4.6

Tuesday, November 1, 2022 1:56 PM

	Przed	Po
E	$m_\mu c^2$	$m_e c^2 + 2 p_q c$
P	0	0

Układ mionu

$$E_\mu = m_\mu c^2$$

$$E_\mu = 2E_n + E_e$$

$$m_\mu c^2 = m_e c^2 + 2|p_q|c$$

$$\frac{c(m_\mu - m_e)}{2} = |p_n| \qquad p_{nx} = 0.$$

Układ LAB

$$p_y' = p_y \qquad p_x' = \sqrt{3}\, p_y$$

$$p_x' = \gamma\left(p_x + \frac{v}{c^2}E\right) = \gamma \frac{v}{c^2} \cdot \frac{c^2(m_\mu - m_e)}{2} = \frac{\gamma v}{2}(m_\mu - m_e)$$

$$\Rightarrow \sqrt{3}\,\frac{c(m_\mu - m_e)}{2} = \frac{\gamma v}{2}(m_\mu - m_e)$$

$$\Rightarrow \sqrt{3}\, c = \gamma v$$

$$\Rightarrow \sqrt{3}\, c = \frac{v}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\Rightarrow 3c^2 - 3v^2 = v^2$$

$$\frac{\sqrt{3}}{2} c = v \Rightarrow \gamma = \frac{1}{\sqrt{1 - \frac{3}{4}}} = 2$$

$$\Rightarrow E'_\mu = \gamma E_\mu = 2 m_\mu c^2$$

$$\vec{p}_{n1} = c \frac{(m_\mu - m_e)}{2} (\sqrt{3}, 1)$$

$$\vec{p}_{n2} = c \frac{(m_\mu - m_e)}{2} (\sqrt{3}, -1)$$

$$c^4 m_{INV}^2 = m_\mu^2 c^4 = 4 m_\mu^2 c^4 - \left(\sqrt{3} c m_\mu - \sqrt{3} c m_e + p_e\right)^2 c^2$$

$$\Rightarrow \sqrt{3} m_\mu c = \sqrt{3} c m_\mu - \sqrt{3} m_e c + p_e$$

$$\Rightarrow p_e = \sqrt{3} m_e c$$

$$\Rightarrow \vec{p}_e = \sqrt{3} m_e c (1, 0)$$