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The Sharp Radius of the Neutron, Proton, Electron, Critical Photon and the Atomic Nucleus

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Abstract

According to the Classical Electron Orbital Radius and the force equilibrium relation before the disintegration of the neutron, we can calculate the sharp radius of the neutron; According to the density of nucleus and the sharp radius of the neutron, we can calculate the sharp radius of the electron; According to the sharp radius of the electron and the force equilibrium relation that electron with the Critical Photon, we can calculate the sharp electron radius of the Critical Photon; From the density of nucleus, we can obtain the mass of the Critical Photon; From the light velocity, we can obtain the energy of the Critical Photon; From the Planck's constant, we can obtain the frequency of the Critical Photon; From the light velocity, we can obtain the wavelength of the Critical Photon; We discover that the wavelength of the Critical Photon is in the peak position of the solar spectrum energy radiation. Coulomb's law stands to the world of elementary particles in the way that Newton's laws of classical mechanics stand to the macroscopic world.

Keywords: Neutron; Proton; Electron; Critical Photon; Mass; Radius; Frequency; Density

Opinion

One: The disintegration of the neutron

The neutron can spontaneously produce disintegration and turn into the proton, at the same time send out an electron and some matter. According to the force equilibrium relation, before the disintegration of the neutron, there was the formula as follows (Figure 1):

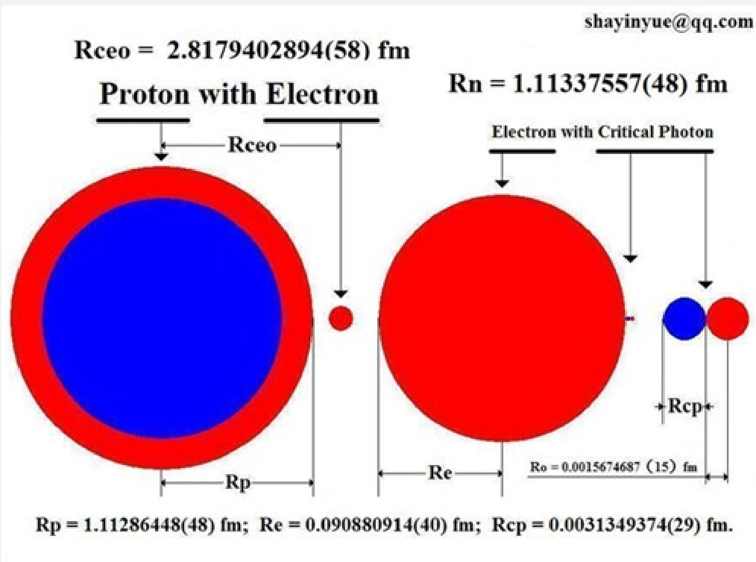

Figure 1: Proton with electron.

$$F = K \times Qp \times Qe \;/\; \left(Rn \times Rn\right) = (Mn\text{-}\ Mp) \times C \times C \;/\; Rn \quad \text{----}\ (1)$$

Where the K is the electromagnetic constant; the Qp is the electric charge of the proton; the Qe is the electric charge of the electron; the Mn is the mass of the neutron; the Mp is the mass of the proton; the Rn is the radius of the neutron; the C is the light velocity.

The total mass for releasing from neutron disintegration is $Mn\text{-}\ Mp$ as follows:

$$Mn\text{-}\ Mp = 1.674927211(84) \times 10\text{^}{-27}\text{-}1.672621637(84) \times 10\text{^}{-27} = 2.30557374(89) \times 10\text{^}{-30}\ kg.$$

$$Mn = 1.674927211(84) \times 10\text{^}{-27}\ kg;\ Mp = 1.672621637(83) \times 10\text{^}{-27}\ kg;\ Me = 9.10938215(45) \times 10\text{^}{-31}\ kg.$$

where the Mn is the mass of the neutron, the Mp is the mass of the Proton and the Me is the mass of the electron [1].

Two: the radius of the neutron

From formula (1), we can acquire the calculation formula of the neutron radius,

$$Rn = K \times Qp \times Qe \;/\; ((Mn\text{-}\ Mp) \times C\text{^}2) \quad (2)$$

According to exact physical constants from modern science, we take the following values:

$$K = 8.9875517873681764 \times 10\text{^}{+9}\ m/F,\ Qp = Qe = 1.602176487(40) \times 10\text{^}{-19}\ C,\ C = 299792458\ m/s.$$

from formula (2), we can calculate the radius Rn of the neutron:

$$Rn = K \times Qp \times Qe \;/\; ((Mn\text{-}\ Mp) \times C\text{^}2) = 1.11337558(48) \times 10\text{^}{-15}\ m \quad (3)$$

Three: the frequency of the neutron

From the radius of the neutron, we can compute the frequency of the neutron:

$$Fn = C \;/\; \left(2 \times \pi \times Rn\right) = 4.2854768(19) \times 10\text{^}{+22}\ 1/s \quad (4)$$

Four: the density of the neutron

From the radius of the neutron, we can compute its density:

$$Dn = Mn \;/\; \left(4/3 \times \pi \times Rn\text{^}3\right) = 2.8972252(39) \times 10\text{^}{+17}\ kg/m\text{^}3 \quad (5)$$

Five: the radius of the proton

According to the density of the neutron, we can calculate the radius of the proton:

$$Rp = \left(Mp/Mn\right)\text{^}\left(1/3\right) \times Rn = 1.11286448(48) \times 10\text{^}{-15}\ m \quad (6)$$

Six: the radius of the electron

According to the matter density of neutron, we can calculate the radius of Electron:

$$Re = \left(Me/Mn\right)\text{^}\left(1/3\right) \times Rn = 9.0880914(40) \times 10\text{^}{-17}\ m \quad (7)$$

Seven: the radius of the atomic nucleus

According to the radius of the neutron and the density of matter, we can calculate the radius of the atomic nucleus:

$$Ra = \left(Ma \;/\; Mn\right)\text{^}\left(1/3\right) \times Rn \quad (8)$$

where the Ma is the mass of the atomic nucleus and Ra is the radius of atomic nucleus.

Mu (Mu = 1.660538782(83) ×10^-27 kg) is the atomic mass unit and Ru is its radius.

$$Ru = (Mu / Mn)\text{^}(1/3) \times Rn = 1.11017826(48) \times 10\text{^}{-15}\ m \quad (9)$$

$$Ra = Ru \times A\text{^}(1/3) \quad (10)$$

where the A is the nuclear number of the atomic nucleus.

Eight: the physical constants of the critical photon

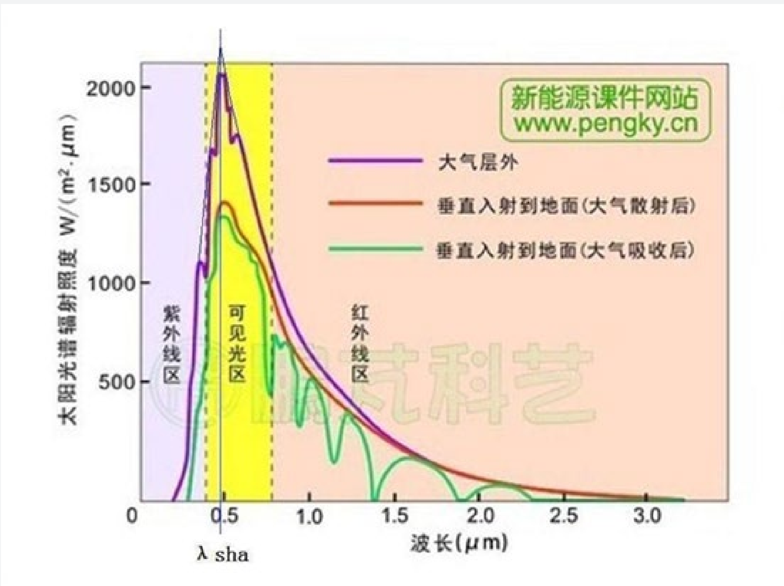

Figure 2: The Physical Constants of the Critical Photon

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According to the radius of the electron and the density of the Neutron, we can calculate the mass of the Critical Photon and other Physical Constants (Figure 2):

$$2\times Ro^2 + Ro^2 (Ro/(Re+2Ro))^2 + 4\times Re\times Ro + 2\times Rceo\times Ro + Re^2 = 0 \quad (11)$$

$$Rceo = K\times Qp\times Qe / (Me\times C^2) = 2.8179402894(58)\ fm \quad (12)$$

Rcp = 2×Ro; Ro = 0.0015674688 (15) fm;

Radius: Rcp = 0.0031349376 (29) fm; Mass: Mcp = 9.347546 (38)×10^-36 kg;

Energy: Ecp = 4.200578(17)×10^-19 J; Energy: Ecp = 2.621795(11) eV;

Frequency: Fcp = 6.339471(26)×10^14 Hz; W avelengh: λcp = λsha = 472.8982(20) nm;

Apply the Wien's law we can obtain:

$$Tsha = 2897768.5(51)\ nm\cdot K / \lambda sha = 6127.679(37) K \quad (13)$$

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