Subject: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Tue, 16 Feb 2010 10:50:27 GMT
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Hi all,

when generating with EvtGen for the luminosity monitor, i'm especially interested in forward angles below 10mrad theta. The generated particles in this region tend to specific angles rather then make a smooth distribution i would expect.

As an example i plotted theta and the z-component of the momentum for pbarpsystem -> pi+ pi- at 15GeV beam. Theta is in 0.1mrad bins and Pz in 0.2MeV bins.

The precision of the EvtGen-output is much higher then the binning, so is there some way to 'tune' EvtGen for the forward direction or am i maybe doing something wrong?

Thanks
Mathias

File Attachments
1) pi+pi-_15GeV.pdf, downloaded 550 times

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by StefanoSpataro on Tue, 16 Feb 2010 11:02:49 GMT
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Hi,
are you plotting data from MCTrack or from the luminosity detector? Is it possible that it is related to some segmentation of the lumi? Or maybe it is effect of the grid size of the field maps, have you tried without magnetic field?
In theory the precision of EvtGen should be enough to give you a smooth distribution, in theory.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Tue, 16 Feb 2010 11:36:36 GMT
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thanks for the fast answer,

this is MC-data, i have a macro which reads the output-ascii-file of EvtGen the same way it's done in pandaroot.

I tried also to read the file with a c++ stream and calculated theta in different ways to check if i loose information somewhere, but that's why i also plotted the z of momentum which is directly from the EvtGen file.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by StefanoSpataro on Tue, 16 Feb 2010 11:55:21 GMT
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You could try to modify the file:

pgenerators/EvtGen/EvtBenBase/EvtStdHep.cc

and set the precision from 8 to something higher (and then recompile EvtGen), just to see if it is only a problem of rounding or maybe something deeper.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Tue, 16 Feb 2010 12:44:27 GMT
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I tried precision 12 and get the same results.

I also looked at some events, the numbers have more digis behind but the first 8 digis stay the same.

File Attachments
1) pi+pi-_15GeV_12.pdf, downloaded 505 times

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Wed, 17 Feb 2010 09:20:17 GMT
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Attached are the EvtGen-sourcefile and the macro i use to analyse the output.

The structure is also visible in generated decay's with pandaEvtGen. I just added a filter to have more statistics and faster simulation in forward direction.

File Attachments
1) myEvtGen.cc, downloaded 461 times
2) anaVert.C, downloaded 479 times

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by StefanoSpataro on Wed, 17 Feb 2010 10:20:57 GMT
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Let's start from the beginning.

How have you created your evtgen file? With the standard simpleEvtGen.cc, or with the old

pandaEvtGen?
Could you please write exactly what have you run, how many events, which energy and so on?
In order to reproduce your problem.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Wed, 17 Feb 2010 13:08:19 GMT
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I use the simpleEvtGen, to reproduce do:

./simpleEvtGen pbarpSystem pp_Pi+Pi-.dec 1000000 15
root -l anaVert.C

files are attached. Thanks for checking!

File Attachments
1) anaVert.C, downloaded 509 times
2) pp_Pi+Pi-.dec, downloaded 499 times

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Mon, 22 Feb 2010 07:53:22 GMT
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if somebody is able to reproduce or not please tell me, in case i'm just imagine that there is something strange or using EvtGen wrong

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Subject: Re: EvtGen Lumi Theta-Distribution
Posted by StefanoSpataro on Mon, 22 Feb 2010 11:26:53 GMT
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Hi,
I have followed what you have done, and I have almost the same plot as you, if I analyse the file with your macro.

I have run fast_sim to check the output. It seems each pz has a "spacing" of exactly 0.0005 GeV/c.
I have checked the output.evt file, but there all the numbers are not so spaced. For this reason, I think the problem stays not in EvtGen, but in our reading the ASCII file. Maybe there is some conversion/rounding which is cutting our momentum with a resolution of 500 keV -> even the angles suffer from this rounding.
At the moment I cannot find the source of such a problem, maybe somebody else could comment about.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Mathias Michel on Tue, 23 Feb 2010 11:37:17 GMT
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Thanks for the affirmation!
I tried already different way's of reading the file, so i am out of idea's here.

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by StefanoSpataro on Thu, 25 Feb 2010 17:56:13 GMT
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Hi,
I have done some tests.
The problems are coming from EvtGen. I have run 100k events of J/Psi, and I have seen that in the output files there are 14 events with a track with exactly Pz = 15.46610609!!!! (but different px/py).

This means that it does not depend on pandaroot but only in evtgen. It sounds weird also the fact that only in Pz this problem appears, while Px and Py have smooth distributions.

I could think that the problem is coming from the random generator, or... no idea!!

I would like to ask to people doing analysis if they have found this kind of problem in other channels (maybe a problem of the PHSP model?). You have only to take your primary tracks, plot Pz in a very narrow window and to check the distribution.

And, if somebody is using a random generator different from the EvtGen one, this check could be also helpful.

Waiting for some feedback...

Ste

Subject: Re: EvtGen Lumi Theta-Distribution
Posted by Stefan Pflueger on Tue, 04 Sep 2012 09:00:00 GMT
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Hi,

I'm observing similar things, at least for larger beam momenta (in my case 8.9GeV). The t spectrum looks quite nasty, as it has periodic oscillation/spikes. Are there any news on this matter?

Ups. Just realized that this post was talking about EvtGen. I was referring to DPM. I will open a new thread.. https://forum.gsi.de/index.php?t=tree&th=3668&start=0&rid=1790&S=52628bf8929831bf7aea080256a9ef18

Best regards,

Stefan