Note. $T = \frac{J_{III}}{J_I} = \frac{|\psi_{trans}|\, v_{tran}}{|\psi_{inc}|^2\, v_{inc}}$

$\frac{v_{III}}{v_I} = \frac{k_{III}}{k_I}$ $\because$ $p = mv = \hbar k$

⟨prob current⟩ Similarly for R

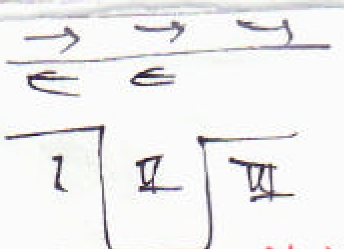
$J(x,t) = \frac{-i\hbar}{2m}\left(\Psi^* \frac{\partial \Psi}{\partial x} - \Psi \cdot \frac{\partial \Psi^*}{\partial x}\right)$

For steady-state (unique E)

$\Psi \to \psi$

Continuity: $\left[\frac{\partial |\psi|^2}{\partial t} + \nabla\cdot\vec{J} = 0\right]$

Note: $J_I = J_{III}$ Conservation of Prob Dens.

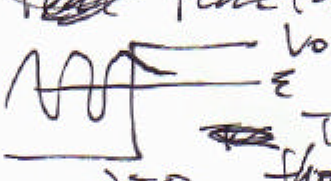


$\psi_I(x) = A_0 e^{ik_1x} + A e^{-ik_1x}$
$\psi_{II}(x) = B e^{ik_2x} + C e^{-ik_2x}$
$\psi_{III}(x) = D e^{ik_1x}$

resonant transmission ($k_2 l = n\pi$)

$4k_1k_2 A_0 = \left[(k_2+k_1)^2 e^{-ik_2l} - (k_2-k_1)^2 e^{ik_2l}\right] D e^{ik_1l}$

~~Pent~~ Penetration vs. Tunneling $k_2 \to i\alpha$



$T = 0$ though $|\psi(x>0)|^2 \neq 0$

$T \approx e^{-2\alpha l}$

$\alpha l \gg 1$