Subject: Re: GEANT3 energy loss Posted by Susanna Costanza on Mon, 21 Apr 2008 16:12:58 GMT View Forum Message <> Reply to Message

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) F	MS(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) F	RMS(E)	mean(1/p)		RMS(1/p)
0.89	2	0.0356	1 1.124	0.0638	36	for GEANT3
0.891	1 (	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 dif	ferent RMS va	alues eve	en in the case of	of BREM = 1 a	and BCUTE = 1 Ge\	/:
mea	an(E) RMS	S(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. fo	r GEANT4.		

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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