Subject: Re: back-propagation with GEANE
Posted by Lia Lavezzi on Thu, 27 May 2010 16:09:36 GMT
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Hi Anastasia,
thank you for the info
Quote:You are right, in absence of magnetic field differences in my plots are very small. But as I don't have any material I can explain these differences only in two ways:
a) It's accuracy of calculation methods used in GEANE.
b) I did something wrong.
Differences in absence of magnetic field are not important I've asked you just to be sure that I used GEANE
I really believe that 10^-8/9 are rounding errors, so without magnetic field the deltas can be explained this way.

Quote:In magnetic field situation become worse: I have difference 2*10^-3 rad for phi angle an 7*10^-6 rad for theta angle. From multiple scattering I expect uncertainties about 6*10^-5 rad for this beam momentum and for phi angle I obtained much more difference.
Any initial delta due to the spread (even little) of the momentum is worsened by the presence of the magnetic field, in particular in this case where your particles travel through the transient field, that is inhomogeneous (in GEANE part of the error matrix is dedicated to the calculation of the transportation of the initial error due to magnetic field).
So you have the geant3 particle that moves from the vertex, through the magnetic field and the layer of luminosity monitor, it spreads its momentum. Then you take this spread momentum as starting point, so you start from a wrong one, repropagate backward the mean value, which will arrive in the PCA to a value different from the MC one.
About the amount of this difference, I think it could be estimated by simulating several (enough to have a statistically valid sample) particles with fixed direction and distributing the momentum on the first luminosity monitor layer: it should be spread and the width of the distribution should tell you the amount of the difference you get later with GEANE. It should moreover be of the order of magnitude of the error calculated by GEANE itself.

Another test to see that everything works fine could be to switch off the multiple scattering during geant3 simulation, in this case the deltas should become smaller, since practically you would simulate with geant3 in the same way you track with GEANE.

Quote:Also I worried about two spots in plot of momentum magnitude (Delta P(P_MC) in file uncer.eps from my first post). Here Delta P is a difference between true simulation value P_MC and magnitude of momentum obtained after back-propagation. Do you know any reason why I obtained two different value for momentum magnitude after back-propagation?
I' ve been thinking about this too... ok, they are two values really close (10^-6), but it is strange to have these two "spots". I don' t know exactly what to say here.
If I understood correctly from a picture of the luminosity monitor the first layer is made up by 4 sensors, is this correct? So I guess your StartPos could belong to any of the four sensors... Could it be that when you start from one sensor you get one of the two spots, and when you start from another you get the other one? ...but this is just a guess!

Is the code available in the svn? It would be helpful if I could recreate your results, maybe I could make more checks and give you more precise answers...
Cheers,
Lia.