$$1-\int_a^b [E(x,t)]^2 \; dx = 1-\int_a^b [P(x,t)E(x,t)+H(x,t)E(x,t)]\, dx$$

$$= 1-\int_a^b [(1-J)E(x,t)]\, dx = 1-\int_a^b \left[\frac{1}{\mu_r\mu_0}e^{-\mu' x}\right] \; dx$$

$$= 1-\left[\frac{1}{\mu_r\mu_0}\int_a^b e^{-\mu' x}\, dx\right]$$

For

$$V = \frac{1}{2}mv^2$$

$$\mu' = \frac{\mu}{\mu_r\mu_0}$$

$$E = -\frac{\hbar^2}{2m}\nabla^2$$

$$\Rightarrow 1-\int_a^b [L(x,t)L(x,t)]\, dx \approx 0.5$$