Fis-MOD   IPA

① Método (1). ⊛ $E = K + 2m_0c^2 = Mc^2 = M_0\,\gamma(v')\,c^2$

⊛ $m_0\,\gamma(v)\,v = M_0\,\gamma(v')\,v'$

Método (2) ⊛ $E = 2K + 2m_0c^2 = M_0\,\gamma(v')\,c^2 \rightarrow 2K + 2m_0c^2 = M_0c^2$

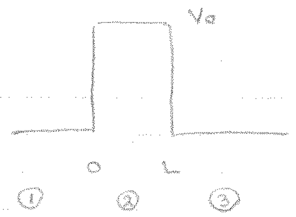
$0 = M_0\,\gamma(v')\,v' \rightarrow v' = 0$

M1: $K_T = M_0\,\gamma(v')c^2 - 2m_0c^2$ $\gamma(v') > 1 \rightarrow \boxed{K_T(M1) > K_T(M2)}$

M2: $K_T = 2K = M_0c^2 - 2m_0c^2$

---

③



$\Psi(x,t) = \varphi(x)\,e^{iE/\hbar\,t}$

$$-\frac{\hbar^2}{2m}\frac{d^2\varphi}{dx^2} = E\,\varphi(x) \rightarrow \begin{cases} \varphi(x) = Ae^{ikx} + Be^{-ikx} & (1) \\ \varphi(x) = Fe^{ikx} & (3) \end{cases}$$

$$\frac{\hbar^2}{2m}\frac{d^2\varphi}{dx^2} = (V-E)\,\varphi(x) \rightarrow \varphi(x) = Ce^{\alpha x} + De^{-\alpha x} \quad (2)$$

$$k = \sqrt{\frac{2mE}{\hbar^2}} \qquad \alpha = \sqrt{\frac{2m(V-E)}{\hbar^2}}$$

(1) $\varphi_1(x=0) = \varphi_2(x=0)$ (3) $\varphi_2(x=L) = \varphi_3(x=L)$

(2) $\frac{d\varphi_1}{dx}(x=0) = \frac{d\varphi_2}{dx}(x=0)$ (4) $\frac{d\varphi_2}{dx}(x=L) = \frac{d\varphi_3}{dx}(x=L)$

(1) $A + B = C + D$ (3) $Fe^{ikL} = Ce^{\alpha L} + De^{-\alpha L}$

(2) $ik(A-B) = \alpha(C-D)$ (4) $ikFe^{ikL} = \alpha(Ce^{-\alpha L} - De^{-\alpha L})$

Dado A, de los cuatro relaciones despejamos F.

$$T(E) = \frac{F\,F^*}{A\,A^*} = \left\{1 + \frac{1}{4}\left(\frac{V^2}{E(V-E)}\right)\sinh^2\alpha L\right\} = 0{,}963 \times 10^{-38}$$

$L = 5\times10^{-9}\,m$

$\alpha = 0{,}8875 \times 10^{10}$