229(8) : Realistic Fusia Potential

This is :

$$V(r) = V_N + V_C \quad -(1)$$

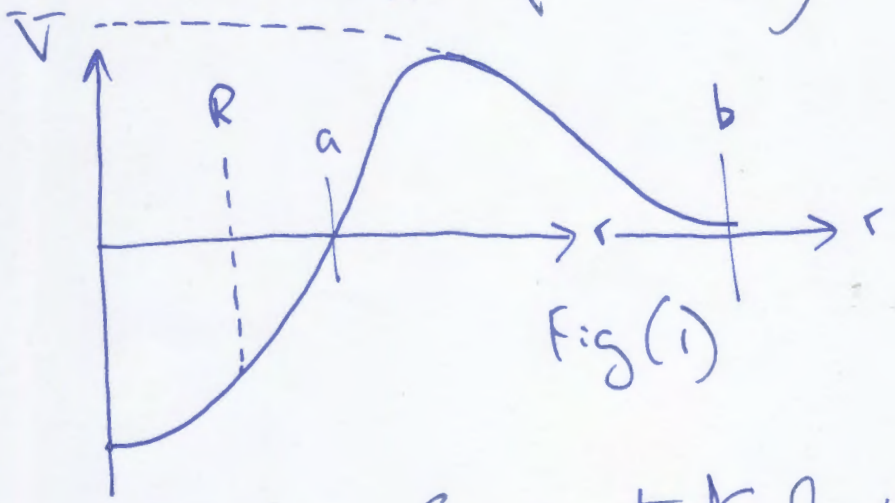
where:

$$V_N = -\frac{V_0}{1+\exp\left(\frac{r-R}{a}\right)} \quad -(2)$$

and

$$V_C = \frac{Z_1 Z_2 e^2}{r}, \quad r > R, \quad -(3)$$

$$= \frac{Z_1 Z_2 e^2}{R}\left(3 - \left(\frac{r}{R}\right)^2\right), \quad r < R \quad -(3a)$$



Fig(1)

Eq.(2) is the Woods Saxa potential inside the nucleus of the fused compound. Eq.(3) is the Coulomb repulsion between protons in nuclei 1 and 2 of atoms 1 and 2, and eq.(3a) is the

2) Coulomb repulsion between protons inside the fused nucleus, regarded as a uniformly charged sphere.

The Coulomb barrier region between a and b

The transmission coefficient is:

$$T = \frac{4}{\left(2\theta + \frac{1}{2\theta}\right)^2}, \quad -(4)$$

$$\theta = \exp\left(\frac{(2\mu)^{1/2}}{\hbar}\int_a^b \left(V(r) - E\right)^{1/2} dr\right)$$

$$\mu = \frac{m_1 m_2}{m_1 + m_2}$$