
Subject: Re: Pions decays in detector

Posted by [Radoslaw Karabowicz](#) on Fri, 18 Oct 2019 11:09:49 GMT

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Dear Anna! Dear Andrei,

you are simulating 1 GeV/c pions. When I was studying physics, these would be called highly relativistic pions. I did the calculation for you, I haven't done this exercise in years, so I hope I didn't do some stupid mistake.

$$p = 1\text{GeV}/c$$

$$m = 141\text{MeV}/c^2$$

$$\tau = 2.6e-8 \text{ s}$$

$$\text{From } p = \gamma(v) * m * v$$

$$\text{I get } v \approx 0.98995c$$

$$\text{and } \gamma(v) \approx 7$$

Hence the mean length of a 1GeV/c pion is:

$$\text{length} = \gamma(v) * v * \tau \approx 7 * c * \tau = 7 * 7.8\text{m} \approx 50\text{m}$$

If you want to see more decays, LOWER the energy of the pion.
