$$\left(-\frac{\hbar^2}{2m}\nabla^2 + V(r)\right)\psi = E\psi$$

$$\hbar = \left[\frac{L^2 m}{t}\right] = [E \cdot t]$$

potential energy

$$F = \nabla\varphi \rightarrow E = \int_c \nabla\varphi\, dx$$

$$[\nabla^2 + k_0^2 + V(r)]\,\psi(r) = 0$$

$$\frac{2mE}{\hbar^2} = k^2 \rightarrow k \equiv \frac{\sqrt{2mE}}{\hbar}$$

$$(\nabla^2 + K^2 + V_0\varphi(r))\,\psi(r) = 0$$

$$\psi_{scat} = \int G(\vec{r},\vec{r}\,')\,V(r)\,\psi(r)\,dr = \frac{1}{4\pi}\int \frac{e^{i\vec{k}|\vec{r}-\vec{r}\,'|}}{|\vec{r}-\vec{r}\,'|}V(r)\psi(r) =$$

$$= \frac{V_0}{4\pi}\frac{e^{ikr}}{r}\int e^{i\vec{k}\vec{r}\,'}\varphi(r)\psi(r') = \frac{V_0}{4\pi}A_0\frac{e^{ikr}}{r}\int e^{iqr'}\varphi(r')$$

$$\psi_{scat} = \frac{V_0}{4\pi}A_0\frac{e^{ikr}}{r}\underbrace{\int e^{iqr'}\varphi(r')\,dr'}_{f(q,r)}$$

$$\varphi(r) = V(r)\frac{m}{\hbar^2 r_e} \qquad \frac{1}{2\pi}$$

$$\frac{1}{m^2} \qquad \frac{1}{m}$$

interaction potential

$$\left(-\frac{\hbar^2}{2m}\nabla^2 + V(r)\right)\psi = \frac{\hbar^2 k^2}{2m}\psi = E\psi$$

$$\left(\frac{2m}{\hbar^2}V(r) + \nabla^2 + k^2\right)\psi = 0$$

$$|||$$

$$(\mu\,\varphi(r) + \nabla^2 + k^2)\,\psi = 0$$

↳ potential function

↳ strength of the interaction with the potential

$$\Rightarrow \mu\,\varphi(r) = \frac{2m}{\hbar^2}V(r)$$

$$\frac{\mu}{4\pi} = r_e$$

$$\varphi(r) = \frac{2m\,V(r)}{\hbar^2}\cdot\frac{1}{r_e} \propto k^2 \cdot \frac{1}{r_e} = \left[\frac{1}{L^2}\cdot\frac{1}{L}\right] = \left[\frac{1}{L^3}\right]$$

$$k = \frac{2\pi}{\lambda} \qquad \hbar = \frac{h}{2\pi}$$

$$E = \frac{hc}{\lambda} = \frac{hc}{2\pi/K} = K\hbar c \rightarrow \frac{E}{c} = \hbar k = p$$

$$\frac{\hbar^2 k^2}{2m} = \frac{E^2}{c^2 m} = E$$

$$e^{ik|\vec{r}-\vec{r}\,'|} \;//\; \left(\frac{E}{mc^2}\right)$$