Subject: genfit2 and electrons - problems with Bremsstrahlung formula
Posted by Elisabetta Prencipe (2) on Wed, 03 Aug 2016 07:57:43 GMT
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Dear all,

I wish to report a discussion which is ongoing through the GENFIT forum, that can affect some of the PandaRoot tests we are performing right now.

It looks that in the class MaterialEffect (/genfit2/trackReps/src/MaterialEffect.cc) a bug was introduced some time ago (later than 2013, in any case).
It is related to the energy loss straggling for Bremsstrahlung, at the point when:

L677 double sigma2 = 1.44*(pow(3., minusXOverLn2) - pow(4., minusXOverLn2)) / (mom_*mom_);

Well, the "/" should be "*". The effect of this human mistake is a bug is in GENFIT2, and GENFIT2 and GEANT are of course in disagreement concerning the Bremms, now. However, in the recent genfit2 revision available via GitHub everything is solved, and the bug is fixed.
Comparison tests between GEANT and GENFIT2 results, regarding both the momentum loss and momentum variance of
electrons/positrons are ongoing. Until tests are not completed, I am in favor to wait to update the new GENFIT2 revision into PandaRoot.
This problem affect _only_ Panda simulations for which

a) GENFIT2 is used
b) electrons/positrons got involved

I see that right now 2 Panda publications are ongoing, both working with electrons, but none of them using the GENFIT2 tools for Bremms. So, it is still safe!
This email is a warning for further investigation with electrons in Panda simulations, until the new update is not provided. I'll let you know asap.

Best regards, Elisabetta