Subject: Different x-y resolutions
Posted by Simone Bianco on Tue, 19 Jul 2011 11:16:58 GMT
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Dear Tracking experts,

I am simulating simple events with 4 pions (2pi+ and 2 pi-) with a momentum of 1GeV/c, which are propagated from (0,0,0). I am generating these particles with an homogeneus distribution in phi and in theta (where theta is restricted to the range [20,140]°).
The simulations are performed with all the detectors in, but I set as active only the MVD, the Stt, the GEMs and the forward tracer.
I perform my reconstruction using:
PndMvdRiemannTrackFinderTask,PndSttTrackFinderReal,PndSttMvdTracking,Pnd RecoKalmanTask,PndMCTrackAssociator,PndPidCorrelator (with pion hypothesis),PndPidIdealAssociatorTask.
At the end of this chain I am running some analysis using the PndVtxPoca vertex finder.
I fill histograms with the three components of the reconstructed vertices. As you can see in the attached figures I get a significantly different sigmas for x and y.

X always looks worse (even with different momenta and theta ranges).
I have already tried with different topologies like using two particles instead of four, or using pions of the same charge, but I always get worse results for X.
I tried with different vertexing tools (POCA, Ralf's fast fitter, another implementation of the POCA) and I always noticed this behaviour. It really seems to come from previous steps since if I try to rotate of 90° the tracks just before running the POCA vertex finder I obtain symmetrical results (worse Y than X, see the second figure attached).

Does any of you have an idea about possible reasons of this effect?

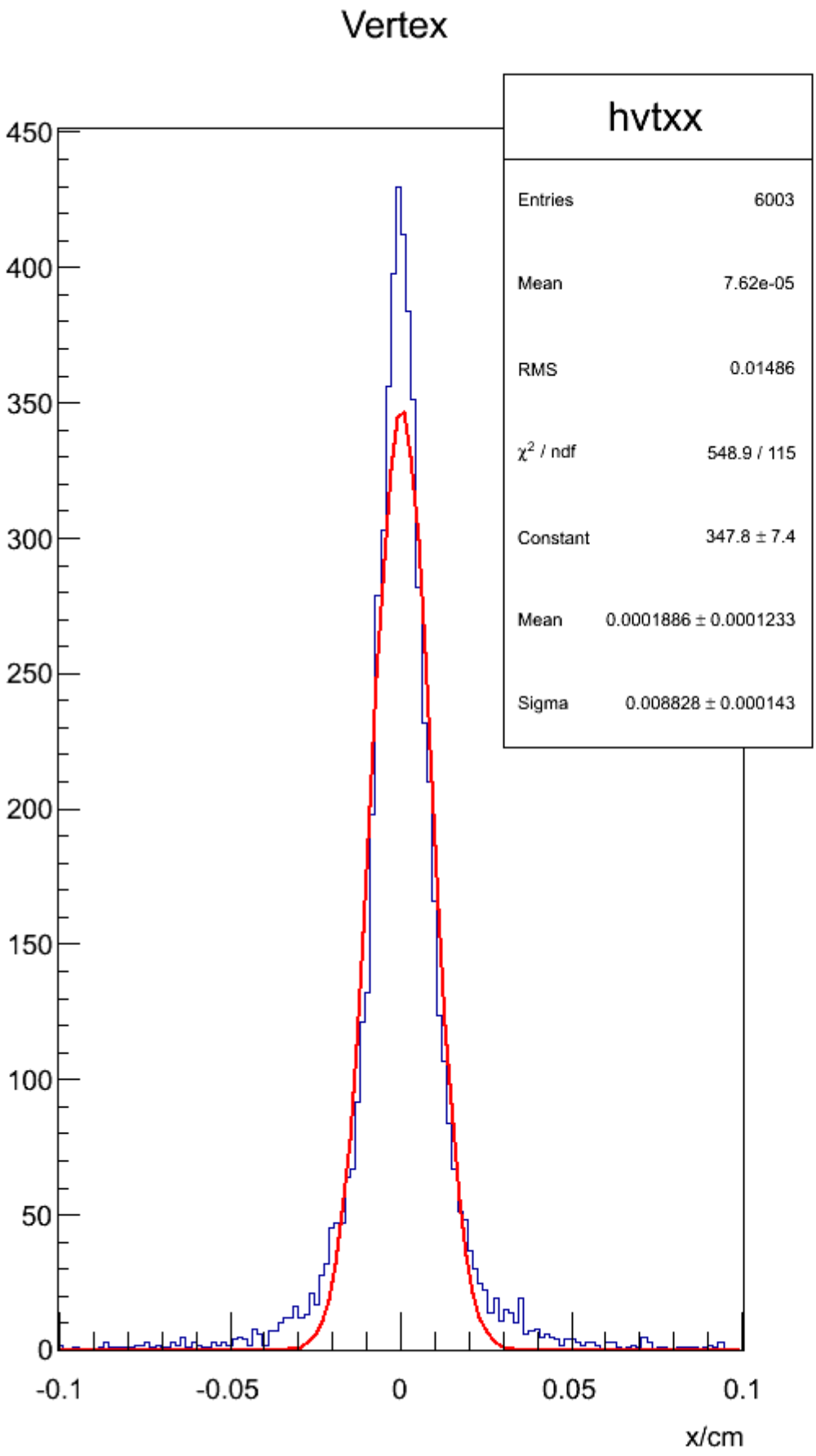
Thanks in advance.

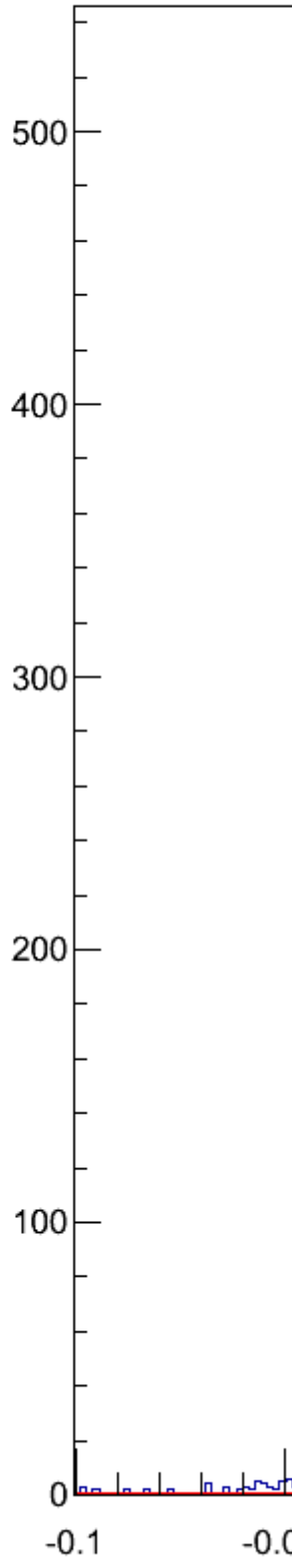
Cheers,

Simone

File Attachments

1) Vtx-0-0-0-1GeV-4Pions.png, downloaded 968 times


Vertex
hvtxx
Entries 6003
Mean 7.62e-05
RMS 0.01486
χ² / ndf 548.9 / 115
Constant 347.8 ± 7.4
Mean 0.0001886 ± 0.0001233
Sigma 0.008828 ± 0.000143
450
400
350
300
250
200
150
100
50
0
-0.1
-0.05
0
0.05
0.1
x/cm


500
400
300
200
100
0
-0.1

2) Rotation-Vtx-0-0-0-1GeV-4Pions.png, downloaded 908 times