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Subject: Re: Geant3 tracking cuts for the EMC  
Posted by [Christian Hammann](#) on Mon, 19 Oct 2009 10:00:44 GMT  
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Hi Soeren

Jens Soeren Lange wrote on Fri, 16 October 2009 17:36

I think experimentally (for "real data") it is really much easier to set threshold (e.g. discriminator) to energy (e.g. 1 MeV) and not to a particle range (e.g. 1 mm). In fact, so far we were (e.g. for the EMC) always talking about 1 MeV threshold or 3 MeV threshold or whatever value, but never about "threshold of 5 mm for a e-, but 3mm for a pi+ (in the same crystal)".

I think I have to agree with Bertram that the 1mm cut in geant 4 is more convenient for the EMC.

The energy cut in geant3 does not in any way correspond to the threshold which is set in the discriminator (in the case of the EMC). The cut applies to the individual particles in the shower, which are tracked or not depending on their energy. In the EMC only the sum of their energies is measured, no threshold can be set for individual shower particles. Thus this cut is more like a range cut, as with lower cut values more particles are propagated and more energy can be transported to the edge of the shower.

This can be seen in the example I gave above, by lowering the cut value the energy in the central crystal decreased by 30MeV!

The range cut in geant4 simply says you don't care whether the energy is deposited here or in 1mm distance. That's the case for the EMC: one doesn't care where in the crystal you have the energydeposition as long its in this crystal. That simply means the cut distance has to be much smaller than the size of the crystal (of course this has to be tuned).

Best regards  
Christian