Subject: PndKinVtxFitter Resoultion
Posted by Simone Esch on Mon, 29 Jul 2013 12:57:47 GMT
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Hello!

I tried to do a resolution plot for my PndKinVtxFitter Vertex Resolution.
If I understand correctly the distance is in cm. If this is true I have a vertex resolution in the order of mm which is in my opinion really bad.
Maybe I compare the wrong values with eatch other. Can someone have a look at my code?

Best regards

Simone

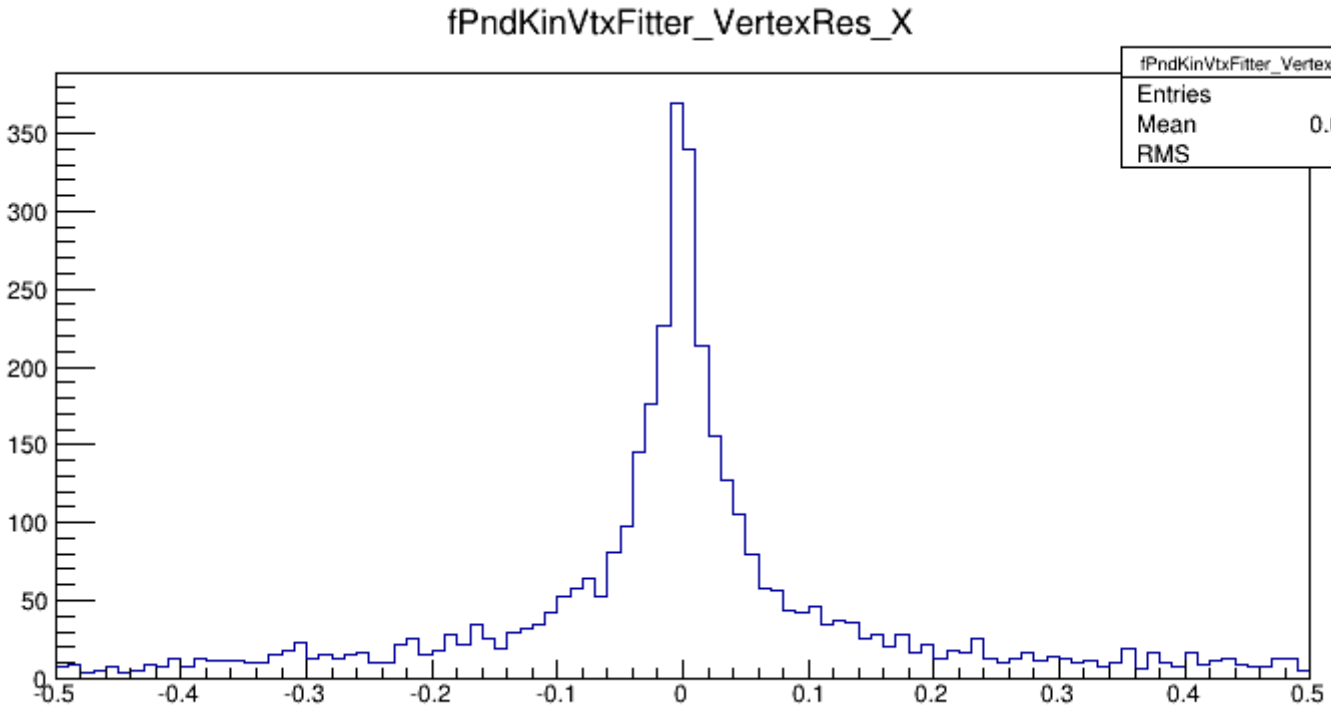
What I did:

```
 lambda2.Cleanup();
 lambda2.Combine(protonplus, pionminus); // Daugther 0 proton, Daughter 1 pion
 lambda2.SetType(3122);

 // **********************
 // PndKinVtxFitter
 // **********************
 double smallestchi2 =100000000000;
 int indexofsmallestchi2 =-1;
 RhoCandidate* lambdaPndKinVtxFitterfit;

 for(int k=0;k < lambda2.GetLength();k++)
 {
  PndKinVtxFitter kinvtxfitter(lambda2[k]);
  kinvtxfitter.AddMassConstraint(1.115);
  kinvtxfitter.Fit();
  if(kinvtxfitter.GetChi2()< smallestchi2 && kinvtxfitter.GetChi2() > 0)
  {
   smallestchi2= kinvtxfitter.GetChi2();
   indexofsmallestchi2=k;
   lambdaPndKinVtxFitterfit=lambda2[k]->GetFit();
   std::cout << "smallest chi2 " << smallestchi2<< std::endl;
  }
 }

 if(indexofsmallestchi2!=-1)
 {
fLambdaMassPndKinVtxFitter->Fill((lambdaPndKinVtxFitterfit->Daughter(0)->P4()+lambdaPnd
KinVtxFitterfit->Daughter(1)->P4()).M());
   fLambdaMassPndKinVtxFitterChi2->Fill(smallestchi2);

fPndKinVtxFitter_VertexRes_X->Fill(lambdaPndKinVtxFitterfit->Daughter(0)->GetPosition().X()
-lambda2[indexofsmallestchi2]->Daughter(0)->GetMcTruth()->GetPosition().X());
```

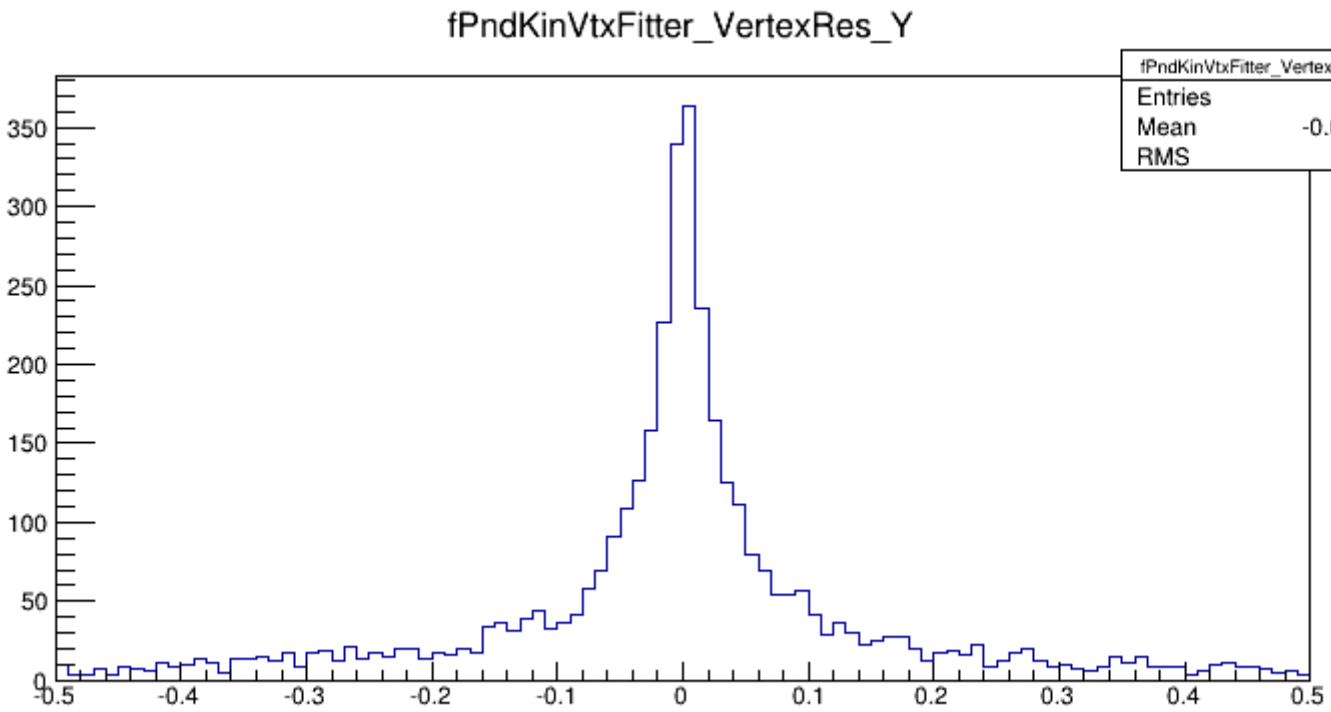
```
fPndKinVtxFitter_VertexRes_Y->Fill(lambdaPndKinVtxFitterfit->Daughter(0)->GetPosition().Y()
-lambda2[indexofsmallestchi2]->Daughter(0)->GetMcTruth()->GetPosition().Y());

fPndKinVtxFitter_VertexRes_Z->Fill(lambdaPndKinVtxFitterfit->Daughter(0)->GetPosition().Z()-
lambda2[indexofsmallestchi2]->Daughter(0)->GetMcTruth()->GetPosition().Z());
}
```

File Attachments

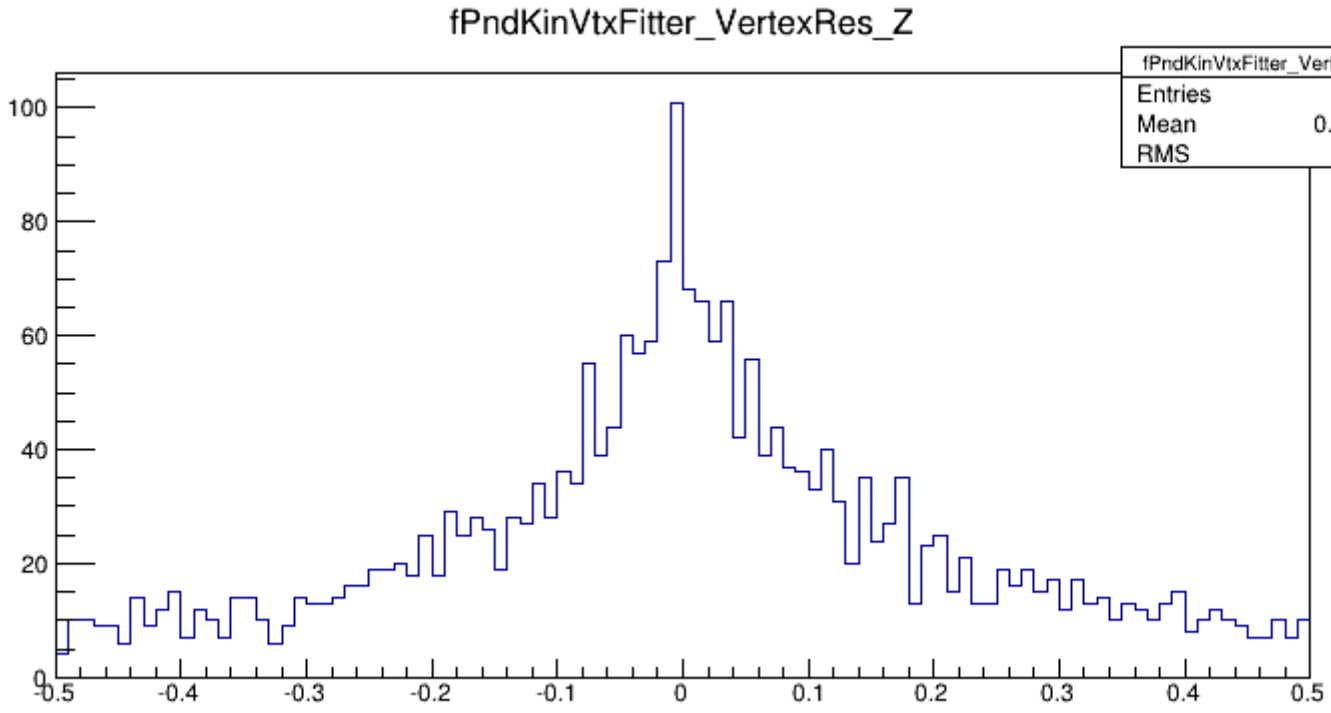
1) resx.png, downloaded 819 times



2) resy.png, downloaded 890 times



3) resz.png, downloaded 911 times



Subject: Re: PndKinVtxFitter Resoultion
Posted by Klaus Götzen on Mon, 29 Jul 2013 14:07:42 GMT
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Hi Simone,

your code looks ok for me.

Since you are considering Lambdas, which have a quite large lifetime a fly quite long, I wouldn't expect a vertex resolution as good as for short living particles like D's decaying within the MVD.

It would be helpful to take a look to the vertex distance from the IP and study the resolution depending on that. You could also fit the mean lifetime of your Lambda candidates and compare it to the PDG value.

Best regards,
Klaus

Subject: Re: PndKinVtxFitter Resoultion
Posted by StefanoSpataro on Mon, 29 Jul 2013 16:12:13 GMT
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I would suggest however to check this topic:

https://forum.gsi.de/index.php?t=tree&th=3901&start=0&rid=306&S=6c581bdc6201b7db71a4ed85c62e1a47#page_top

and to use PndChiVtxFitter, which seems to produce better results. Atleast we could have a term of comparison.

Subject: Re: PndKinVtxFitter Resoultion
Posted by Simone Esch on Tue, 30 Jul 2013 13:41:46 GMT
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Hello Stefano

I used the PndChiVtxFitter and got the following pictures:

They look even worse.

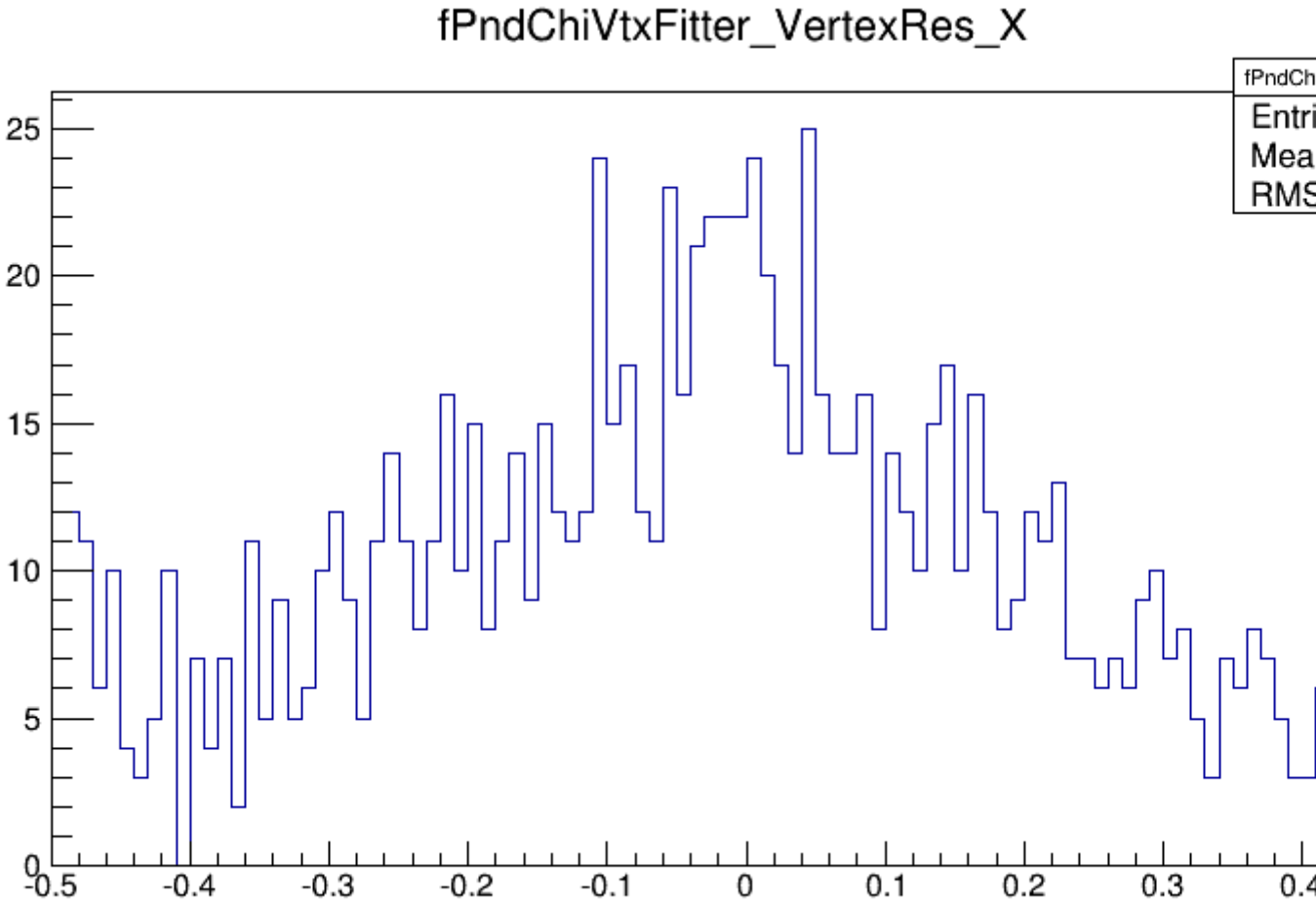
The Chi2 distribution looks even more strange (this is the distribution of all chi2, not just the best chi2 per event.)

Best regards

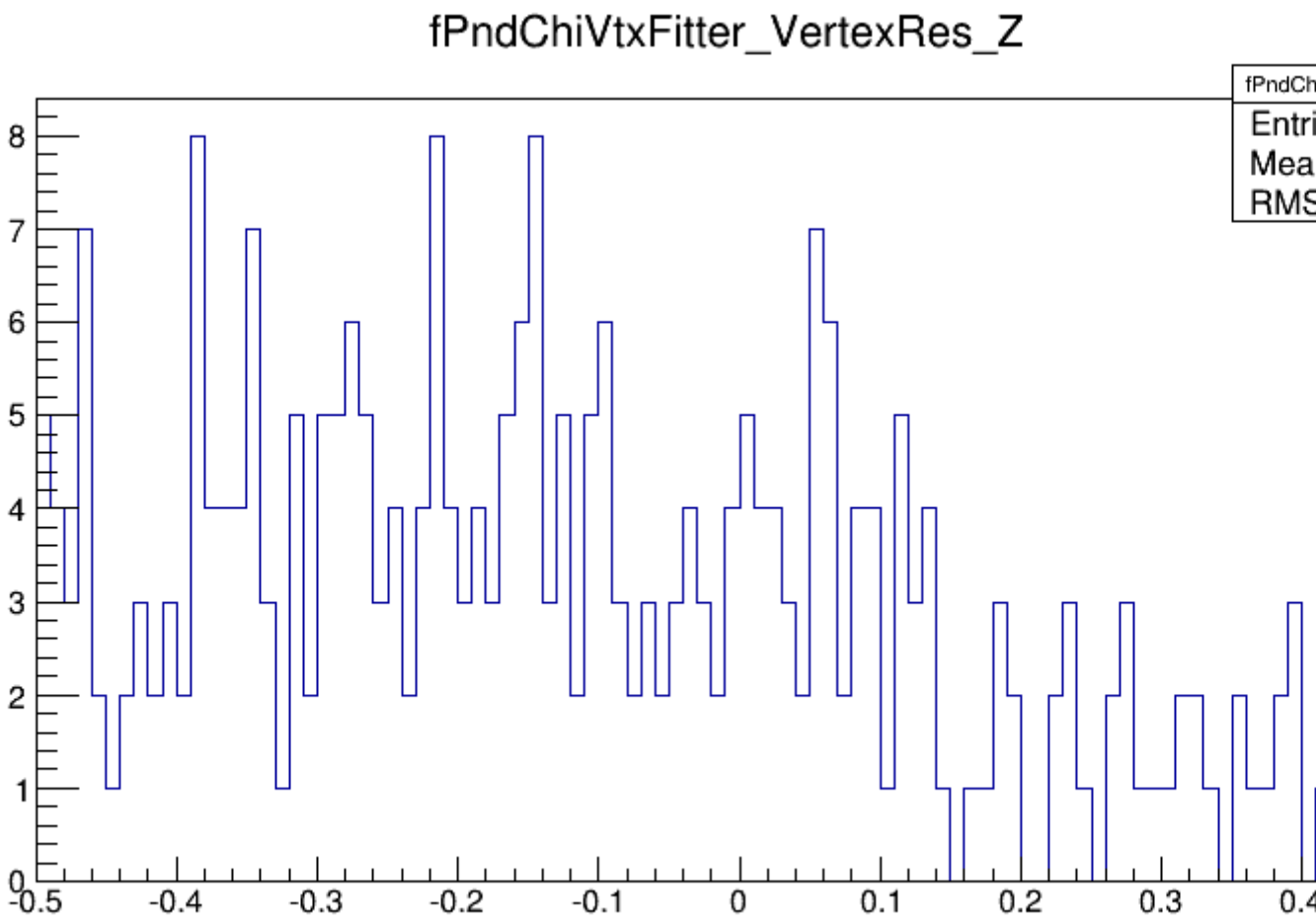
Simone

File Attachments

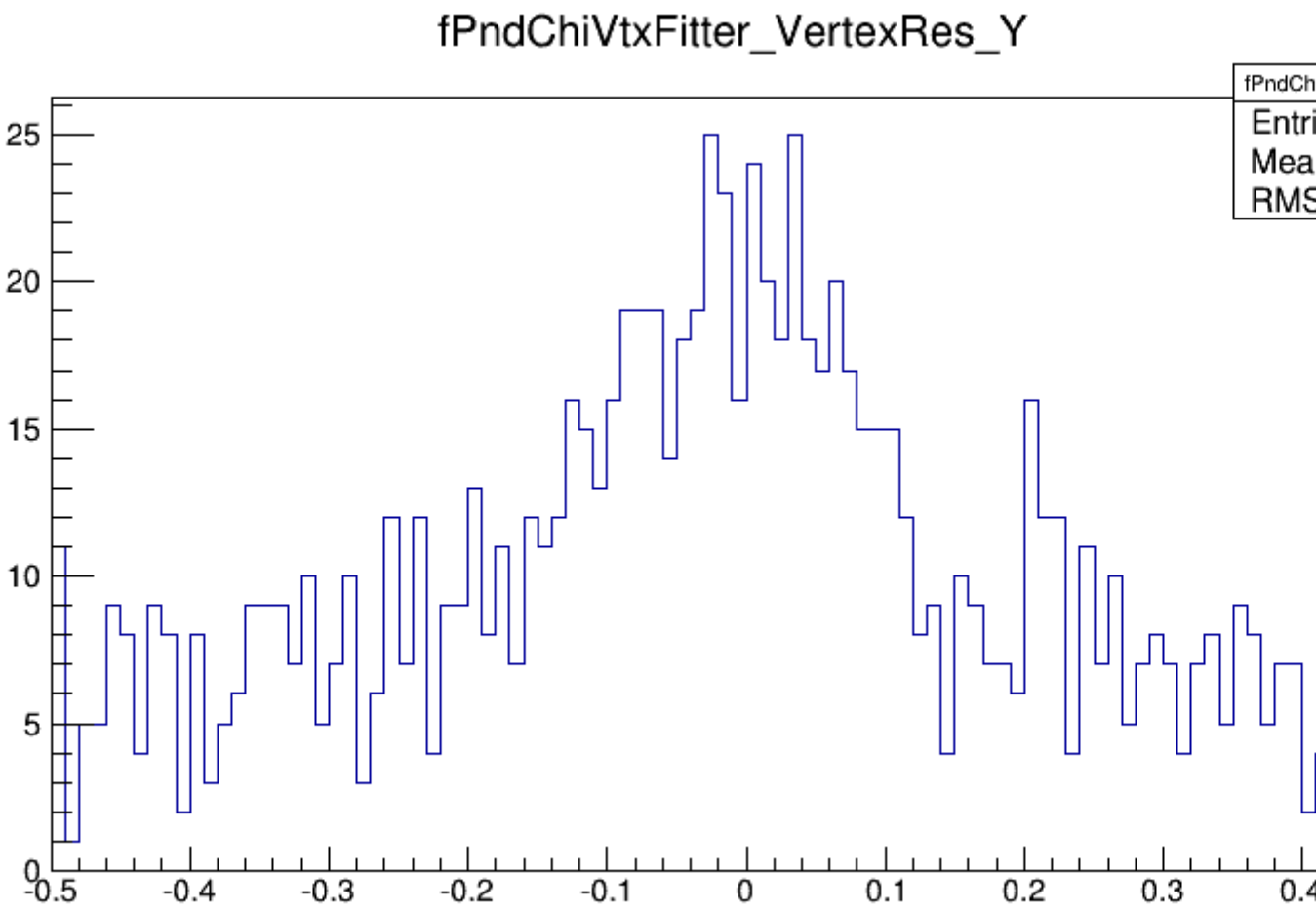
1) pndchivtxfitter_rex.png, downloaded 706 times



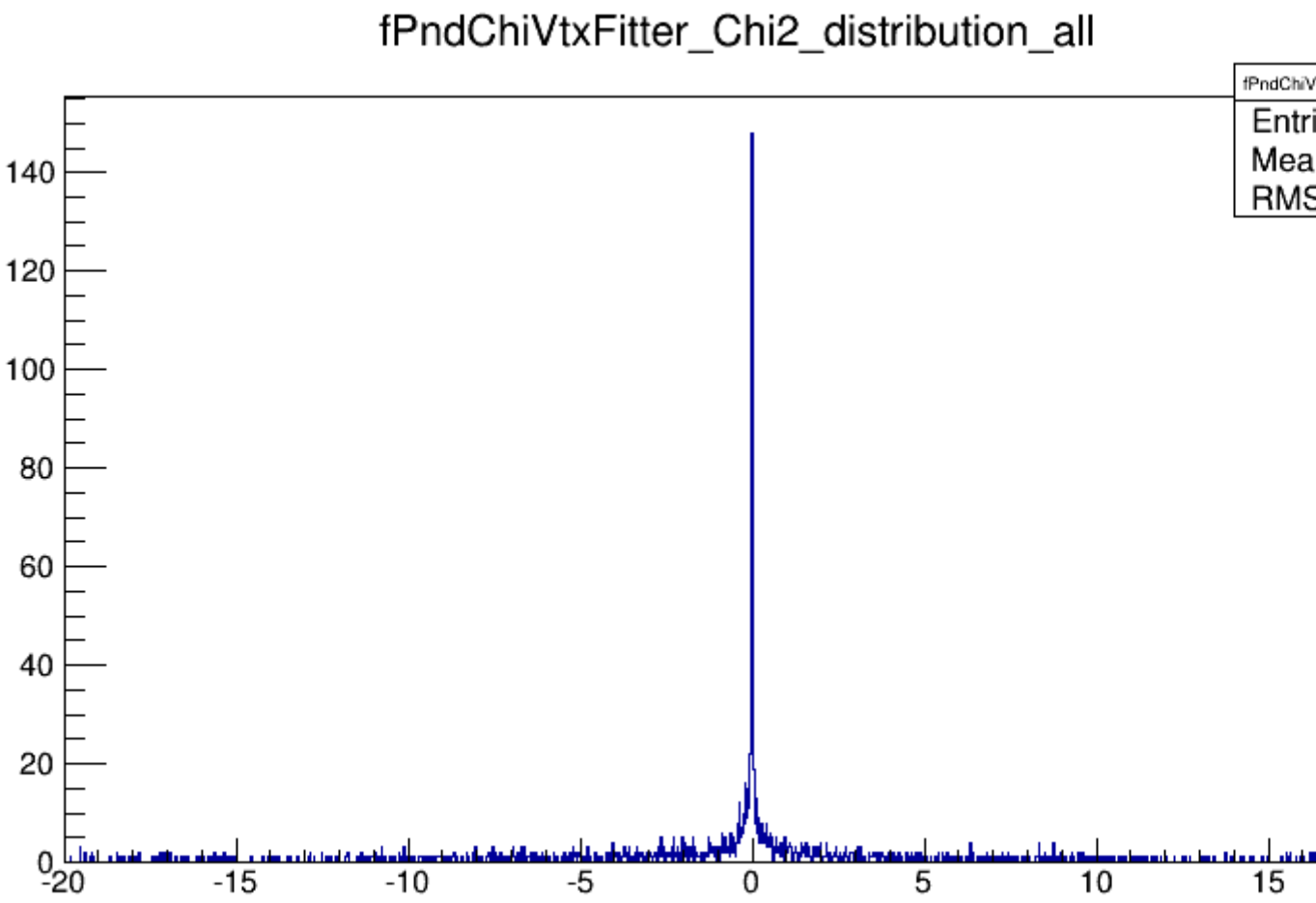
2) pndchivtxfitter_resz.png, downloaded 663 times



3) pndchivtxfitter_resy.png, downloaded 707 times



4) pndchivtxfitter_chi2.png, downloaded 703 times



Subject: Re: PndKinVtxFitter Resoultion
Posted by StefanoSpataro on Wed, 31 Jul 2013 06:37:11 GMT
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Have you used the updated version? There was a small bug found by Layra that I fixed in svn a couple of days ago.

Subject: Re: PndKinVtxFitter Resoultion
Posted by Simone Esch on Wed, 31 Jul 2013 07:28:26 GMT
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I updated my PandaRoot this morning.
PndChiVtxFitter.cxx is now Rev. 20887. Due to the update I get slightly different numbers, but the same distributions

Subject: Re: PndKinVtxFitter Resoultion
Posted by StefanoSpataro on Tue, 06 Aug 2013 14:06:29 GMT
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Is it possible that there are problems in retrieveing correctly the MC truth? Could you please check if the mc particles are really protons/pions and not something else?

Subject: Re: GetPosition()
Posted by Simon Reiter on Wed, 07 Aug 2013 09:36:08 GMT
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I have just a short question: Is GetPosition() returning the vertex of a particle? And if so, how is it calculated for each particle and do I have to use a fitter for better results?

Best regards
Simon

Subject: Re: GetPosition()
Posted by Ralf Kliemt on Wed, 07 Aug 2013 09:50:28 GMT
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Hallo Simon,

GetPosition() and Pos() return the position where the current four-momentum of the particle is defined. The momenum direction will change if you define it at another place of the measured trajectory.

After a vertex fit the daughter particles will have their four-momenta defined at the decay vertex (that's the goal).
You may also (since yesterday) use GetDecayVertex() at your composite. You'll be returned a RhoVector3Err, which is basically a TVector3 and a 3x3 TMatrixD for the covariance.

Cheers
Ralf
