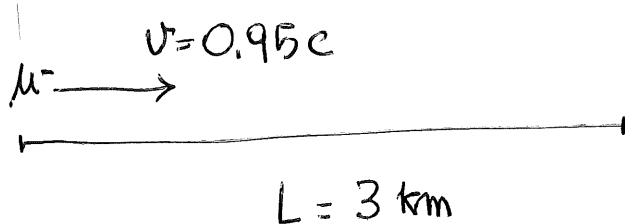


3.1



the time it takes in the lab is

$$t = L/v = \frac{3 \times 10^3 \text{ m}}{0.95 \times 3 \times 10^8 \text{ m/s}} = 1.05 \times 10^{-5} \text{ s}$$

In the μ^- frame $t_0 = \frac{t}{\gamma} =$

$$= 1.05 \times 10^{-5} \text{ s} \sqrt{1 - 0.95^2} = 3.29 \times 10^{-6} \text{ s} = 3.29 \mu\text{s}$$

$$\mu^- \text{ left: } N_0 \cdot e^{-t_0/\tau} = N_0 e^{-\frac{3.29}{2.2}} = 0.224 \cdot N_0$$

22% μ^- survive.

(much more than without γ factor

$$N_0 e^{-\frac{t}{\tau}} \approx 0.008 N_0 \Rightarrow \approx 0.8\% \text{ survive}).$$