Subject: GEANT3 energy loss
Posted by Sebastian Neubert on Mon, 07 Apr 2008 14:32:53 GMT
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Hi!

in Munich we are working on the Energy Loss simulations in the TPC. Viola is using revision 2233 of the gconfig package and we have the impression, that the behaviour of GEANT is instable. At least it has changed from what we got some weeks ago.

Now we observe, that also geant 3 seems to be sensitive to the step size limitation. For low momenta (<300 MeV) we observe generally too low energy loss values. The effect seems again to depend on the step size.

Has anything changed in the GEANT configuration?

Cheers! Sebastian.

Subject: Re: GEANT3 energy loss
Posted by Sebastian Neubert on Wed, 16 Apr 2008 12:22:48 GMT
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Hi!

We have found out what was going wrong with the energy loss.

The option "STRA" was turned to 1 in g3config. As I read from the forum contributions from november Stefano suggested this, because this setting is used in Hades.

I have put some debug output into the geant3 code and observe that for STRA=1 only the G3STREN function gives a contribution to the energy loss with the behaviour, that I have shown lately.

When you switch to the Urban model (STRA=0) it works.

What should we do?

Sebastian.

Subject: Re: GEANT3 energy loss
Posted by Susanna Costanza on Mon, 21 Apr 2008 16:12:58 GMT
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Sebastian Neubert wrote on Mon, 07 April 2008 16:32
We have the impression that the behaviour of GEANT is instable.
(...)
Has anything changed in the GEANT configuration?

Hi!
I observed a different behaviour of electrons in GEANT3 and GEANT4 too while studying bremsstrahlung.
I generated electrons @ 1 GeV and I studied the energy and 1/p distibutions after passing through a plane either of aluminium or of argon, with a thickness of 1cm.
For the simulation, I set BREMS = 1 and BCUTE = 1 MeV in SetCuts.C. In this case I observe correct mean and RMS values for energy and 1/p distributions, either with GEANT3 or GEANT4:

mean(E)	RMS(E)	mean(1/p)	RMS(1/p)	
0.8921	0.2007	1.244	0.7997	for GEANT3
0.8886	0.2051	1.246	0.794	for GEANT4.

Instead, if I simulate with BREM = 2 (correct energy loss but not
secondary generation) and high BCUTE values (1 GeV), which are the settings needed for a correct comparison between MC and GEANE, I obtain:

mean(E)	RMS(E)	mean(1/p)	RMS(1/p)	
0.892	0.03561	1.124	0.06386	for GEANT3
0.8911	0.1995	1.235	0.7389	for GEANT4.

As you can see, the mean values are correct and comparable, but it's not the case of the RMS values: the ones obtained using GEANT3 are wrong!

I obtain different RMS values even in the case of BREM = 1 and BCUTE = 1 GeV:

mean(E)	RMS(E)	mean(1/p)	RMS(1/p)	
0.892	0.03624	1.124	0.06707	for GEANT3
0.8911	0.1995	1.235	0.7389.	for GEANT4.

...

It seems there's something wrong with GEANT3.
So GEANT3 must be used with low BCUTE values, both in the case of BREM =1 and BREM = 2.

Ciao!
    Susanna

Subject: Re: GEANT3 energy loss
Posted by StefanoSpataro on Fri, 25 Apr 2008 16:40:13 GMT
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Hi Sebastian,
I have explored the forum a bit and found my message,
but I have also explored HADES code and I have not found where this STRA flag is set to 0, it seems by default set to 1 (but I do not remember what I did 6 months ago).

From a Mohammad message:

STRA
This flag turns on the collision sampling method to simulate energy loss in thin materials,

particularly gases. For more information see [PHYS334].
The control variable is ISTRA .
0 - Collision sampling is switched off. Default setting.
1 - Collision sampling is activated.

No idea on what it does and how it should be set properly.