
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 distributions 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
