Subject: Re: GEM tracking
Posted by Radoslaw Karabowicz on Thu, 04 Jun 2009 16:10:34 GMT
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Dear Christian,

I have to apologize for my late answering, but the test and the results analysis took a bit longer I expected. The change from linux to mac didn't help either.
But here I am with something interesting, I hope.

I took the box generator, and used:

```
FairBoxGenerator* boxGen = new FairBoxGenerator(211,1);
boxGen->SetThetaRange(theta   -0.01,theta   +0.01);
boxGen->SetPhiRange  (phi     -0.01,phi     +0.01);
boxGen->SetPRange    (momentum-0.01,momentum+0.01);
primGen->AddGenerator(boxGen);
```

I have been varying the theta parameter from 2 to 40, phi from 0 to 360, and momentum was {0.1,0.2,0.5,1.0,2.0,4.0,8.0}. I have generated 1000 pions in each of the bins and tried to reconstruct them using start parameters:

```
TVector3 StartPos    = TVector3 (0.,0.,0.);
TVector3 StartPosErr = TVector3(0.01,0.01,0.01);

TVector3 StartMom    = TVector3 (1.,0.,1.);
StartMom.SetMagThetaPhi(fMomentum+0.05,
                        TMath::DegToRad()*(Double_t)fTheta,
                        TMath::DegToRad()*(Double_t)fPhi);
TVector3 StartMomErr = TVector3(0.1*StartMom);
```

where fMomentum, fTheta and fPhi were taken from the real parameters of the simulated pions.

As the results I have been looking at the distribution of the reconstructed momentum:

This plot shows the distribution of reconstructed momentum magnitude for pions shot at phi = 0, theta = 10. The distribution look OK, maybe a bit to broad, but at least at correct momentum.

Taking the different distributions for pions shot at different theta and phi, I was able to construct a map of the mean values of the reconstructed momentum magnitude as functions of theta and phi. The resulting map for 2 GeV pions is:

It certainly looks strange, but the behaviour is consistently repeated with different particle momenta (here 0.5 GeV):

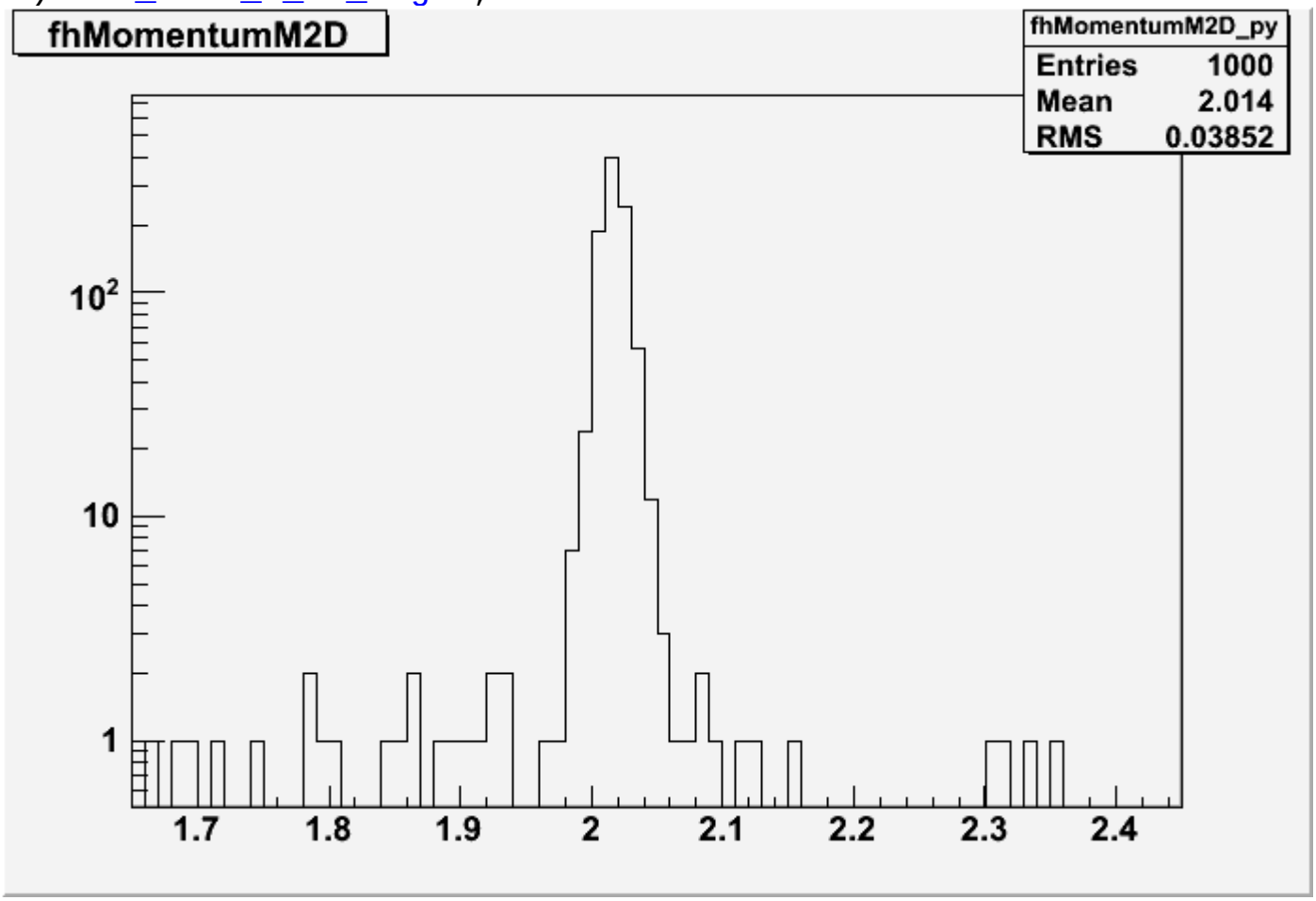
Have you ever seen anything so strange? For some phi angles the tracking performs good for all theta, but for some angles the fitting gives WAY too small or too large momenta, consistently for all theta. Even worse, the larger the theta angle, the greater the discrepancy.

The only thing I am afraid of is that I messed with the angles somehow, i mean rads and degs, I am checking it now... (well, tomorrow).

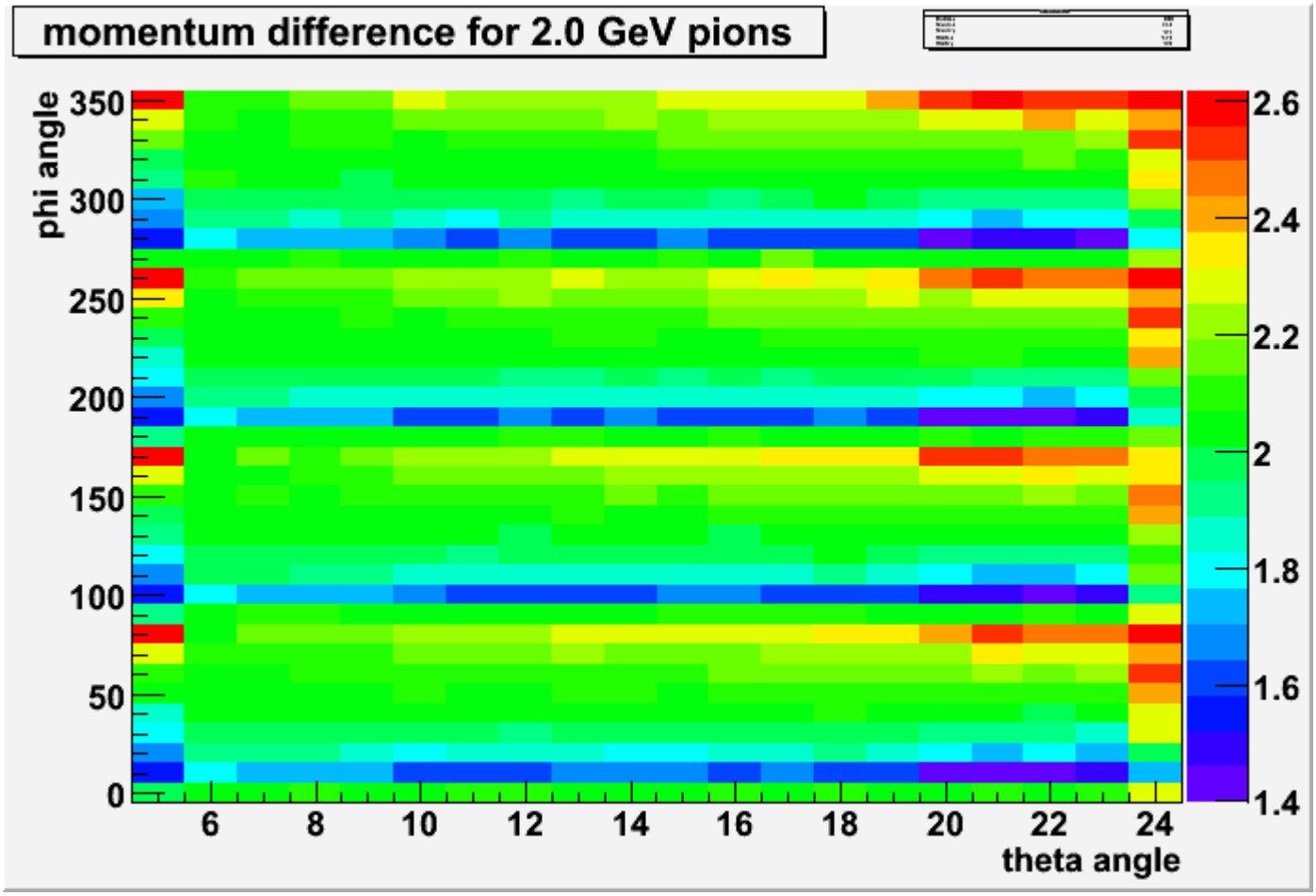
yours,
radek

File Attachments

1) mom_reco_2_10_0.gif, downloaded 1160 times



2) gev2.0_mom_cl.png, downloaded 1135 times



3) gev0.5_mom_cl.png, downloaded 1214 times

