Low Energy Nuclear Reactions Explained by Nuclear Oscillation—The End of Tunnelling

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— Low energy nuclear reactions can be explained through a nuclear oscillation factor using classical mechanics eliminating the need for a tunnelling explanation. Consider an incoming positive charge approaching vibrating nucleus. If the amplitudes of oscillating are equal in all directions and x the position of the incoming charge to the nucleus, then the position of the particle is \( r = \left[ (x + A \cos X)^2 + (A \cos Y)^2 + (A \cos Z)^2 \right]^{1/2} \). Then KE needed = Barrier Height = \( kQ(n)q(i)/[(x + A \cos X)^2 + (A \cos Y)^2 + (A \cos Z)^2]^{1/2} \). If the nuclear reaction takes place on the x-axis and contact with the nuclear surface is considered to be contact with the nuclear well, \( x = A \cos X \), the magnitude for \( r \) after collecting terms is \( r = [4(A \cos X)^2 + (A \cos Y)^2 + (A \cos Z)^2]^{1/2} \). The KE needed to mount the barrier height is \( KE = kQ(n)q(i)/(4(A \cos X)^2 + (A \cos Y)^2 + (A \cos Z)^2]^{1/2} \). If the maximum for all \( \cos \) values is +1 and for all minimum values is -1, \( r = (6)^{1/2}A \). And average \( \cos \) value is \( \text{RMS cos} = \left( \frac{1}{2} \right)^{1/2} \), \( r = (3)^{1/2}A \). For a static nucleus \( r = 0 \). The barrier height minimum is \( KE = kQ(n)q(i)/(6)^{1/2}A \), maximum \( KE = kQ(n)q(i)/0 \) and average \( KE = k(q(n)q(i)/(3)^{1/2}A \). Therefore the Coulomb barrier is different at different times accounting classically for all nuclear reactions.

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