208.5-13

$\frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}\cdot c^2 - m_0c^2 = A \Rightarrow A = m_0c^2\left(\frac{1}{\sqrt{0.99}}-1\right)$

$\frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}c^2 - \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}c^2 = A' \Rightarrow A' = m_0c^2\left(\frac{10}{\sqrt{1.99}}-\frac{10}{\sqrt{19}}\right)$

208.5-14

(1) $(m_0\gamma c^2 - m_0c^2) = n\, m_0c^2 \Rightarrow u = \frac{\sqrt{n^2+2n}}{n+1}c$

(2). $p = \frac{m_0}{\sqrt{1-\frac{v^2}{c^2}}}\cdot u = \sqrt{n^2+2n}\, m_0c$

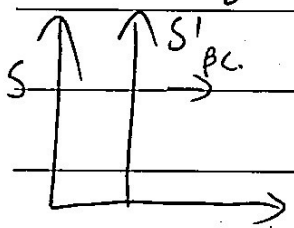
208.5-15

$t = t_0\gamma \Rightarrow \gamma = \frac{7}{2} \Rightarrow u = \frac{3\sqrt{5}}{7}c.$

$m = 207m_e\gamma = 724.5\, m_e.$

$E_k = mc^2 - m_0c^2 = 207\frac{5}{2}m_ec^2 = 517.5\, m_ec^2$

208.5-16



以A为S' ∴ $u = \beta c$. $v_x = -\beta c$.

∴ $v_x' = \frac{v_x - u}{1-\frac{uv_x}{c^2}} = -\frac{2\beta c}{1+\beta^2}$

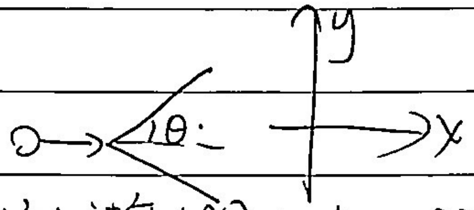
∴ $E = m_0/\sqrt{1-\frac{v_x'^2}{c^2}}\cdot c^2 = \frac{1+\beta^2}{1-\beta^2}m_0c^2.$

~~208.5~~

208.5-18

$E_\gamma = \Delta m c^2 = 8.81\times10^{-13}$ J

208.5-19



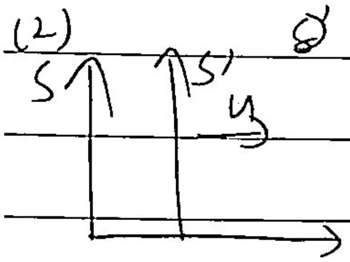
~~(1) [illegible]~~.

∴ 分裂后 ~~[illegible]~~ y方向有速度，~~[illegible]~~ X方向速度相同（θ角相同）.

∵ $mv_1 + mv_2 = 0 \Rightarrow v_1 = -v_2$ 记 $\gamma = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$ ；$\vec{v} = \vec{v_x} + \vec{v_y}$

∴ $E_1 = m_0\cdot\gamma(v_1)c^2$，$E_2 = m_0\gamma(v_2)c^2$ ∴ $E_1 = E_2$.

(2)



设 $u = kc$. 分裂后. $E = 2\frac{m'}{\sqrt{1-\frac{v^2}{c^2}}}c^2$.

$v_1^2 = \sqrt{v_y^2 + v_x^2}$

~~分裂后~~ 分裂前后能量守恒.

∴ $\frac{m}{\sqrt{1-\frac{u^2}{c^2}}}c^2 = 2\frac{m'}{\sqrt{1-\frac{v^2}{c^2}}}c^2$

动量守恒. 水平方向.

$\frac{m}{\sqrt{1-\frac{u^2}{c^2}}}\cdot u = 2\frac{m'}{\sqrt{1-\frac{v^2}{c^2}}}\cdot v_x$. ∵ $v_x^2+v_y^2=c^2$.

$v_x = c\cdot\cos\theta$.

∴ $k = \cos\theta$.