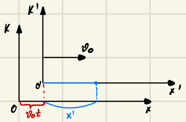


$x = x' + v_0 t$

$v_x = v_x' + v_0$

$a_x = a_x'$

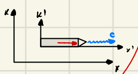
$$\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$$

$x = \gamma (x' + v_0 t')$ $\quad y = y'$ $\quad z = z'$

$t = \gamma (t' + \frac{v_0}{c^2} \cdot x')$

$\beta_x = \frac{v_x}{c}$

$\beta_x = \frac{\beta_x' + \beta_{0x}}{1 + \beta_x' \beta_{0x}}$



$\beta_x' = 1$

$\beta_x = \frac{1 + \beta_{0x}}{1 + 1 \cdot \beta_{0x}} = 1$

если $x' = const$

$\Delta t = \gamma \Delta t'$

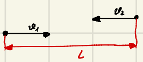
собств. время

$\Delta t = \frac{\Delta t}{\sqrt{1-\frac{v_0^2}{c^2}}}$

$\Delta t > \Delta t_0$

$l = l_0 \cdot \sqrt{1-\frac{v^2}{c^2}}$

№17

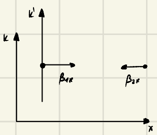


$v_1 = v_2 = v$

$t = \frac{L}{c}$

$v = \frac{\frac{L}{2}}{\frac{L}{c}} = \frac{L}{2} \cdot \frac{c}{L} = \frac{c}{2}$

в ЛСО $v_{отн} = c$



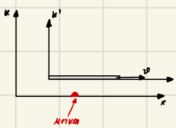
$\beta_x' = \frac{\beta_x - \beta_{0x}}{1 - \beta_x \beta_{0x}}$

β_x — ск-ть 2 в ЛСО

$\beta_{2x}' = \frac{-\frac{1}{2} - \frac{1}{2}}{1 + \frac{1}{2} \cdot \frac{1}{2}}$ — ск-ть K' отн-но K. по сути β_{1x} и β_{0x} одно и то же.

$\beta_{2x}' = -\frac{1}{\frac{5}{4}} = -\frac{4}{5} = -0{,}8.$

№ 8.79



Δt_0

$\Delta t = 3$ нс ← собств. времени (метки неподвижны)

$\Delta t' = 5$ нс

$l_0 = ?$

$\Delta t' = \frac{\Delta t_0}{\sqrt{1-\beta^2}}$

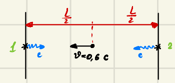
$\sqrt{1-\beta^2} = \frac{3}{5}$

$\beta = \sqrt{1-\frac{9}{25}} = \frac{4}{5} \Rightarrow v = \frac{4}{5}c$

$l_0 = v \cdot \Delta t' = \frac{4}{5} \cdot c \cdot 5 \text{нс} = 4 \cdot 300 \cdot 10^6 \cdot 10^{-9} = \frac{1200}{1000} = 1{,}2$ м

Ответ: 1,2 м.

№8.7.



$L = v \cdot 2$ нс

$L =$

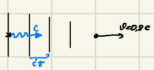
$t_1 = \frac{\frac{L}{2}}{1{,}6\,c}$ (c+v) $\qquad t_2 = \frac{\frac{L}{2}}{0{,}4\,c}$ (c−v)

$\Delta t = t_2 - t_1 = \frac{L}{0{,}8 \cdot c} - \frac{L}{3{,}2c} = \frac{3L}{3{,}2\,c}$

$\Delta t_0 = \Delta t \sqrt{1-\frac{v^2}{c^2}} = \frac{3L}{3{,}2c} \cdot \sqrt{1-0{,}36} = \frac{3L \cdot 0{,}8}{3{,}2\, c} = \frac{3}{4} \frac{L}{c}$

собств — несобств

№ 8.30



$\tau = 1$ с.

$t = \frac{c\tau}{c-v} = \frac{c\tau}{0{,}2c} = 5\tau$

$t' = t \cdot \sqrt{1-\frac{v^2}{c^2}} = 5\tau \cdot \sqrt{1-\frac{0{,}64c^2}{c^2}} = 3\tau = 3c.$

$= \tau \cdot \sqrt{\frac{c+v}{c-v}}$

$\tau \cdot \sqrt{\frac{1+\beta}{1-\beta}}$