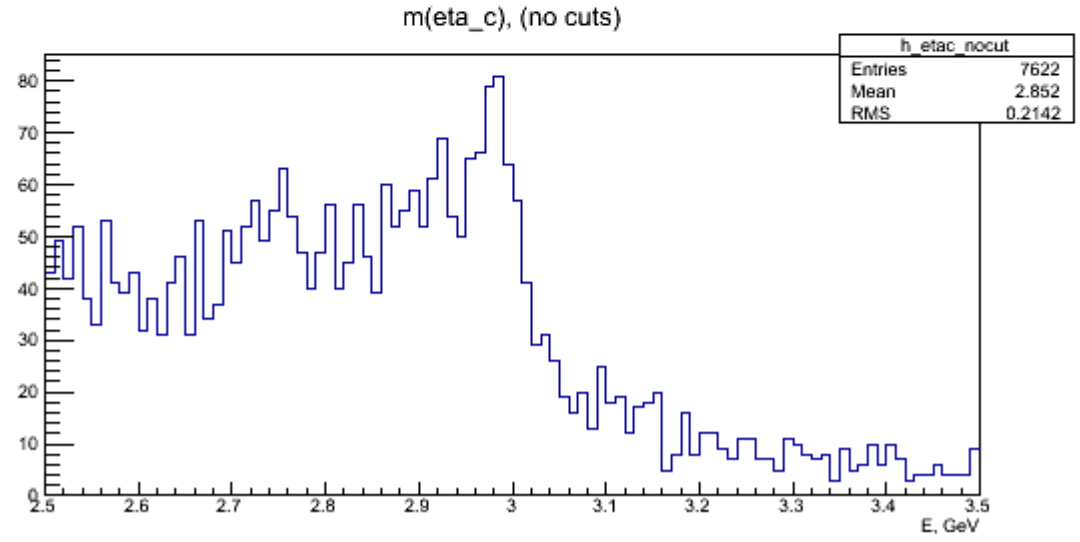
File Attachments

1) m_nocuts_stt.png, downloaded 708 times

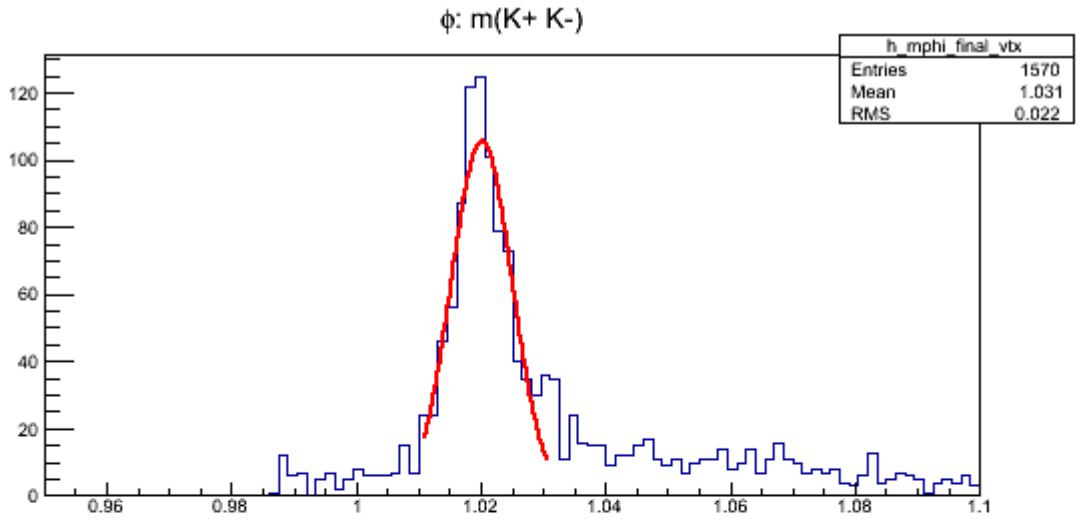


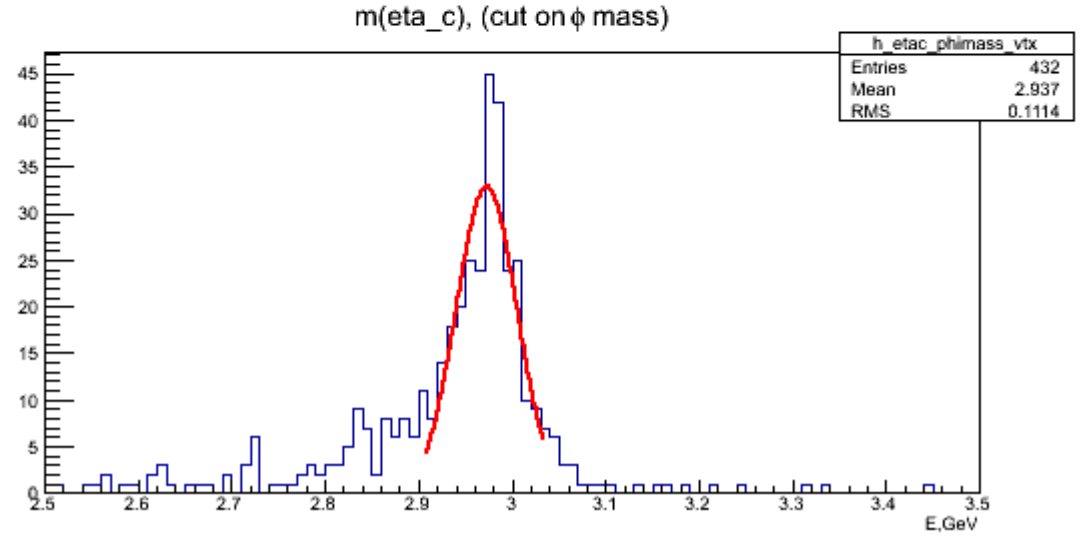
2) m_nocuts_stt_new.png, downloaded 809 times



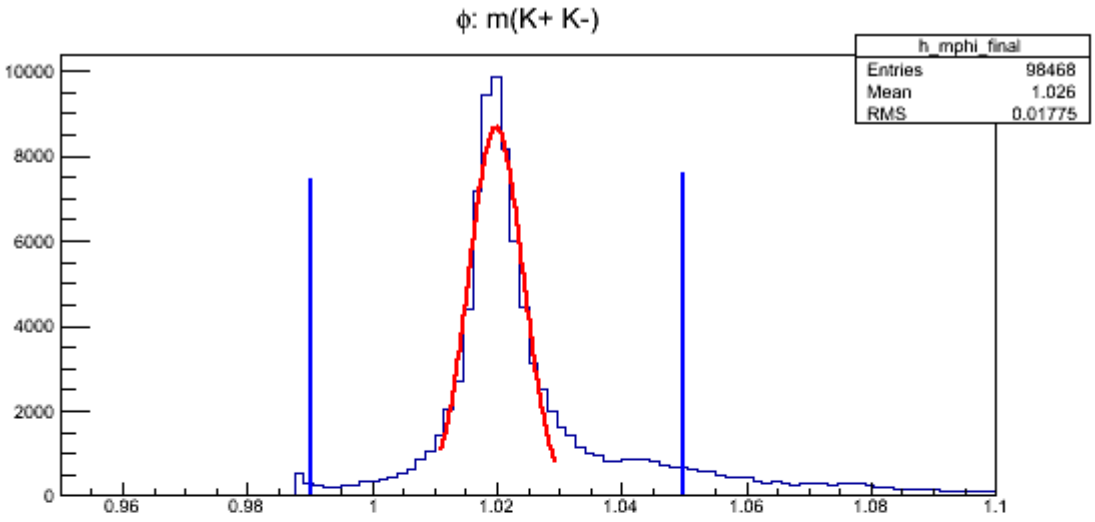


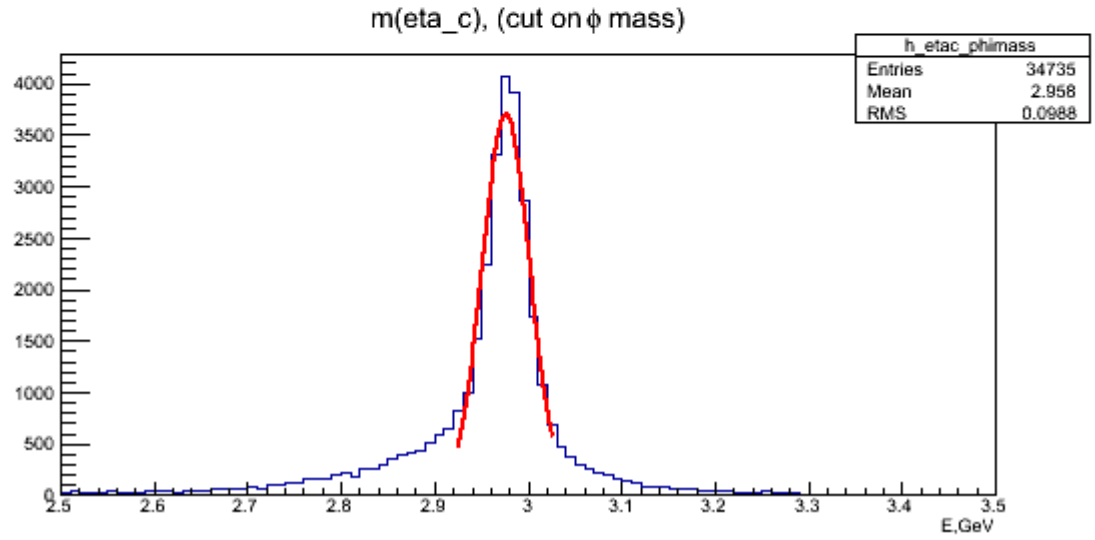
3) m_phicut_stt_new.png, downloaded 830 times





4) m_phicut_stt.png, downloaded 833 times





Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Lia Lavezzi on Fri, 29 Jul 2011 14:30:21 GMT
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Quote:Lia has also updated the run_reco_stt_evt.C and run_reco_stt_mix.C adding the task of the extrapolation to the Gem region.
Actually the task for the extrapolation was already there, I just set the additional flag to extrapolate to the GEM with the MC pdg code instead of the default one.
Dima, did you use this updated macro to produce your last plot? Could it be that the mc pdg code in the gem extrapolation worsen results? I would be very surprised (from my tests there was almost no change in efficiency).

Cheers,
Lia.

Subject: Re: Update on eta_c reconstruction with STT and TPC

Posted by Dima Melnychuk on Fri, 29 Jul 2011 14:43:53 GMT
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Hi Lia,

yes I used the updated macro to produce the last results, i.e. with

```
PndSttMvdGemTracking * SttMvdGemTracking = new PndSttMvdGemTracking(0);
SttMvdGemTracking->SetPdgFromMC();
fRun->AddTask(SttMvdGemTracking);
```

So I will try to comment the line

```
SttMvdGemTracking->SetPdgFromMC();
```

and see how it will affect the efficiency, however it will take some time to run reconstruction on 2000 events (5-6 hours) and I suppose it's better to wait with grid reproduction of the signal with stt till I have the results.

But on the other hand I suppose that STT code on the grid can be updated till the latest version (if other modifications are not expected), since this point will affect only the switch in the macro.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Lia Lavezzi on Fri, 29 Jul 2011 15:04:06 GMT
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Quote:So I will try to comment the line

```
SttMvdGemTracking->SetPdgFromMC();
```

and see how it will affect the efficiency
Yes, I would appreciate this, thank you for testing it on a real channel.

Quote:however it will take some time to run reconstruction on 2000 events (5-6 hours) and I suppose it's better to wait with grid reproduction of the signal with stt till I have the results.
Yes, I agree, it is better to see what happens first.

Quote:But on the other hand I suppose that STT code on the grid can be updated till the latest version (if other modifications are not expected), since this point will affect only the switch in the macro.
I agree also on this: from STT side I can confirm we can update the stt and sttmvdtracking directories and we could wait for your results before updating the macros.

(For the secondary track finder I still have to work on it, so we cannot wait for it).

Cheers,

Lia.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Fri, 29 Jul 2011 17:02:55 GMT
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Dima Melnychuk wrote on Fri, 29 July 2011 16:43
So I will try to comment the line

SttMvdGemTracking->SetPdgFromMC();

and see how it will affect the efficiency, however it will take some time to run reconstruction on 2000 events (5-6 hours) and I suppose it's better to wait with grid reproduction of the signal with stt till I have the results.

Considering the time scale we will do only a last grid production. Therefore, it is better to check everything before starting. The same fo the ideal pid of tpc, I have not well understood if this is finally fixed or not.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Johannes Rauch on Fri, 29 Jul 2011 17:06:37 GMT
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Dear Stefano,

I changed the tpcDetector, and now we can access also secondary tracks from the MCTrackArray.
This is checked in.

But when trying eta_c with mc pid, I get very low efficiencies.

So there is still a bug, but I think its in the reco, not in the sim.

regards,

Johannes

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Sat, 30 Jul 2011 07:05:02 GMT
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Hi Lia,

So running STT reconstruction for eta_c with commented

SttMvdGemTracking->SetPdgFromMC();
on the same data set I have the same efficiency around 15% as with this option on. So at least if this is a real drop in efficiency with STT and not a statistical fluctuation it's not the problematic place.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Lia Lavezzi on Sat, 30 Jul 2011 09:06:59 GMT
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Hi Dima,
thank you for the feedback and good to know that we can exclude this change from the suspects

I was looking again at the IM distributions: the shapes of the distributions of the eta_c IM seem similar. The mean values are 2.852 and 2.848 and the RMS are 0.2142 and 0.2151. Moreover the peak # of entries is 80 in the low statistic case and 8000 in the high statistic one and the counts drop to 40 in the first case and 4000 in the second one. So it could really be only the low statistic.

For the phi IM it is more difficult to say, since the ranges of the histograms are different.

What about the errors on the efficiency calculation? Do you think that the two efficiencies (low and high stat) are compatible within the errors?

The grid sample has been simulated in the july11 release, right?

I would ask also Gianluigi to comment on this, since maybe he knows of possible causes of the drop in efficiency that I miss.

Cheers,
Lia.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Sat, 30 Jul 2011 10:09:41 GMT
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Hi Lia,

Looking on the number of counts in eta_c peak with 80 vs 8000, I can add that number of analysed events is 2000 vs 100k. So drop of efficiency by factor 2 appears already on this level.

And concerning the error at lower statistics (calculating it as a square root of number of reconstructed eta_c) it' about 1%, i.e. 15+/-1 % vs 23%. So the numbers are not really compatible within errors, (may be it's just a matter of fluctuation).

> The grid sample has been simulated in the july11 release, right?

Yes.

By monday I will try to calculate a litle bit higher statistics, i.e. 5000 events. And here I have a question to Gianluigi if I should update the code to his commit from yesterday night?

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Felix Boehmer on Sat, 30 Jul 2011 10:23:39 GMT
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Hi Dima,

Just a quick question:
do you observe any differences in the efficiency with larger samples between pion and kaon hypotheses in the fit?

Cheers

Felix

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Lia Lavezzi on Sat, 30 Jul 2011 13:34:10 GMT
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Quote:Looking on the number of counts in eta_c peak with 80 vs 8000, I can add that number of analysed events is 2000 vs 100k. So drop of efficiency by factor 2 appears already on this level.

And concerning the error at lower statistics (calculating it as a square root of number of reconstructed eta_c) it' about 1%, i.e. 15+/-1 % vs 23%. So the numbers are not really compatible within errors, (may be it's just a matter of fluctuation).
Hi Dima,
you are right, considering these numbers I am also wondering if it is really just statistics. Let' s see what happens with more events.
Cheers,
Lia.

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Dima Melnychuk on Sat, 30 Jul 2011 15:57:18 GMT
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Hi Felix,

the numbers I quoted in one of my post, i.e.

Efficiency | sigma(eta_c) | sigma(phi)
pion:
27.04% | 11.74 MeV | 3.61 MeV
kaon:
27.29% | 11.94 MeV | 3.55 MeV

is for 2000 events statistics, and producing higher number of events is rather time consuming. And here statistical errors for efficiency are around 1.3%. I plan till Monday to produce 5000 events with pion hypotheis, but it will not decrease errors below the difference between pion and kaon hypotheses I quote here.

Dima

Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by StefanoSpataro on Sat, 30 Jul 2011 16:27:56 GMT
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Just one comment,
The ideal id shows a nice residual for low momentum, while the wrong hypothesis gives bad tails which we cannot show to referees. For etac we can cheat using the default kaon hypothesis, but in psi channel the problem will appear again. The working ideal id would be the better solution, I think

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Subject: Re: Update on eta_c reconstruction with STT and TPC
Posted by Felix Boehmer on Sat, 30 Jul 2011 16:30:56 GMT
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Hi Stefano,

I completely agree. Johannes is working on finding the problem there... we'll give an update on Monday!

Cheers

Felix
