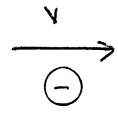
12.15



$E_{tot} = 9{,}08 \cdot 10^{-14}\ J$

$m = 9{,}109 \cdot 10^{-31}\ kg$

Sökt: Elektronens hastighet v

Lös ut v ur formeln för total energi ($E_{tot} = \gamma mc^2$)

$$E_{tot} = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\sqrt{1 - \frac{v^2}{c^2}} = \frac{mc^2}{E_{tot}}$$

Kvadrera VL och HL!

$$1 - \frac{v^2}{c^2} = \frac{m^2c^4}{E_{tot}^2}$$

$$\frac{v^2}{c^2} = 1 - \frac{m^2c^4}{E_{tot}^2}$$

$$v^2 = c^2\left(1 - \frac{m^2c^4}{E_{tot}^2}\right)$$

$$v = \pm c\sqrt{1 - \left(\frac{mc^2}{E_{tot}}\right)^2}$$

$$v = 2{,}998 \cdot 10^8\ m/s \cdot \sqrt{1 - \left(\frac{9{,}109 \cdot 10^{-31} \cdot (2{,}998 \cdot 10^8)^2}{9{,}00 \cdot 10^{-14}}\right)^2}$$

$$= 1{,}24 \cdot 10^8\ m/s$$

Svar: $1{,}24 \cdot 10^8\ m/s$