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Subject: Re: Radiation length units

Posted by [Volker Friese](#) on Mon, 11 May 2015 16:54:54 GMT

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Radiation length is a material property, so it must not vary with the step size in the simulation. The large values you see are possibly due to your encountering vacuum, the radiation length of which is infinite.

Usually, the radiation length is given in units of  $\text{g}/\text{cm}^2$ , so to arrive at the unit cm you would have to divide by the density in  $\text{g}/\text{cm}^3$ . It is unclear which value `FairRadLenPoint::GetRadLength()` returns. It would be nice if at least the unit of the return value could be specified in the class documentation.

Assuming the unit is cm, then what you calculate is the material budget along the trajectory step described by the `FairRadLenPoint`, in units of the radiation length of the material. Since this is a measure of the energy loss of electrons by Bremsstrahlung and also for multiple scattering, it makes sense to sum up this value along the trajectory, even if different materials are involved.

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