Subject: very high reconstructed momenta of muons
Posted by Malgorzata Gumberidze on Wed, 11 Apr 2012 22:58:18 GMT
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Dear tracking experts.

During test of the TMVA i was surprise to see some number of track with reconstructed momenta which are very high in comparison to the monte carlo
value (Look into the attached plot: momentum.gif, keep in mind that i have also higher values, but i put limit on x-axis).

So let's me try to explain what i was dung.

I'm using PandaRoot version nov11 and externals may11.

I have simulated muons (flat distributions using pgun) in the momentum range:
0.2 GeV/c till 5GeV/c. They in my analysis i select

1. only primary tracks
   if (mctrack->GetMotherID()!=-1) continue;

2. i check if the reconstructed track is correlated to the monte carlo one:
  if (pidCand->GetMcIndex()!=mc) continue;

3. if i have more then one reconstructed track which belong to the same monte carlo i select one which has momentum closest to monte carlo one.

I tried to have a look (after some advices from Stefano) if one can find some topology of this high momenta looking into: number of hits in MVD or STT or
theta or phi or chi2 from fit .....

SO in the attachment you can see several plots. All plots are done as a function of momentum, so you can see not only problematic region, but also good one. In the case when i plot theta vs phi i put cut on p > 6 GeV/c.

In general looking into theta or phi it does not look that this high momenta comes from some specific region of the PANDA. In case of STT hits it looks that they have smaller number of the hits, below 28. But generally from the topology they do not look much different then good momenta track, but maybe i have overlook something.

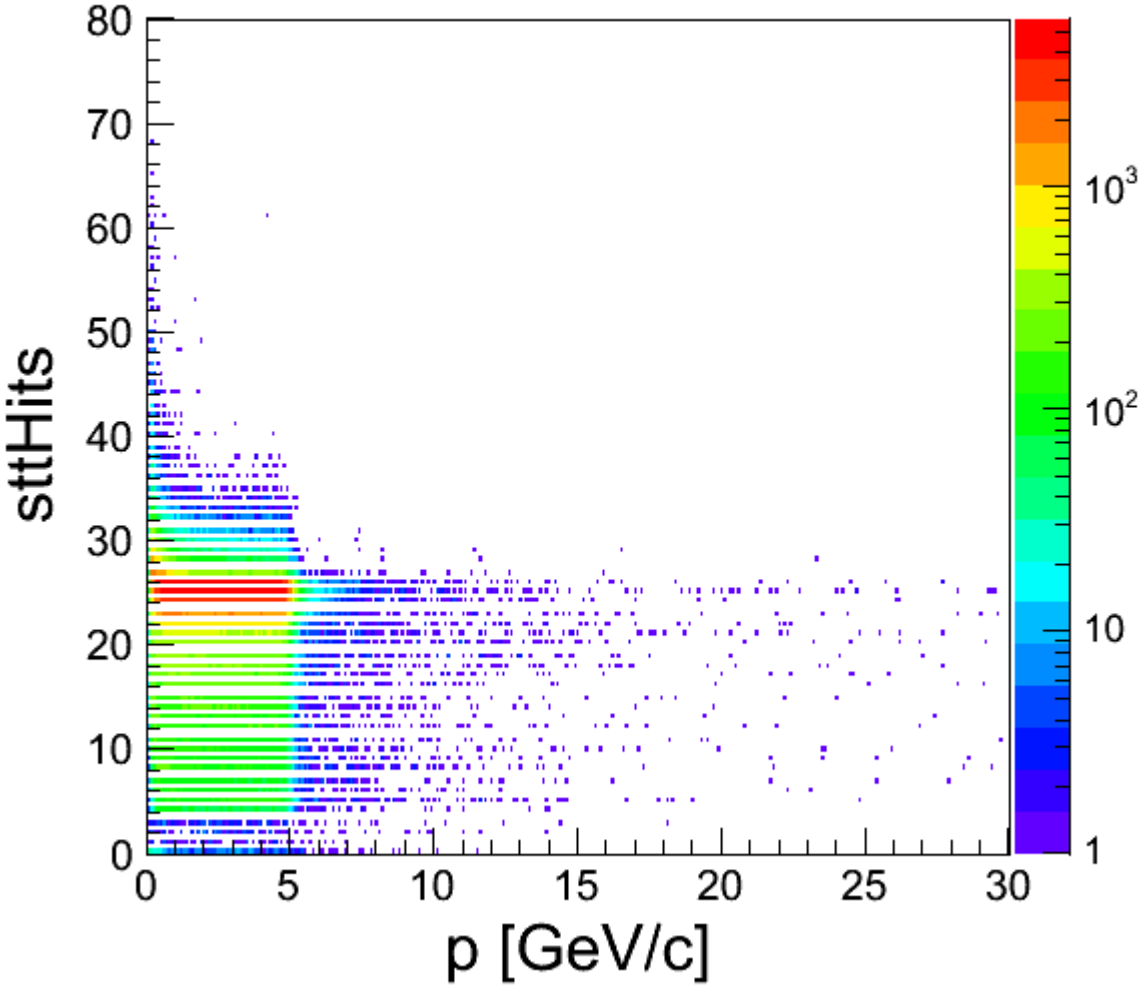
I hope that the names of plots are self-explaining.

So i do not know if i do something wrong, or it is like it is …. at least it looks strange.

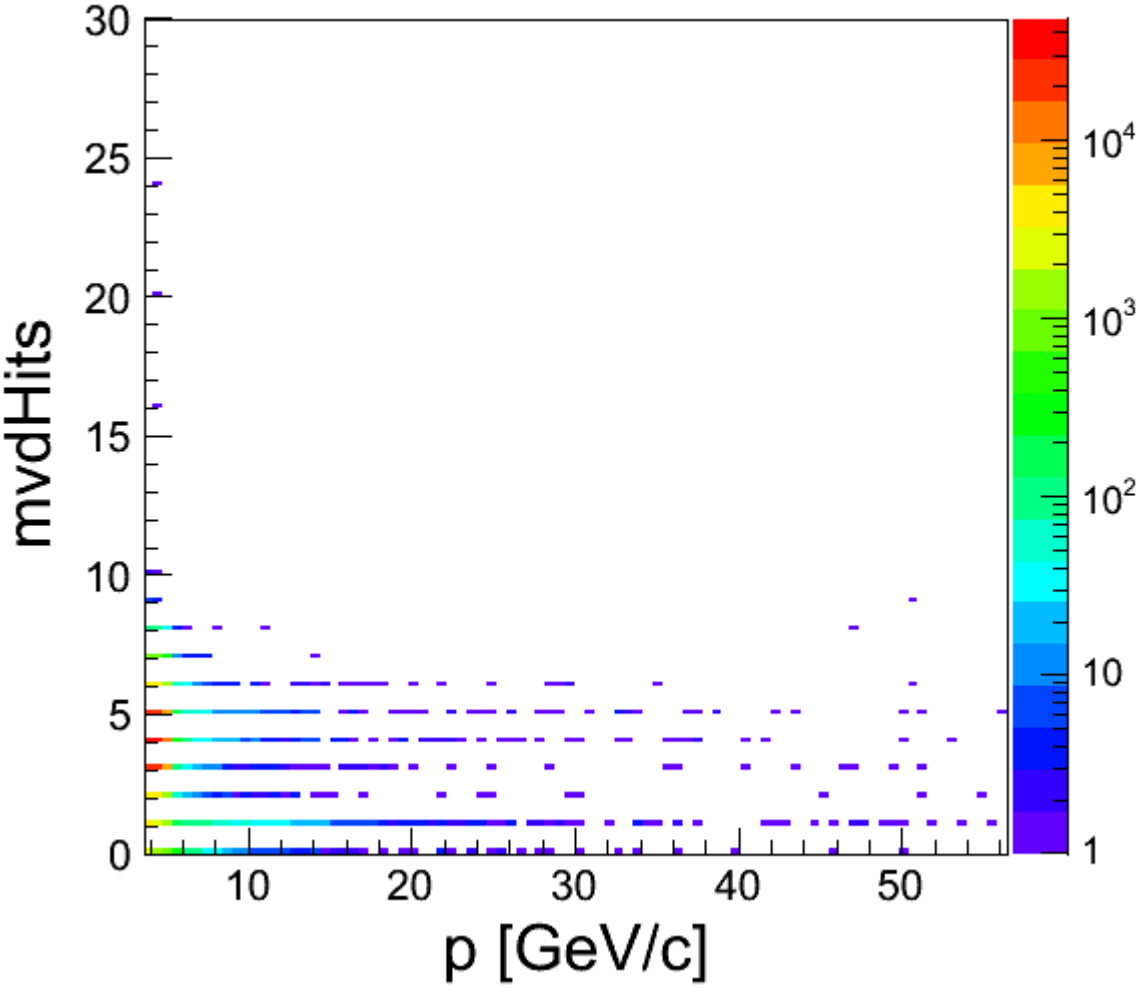
gosia

File Attachments

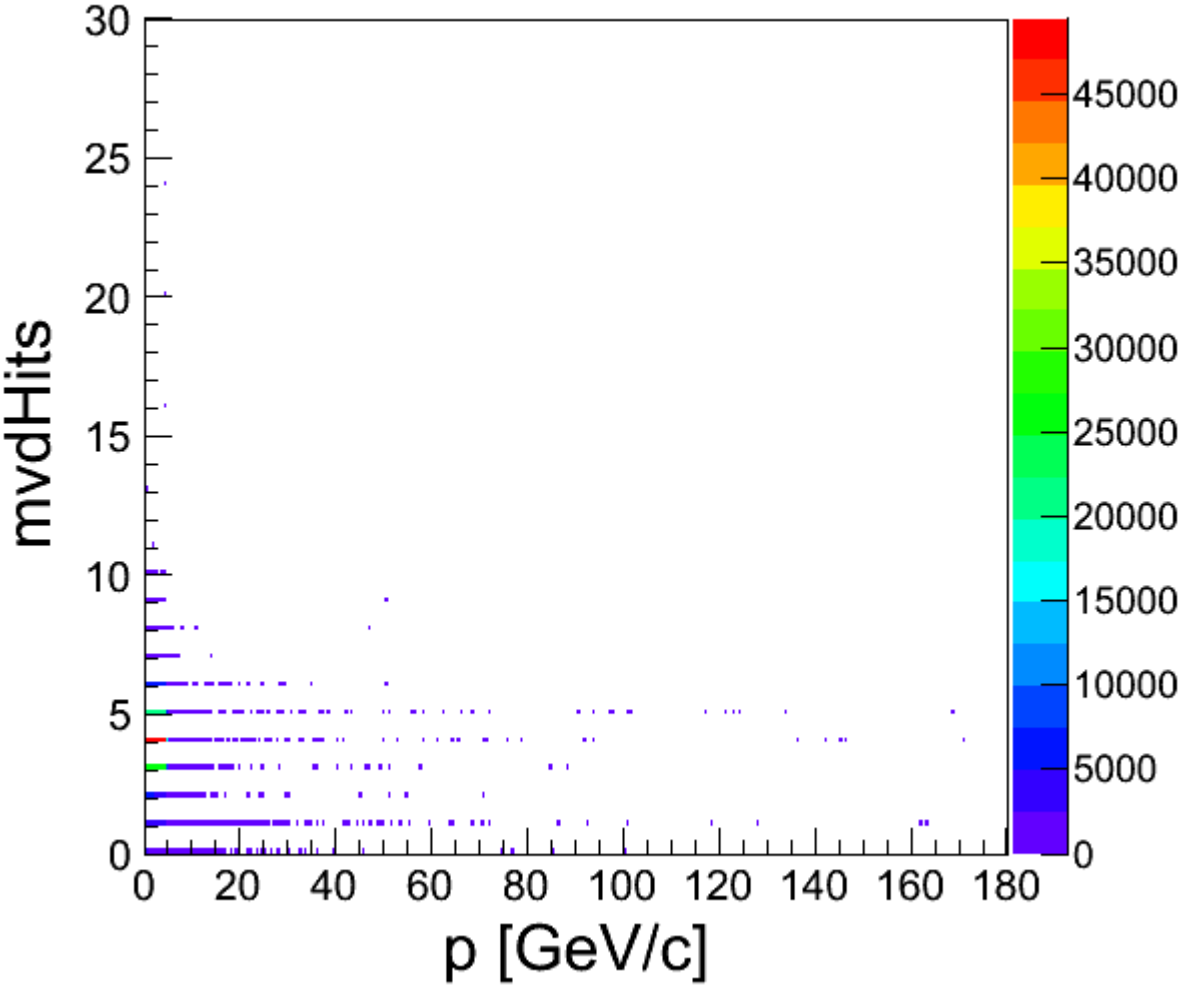
1) muon_sttHits.gif, downloaded 996 times



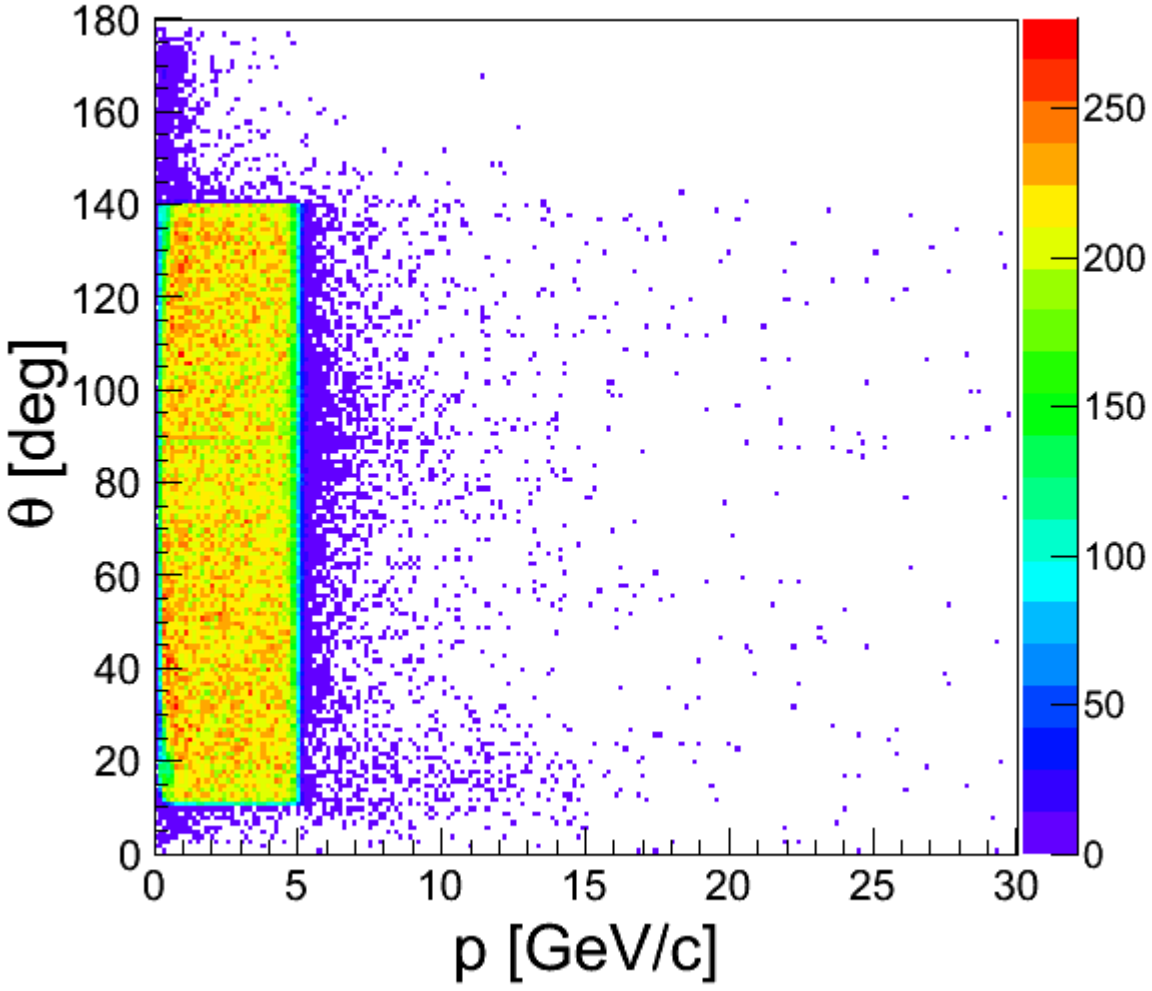
2) muon_mvdHist_zoom.gif, downloaded 1137 times



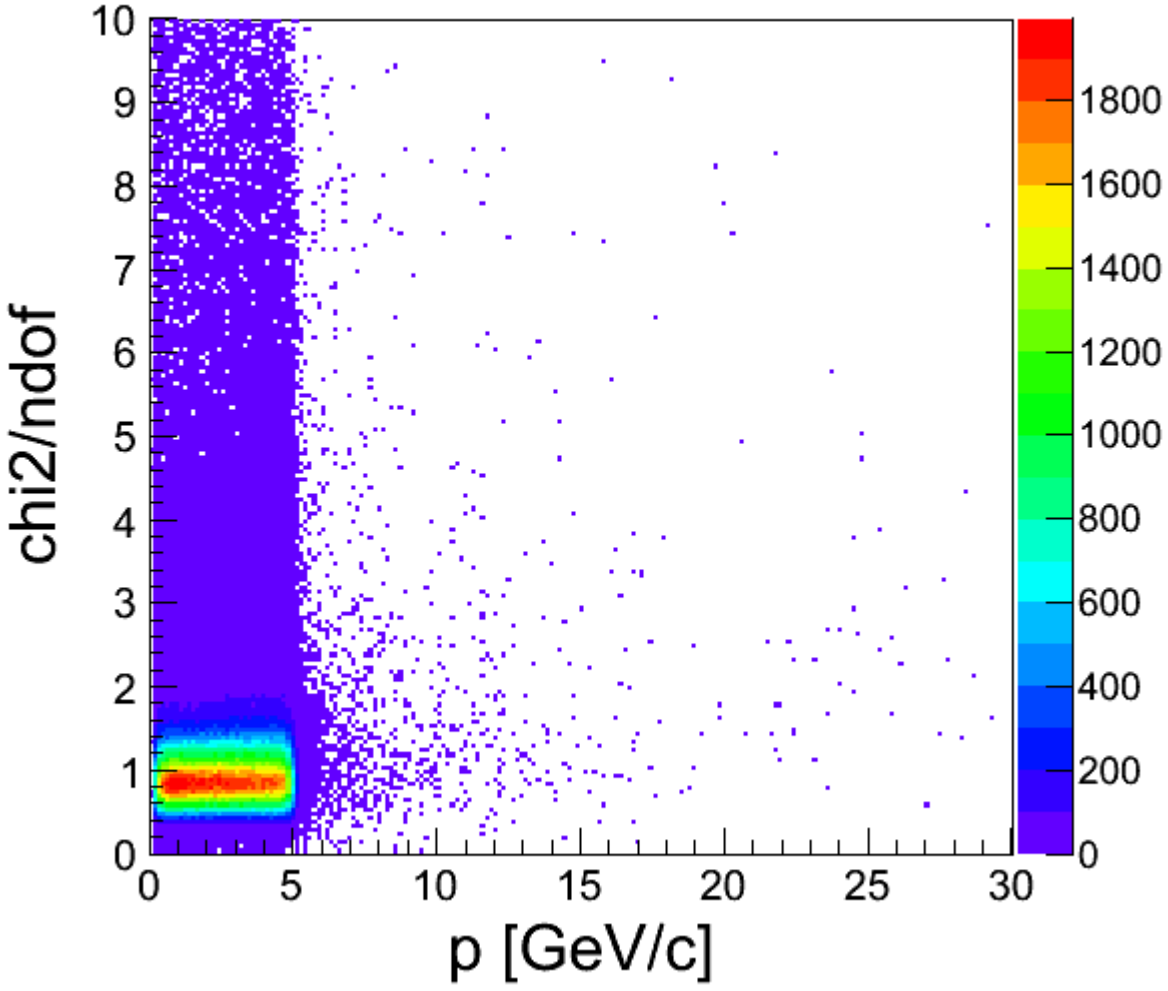
3) muon_mvdHits.gif, downloaded 1116 times



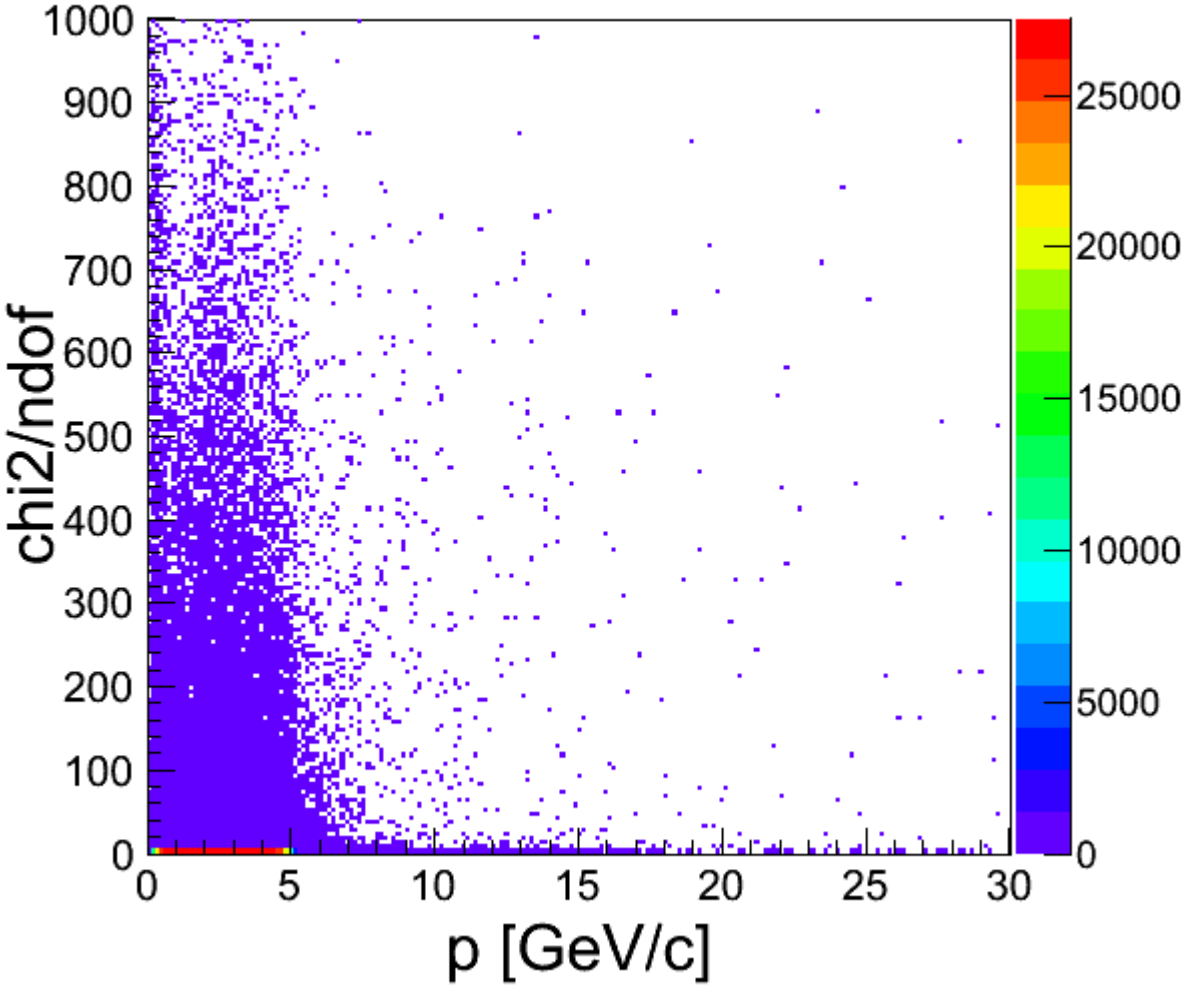
4) muon_theta.gif, downloaded 1137 times



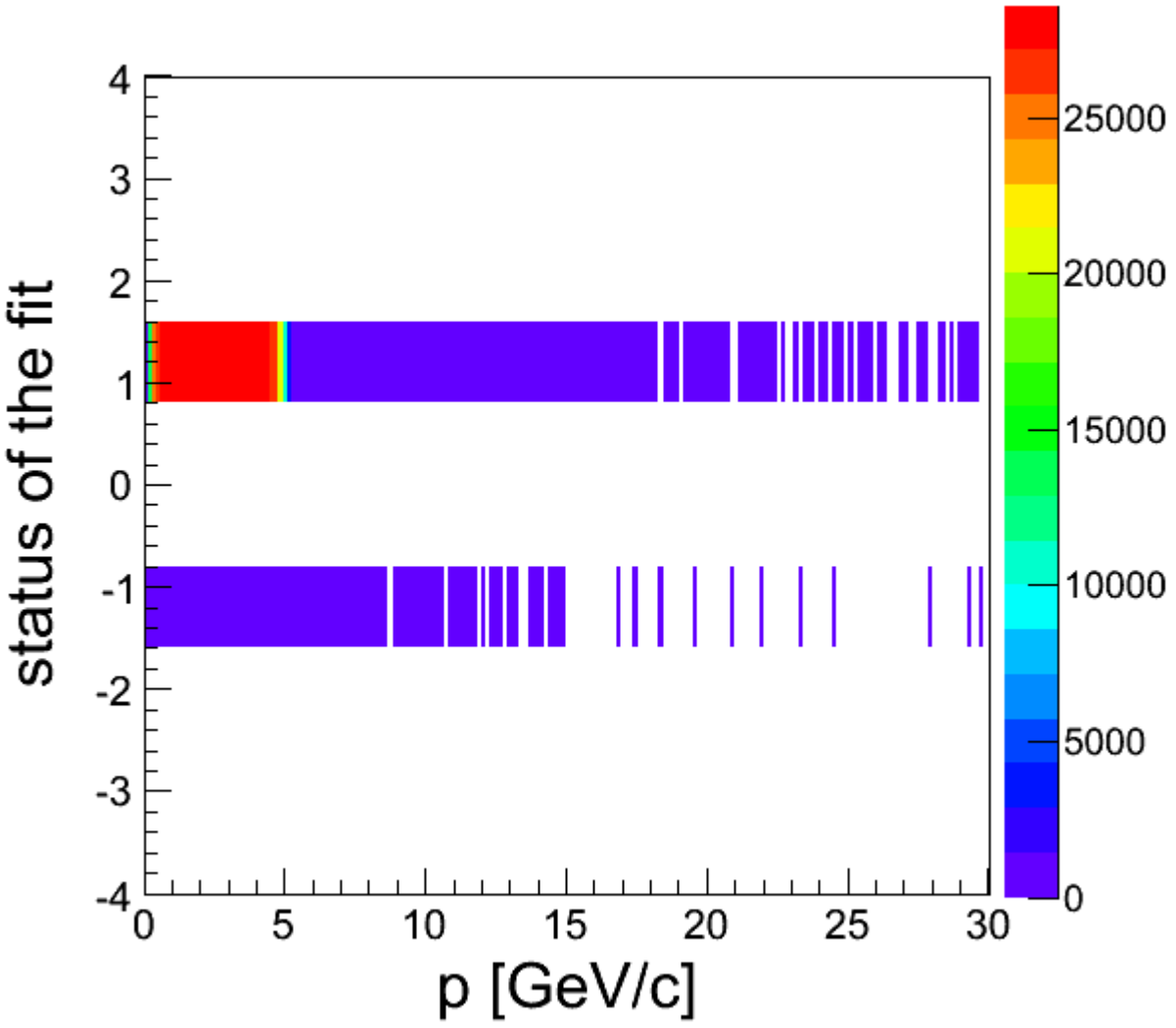
5) muon_chi2ndof_zoom.gif, downloaded 1152 times



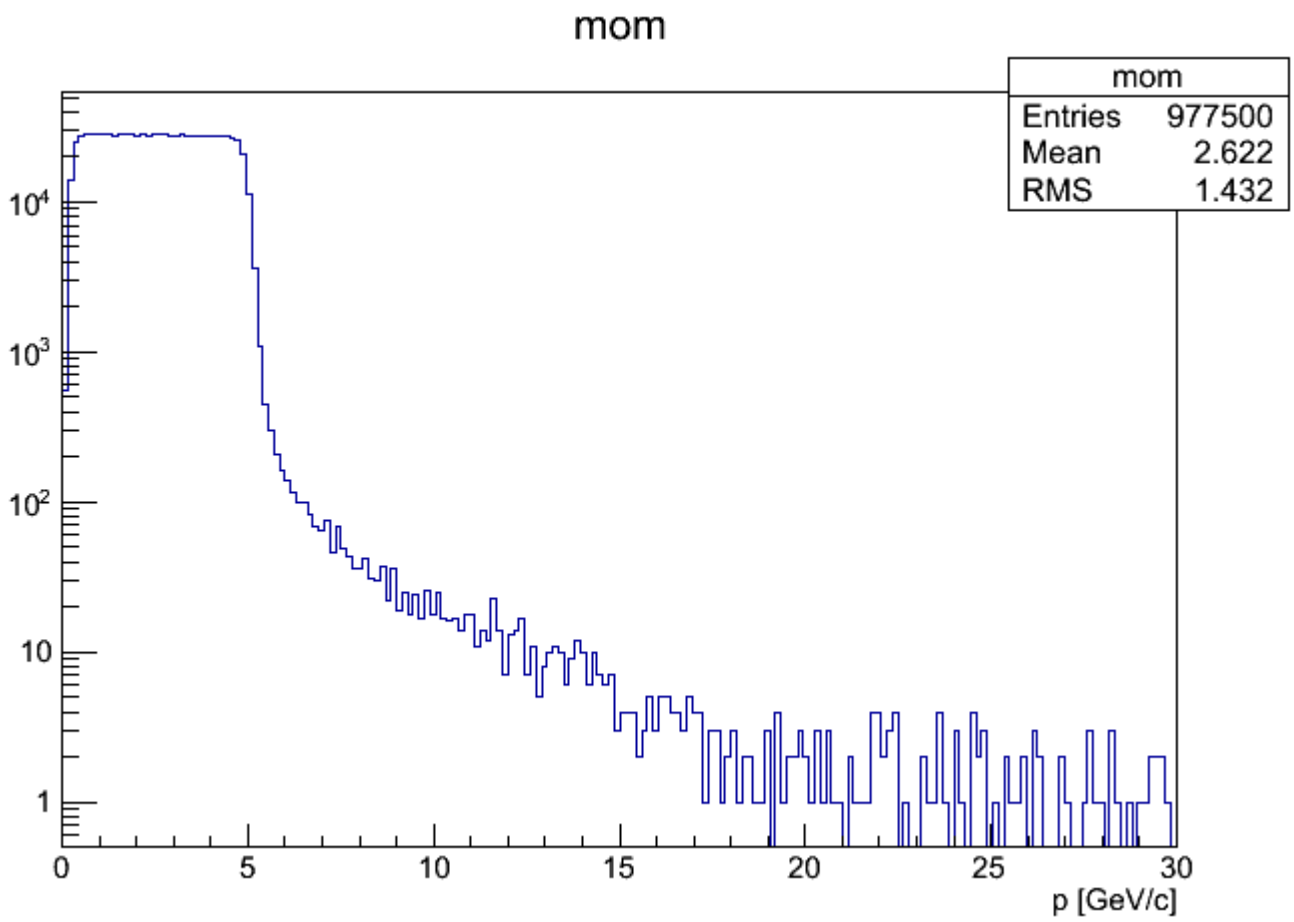
6) muon_chi2ndof.gif, downloaded 1168 times



7) muon_fitstat.gif, downloaded 1150 times



8) momentum.gif, downloaded 1158 times



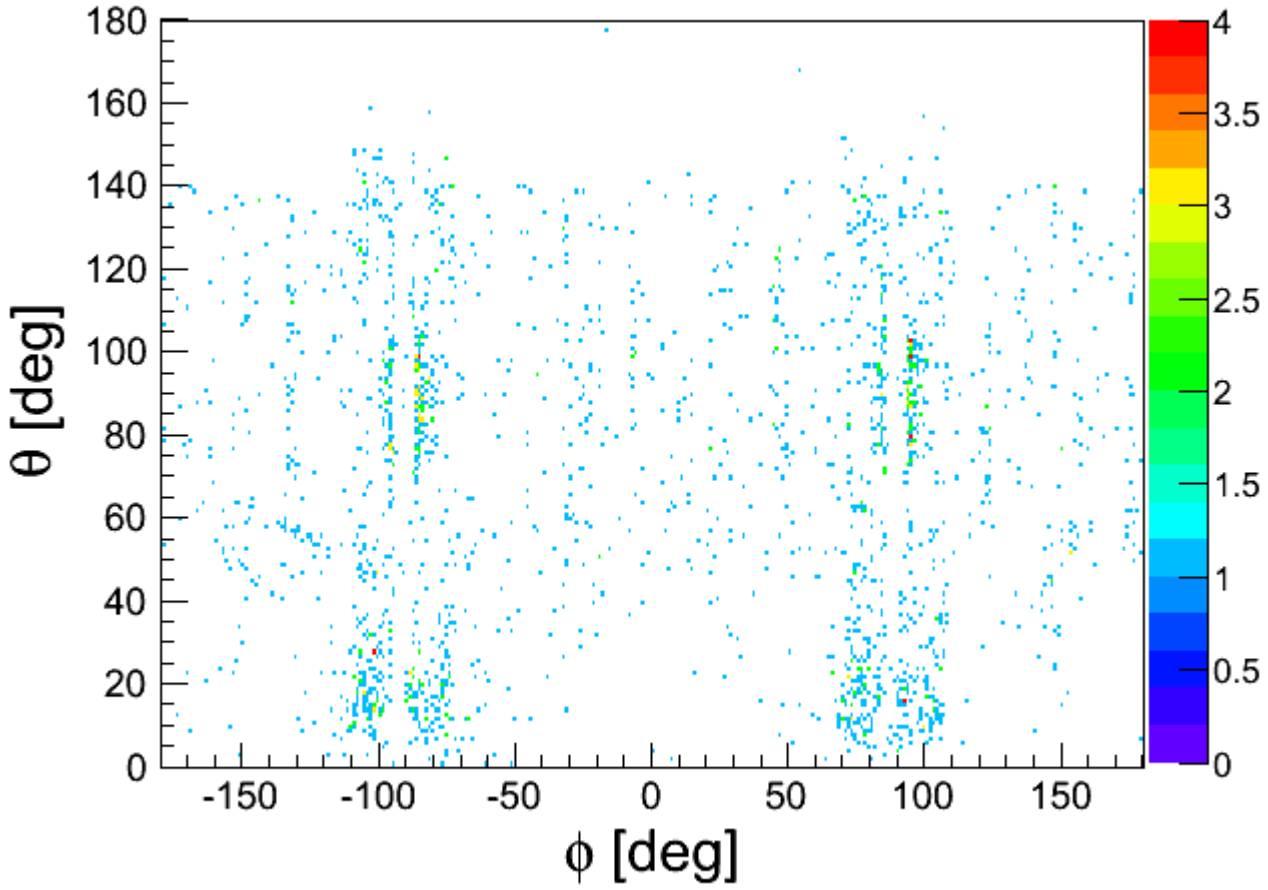
Subject: Re: very high reconstructed momenta of muons
Posted by Malgorzata Gumberidze on Thu, 12 Apr 2012 20:12:33 GMT
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Please find in the attachment 3 more plots, which maybe this time shows that
big statistics of this high momenta come from the regions of phi around 90 drgree,
and 2 regions of theta: 90degree and below 30 degree.

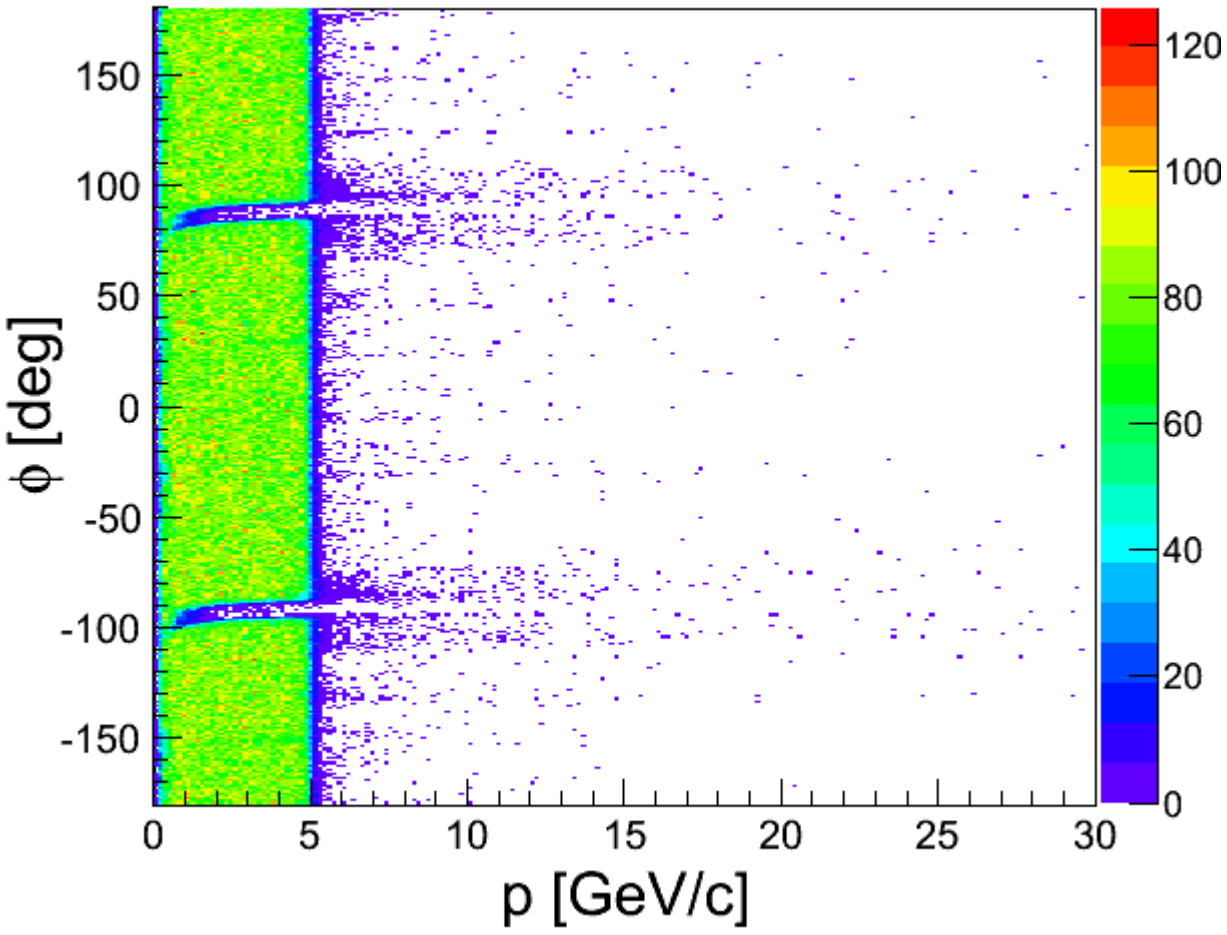
gosia

File Attachments

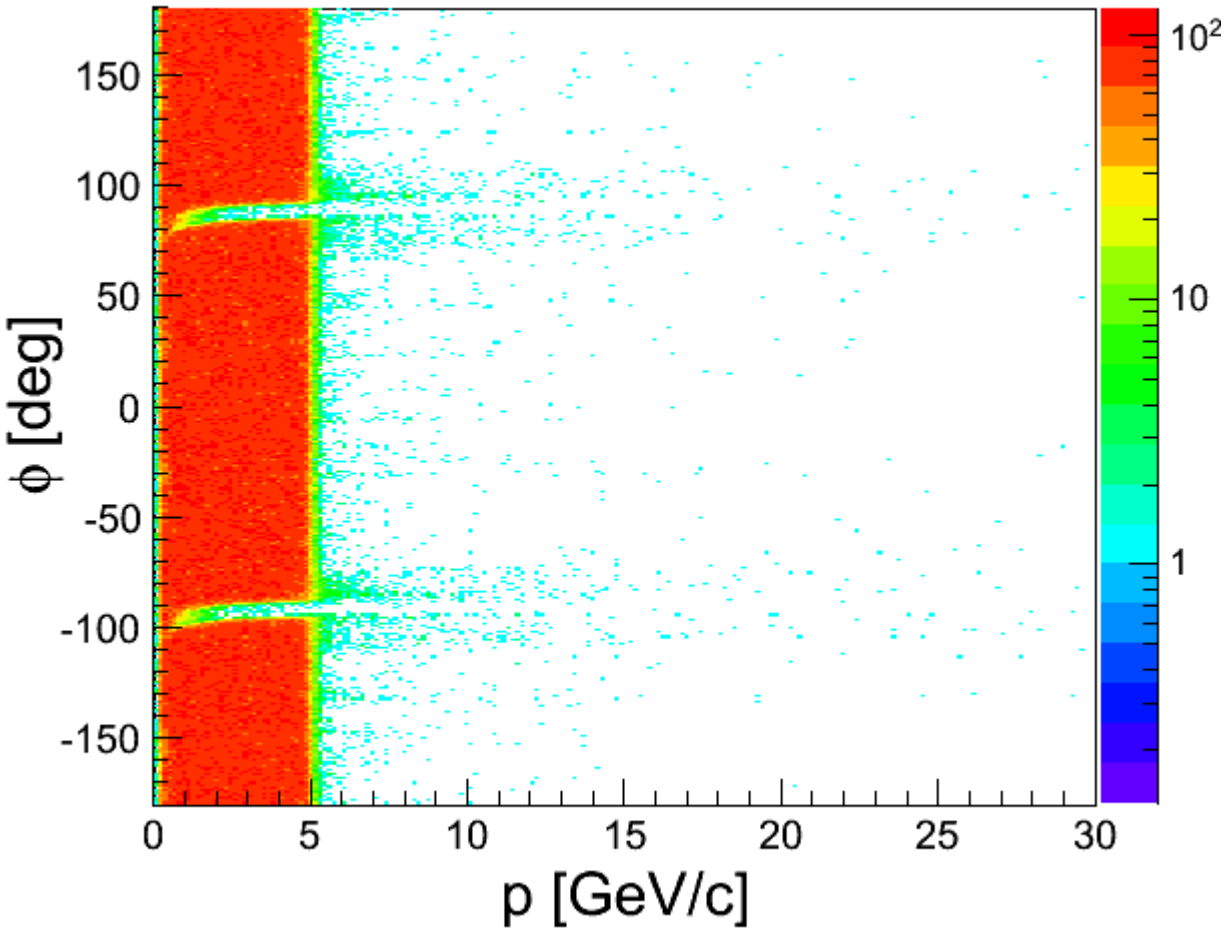
1) muon_theta_phi.gif, downloaded 921 times



2) muon_phi.gif, downloaded 952 times



3) muon_phi_logZ.gif, downloaded 984 times



Subject: Re: very high reconstructed momenta of muons
Posted by Malgorzata Gumberidze on Mon, 16 Apr 2012 22:42:33 GMT
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Dear All,

I have made few more test after discussions with Stefano in order to check where the high momenta tail is coming from: tracking code or Kalman (as it was suggested by Gianluigi).

What i have done is to switch on native tracking by using in the pid level:

```
PndPidCorrelator* corr = new PndPidCorrelator();
corr->SetInputBranch("SttMvdGemTrack");
corr->SetInputIDBranch("SttMvdGemTrackID");
corr->SetDebugMode(kFALSE);
fRun->AddTask(corr);
```

One can see that the tail at high momenta (up to 15GeV/c) is present

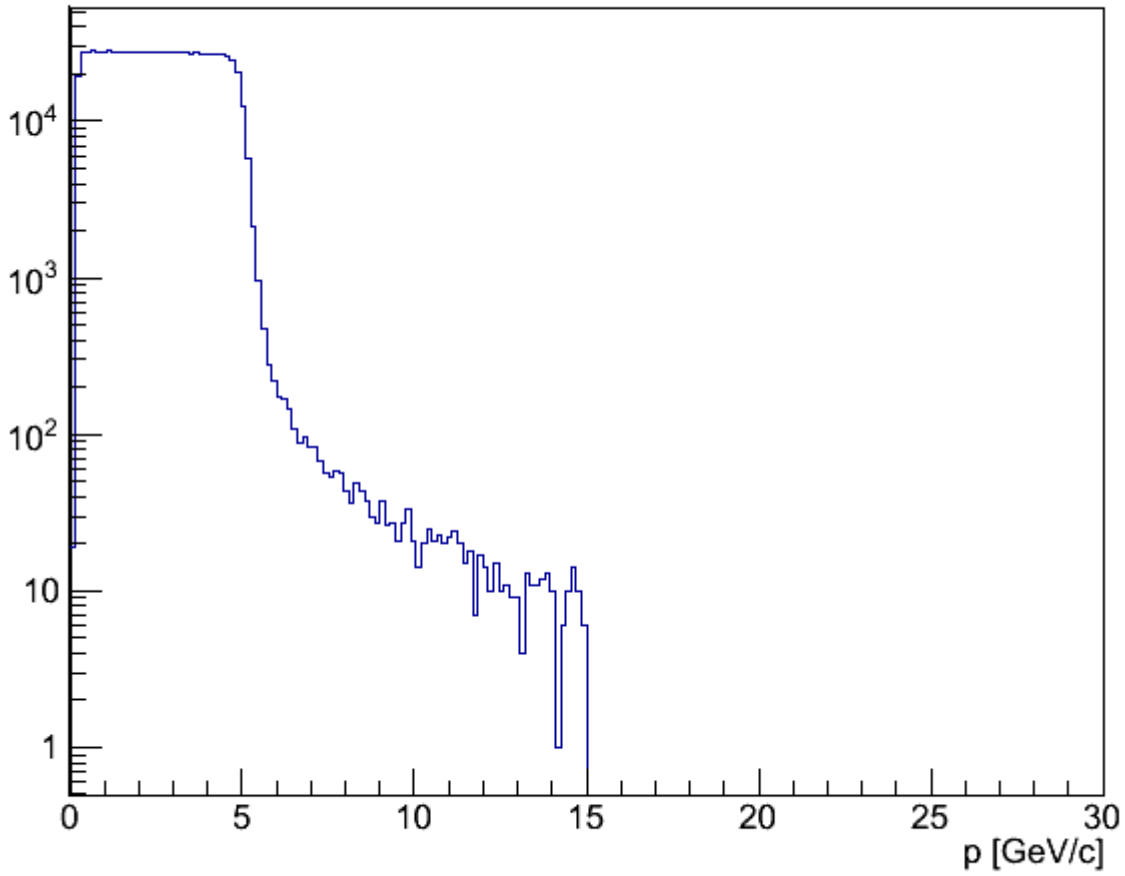
also with native tracking. So it means it is not coming from genfit.

It would be nice that experts can cross check this problem in the code as well.

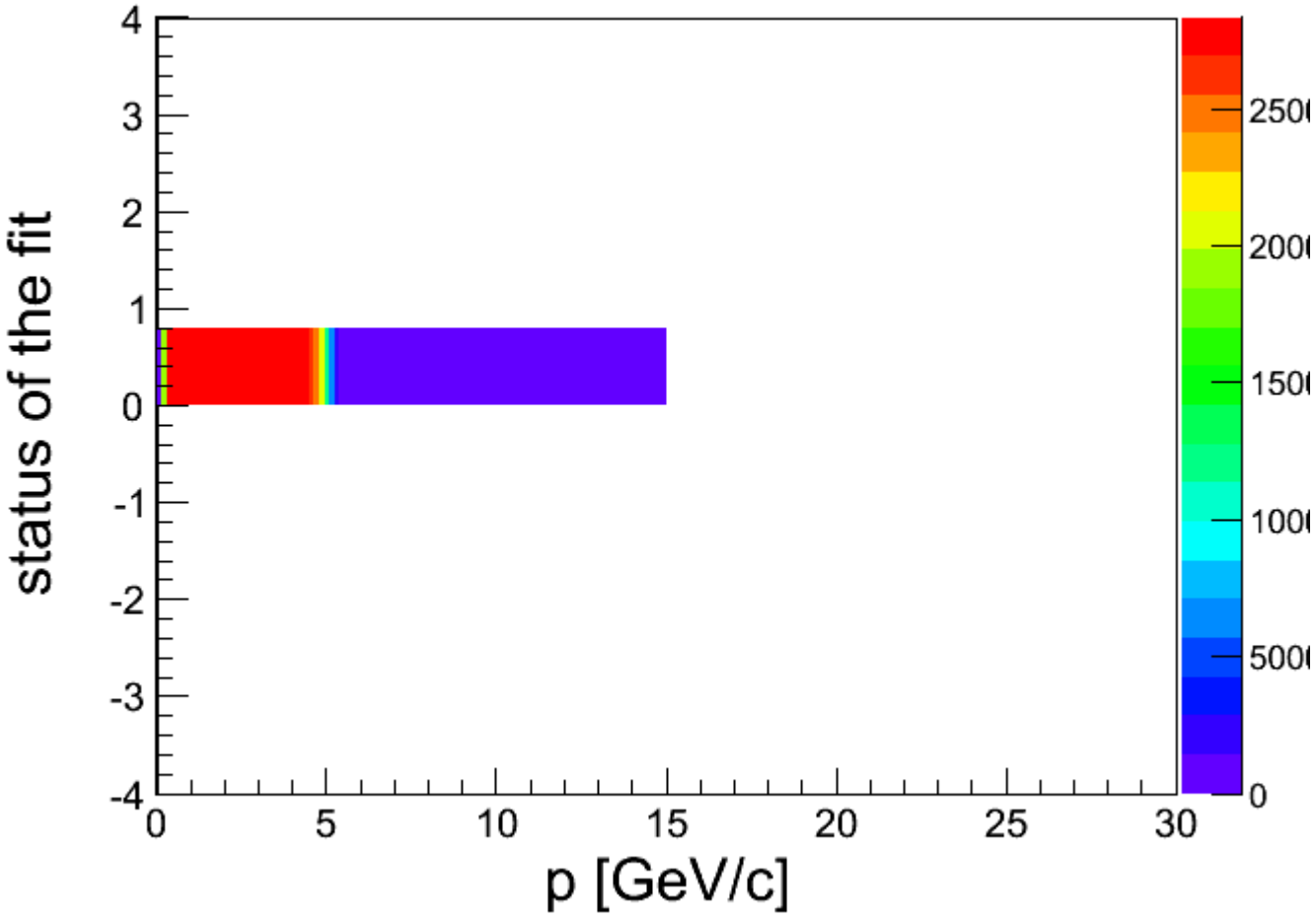
gosia

File Attachments

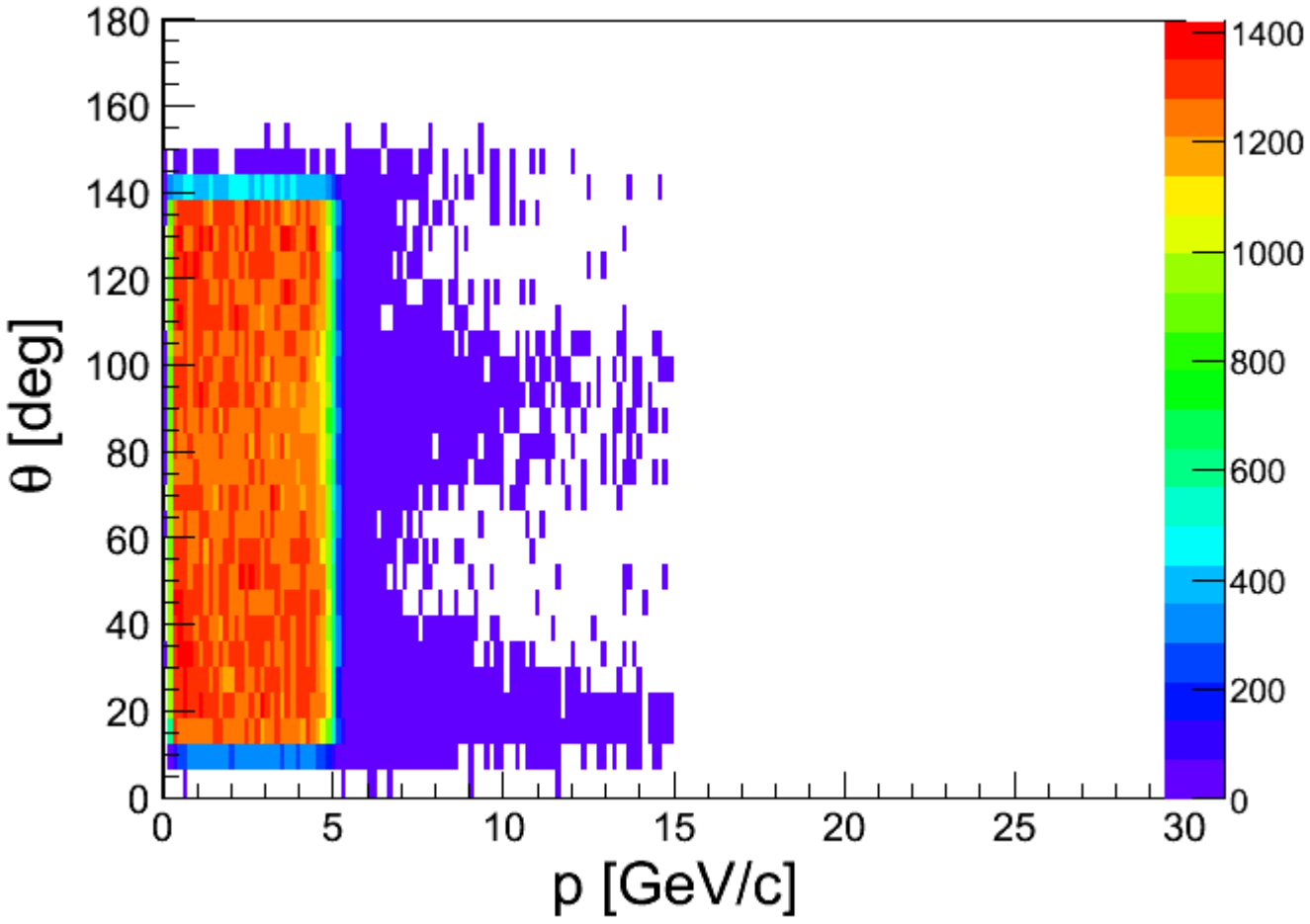
1) muon_mom_noGen.gif, downloaded 1024 times



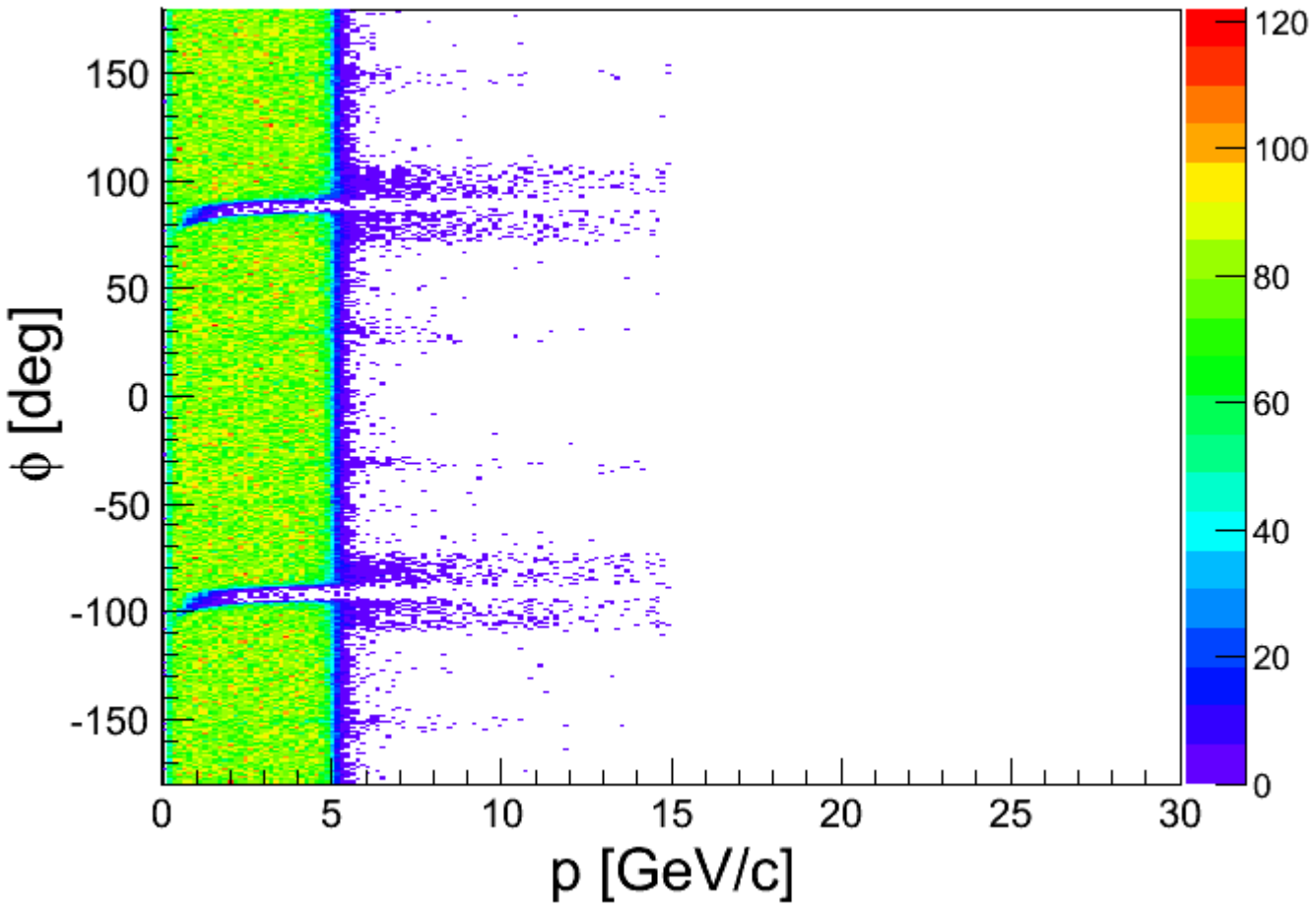
2) muon_fitStat_p_noGen.gif, downloaded 1023 times



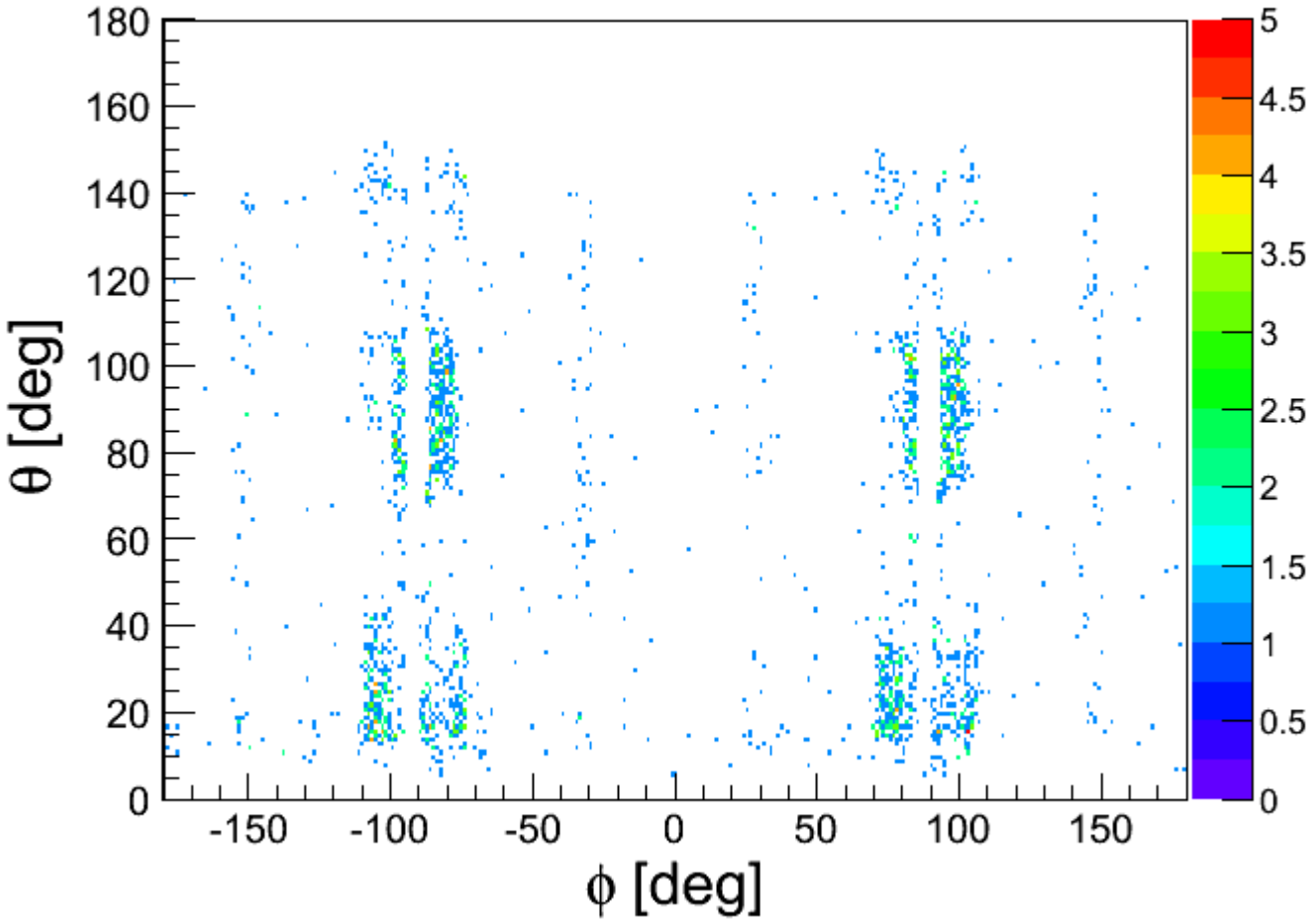
3) muon_theta_p_noGen.gif, downloaded 991 times



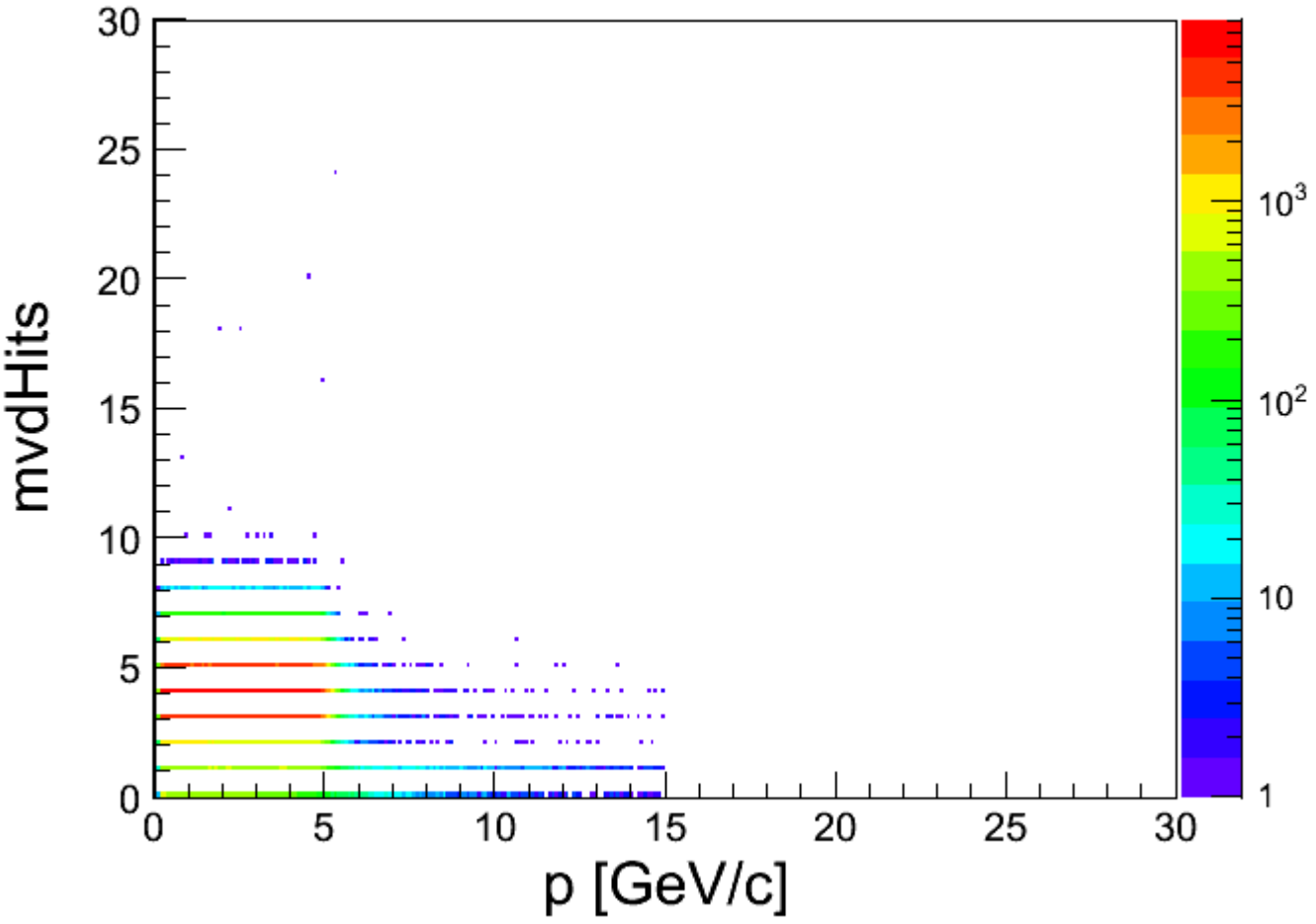
4) muon_phi_p_noGen.gif, downloaded 916 times



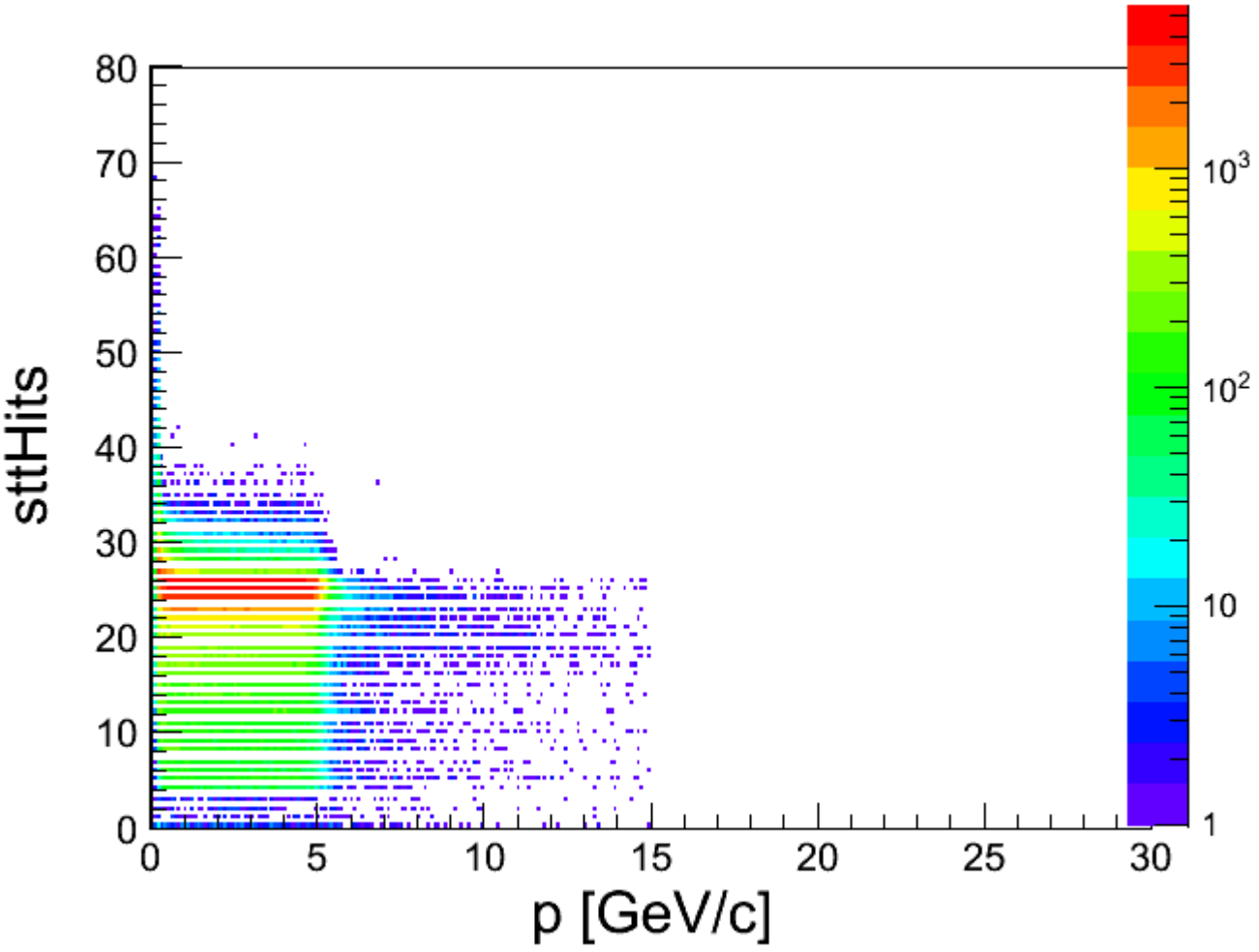
5) phi_theta_muon_noGen.gif, downloaded 1062 times



6) mvdHits_p_noGen.gif, downloaded 1018 times



7) sttHit_p_muon_noGen.gif, downloaded 1009 times



Subject: Re: very high reconstructed momenta of muons
Posted by StefanoSpataro on Tue, 17 Apr 2012 09:13:01 GMT
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I suppose that chi2 and ndf should be filled also by Gianluigi code, considering that a fit is performed, while at present such data members are empty.
Gianluigi, would it be possible to add such informations to the PndTrack?

From the plots is quite evident that tracks with fahe high momentum are present. Probably there is an upper cut at 15GeV/c in the reconstruction code, but still there are tracks with momenta higher than 5 GeV/c, coming from the edges of the detector.
Would it be possible to take a look? For sure they are not coming from genfit.

Subject: Re: very high reconstructed momenta of muons
Posted by Gianluigi Boca on Tue, 17 Apr 2012 11:39:09 GMT
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hi Gosia and all,
concerning these high momenta muons, please consider doing these

two preliminary steps :

1) please update your code with the latest trunk version and use the jan12 externals; I believe it is always safer to use the newest versions of the code;

2) please quantify the percentage of muon tracks with 'anomalous' large momentum; from your plots it is not clear to me what is the level of the problem we are talking about

thanks

Gianluigi

Subject: Re: very high reconstructed momenta of muons
Posted by Lia Lavezzi on Tue, 17 Apr 2012 13:51:25 GMT
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Hi Gosia,
I just committed a fix to the class PndSttTube, so I would recommend to update the code to the last revision (15297) to be sure to include it.
Ciao,
Lia.
