

On the Radius of the Neutron, Proton, Electron, Light Photon and the Atomic Nucleus

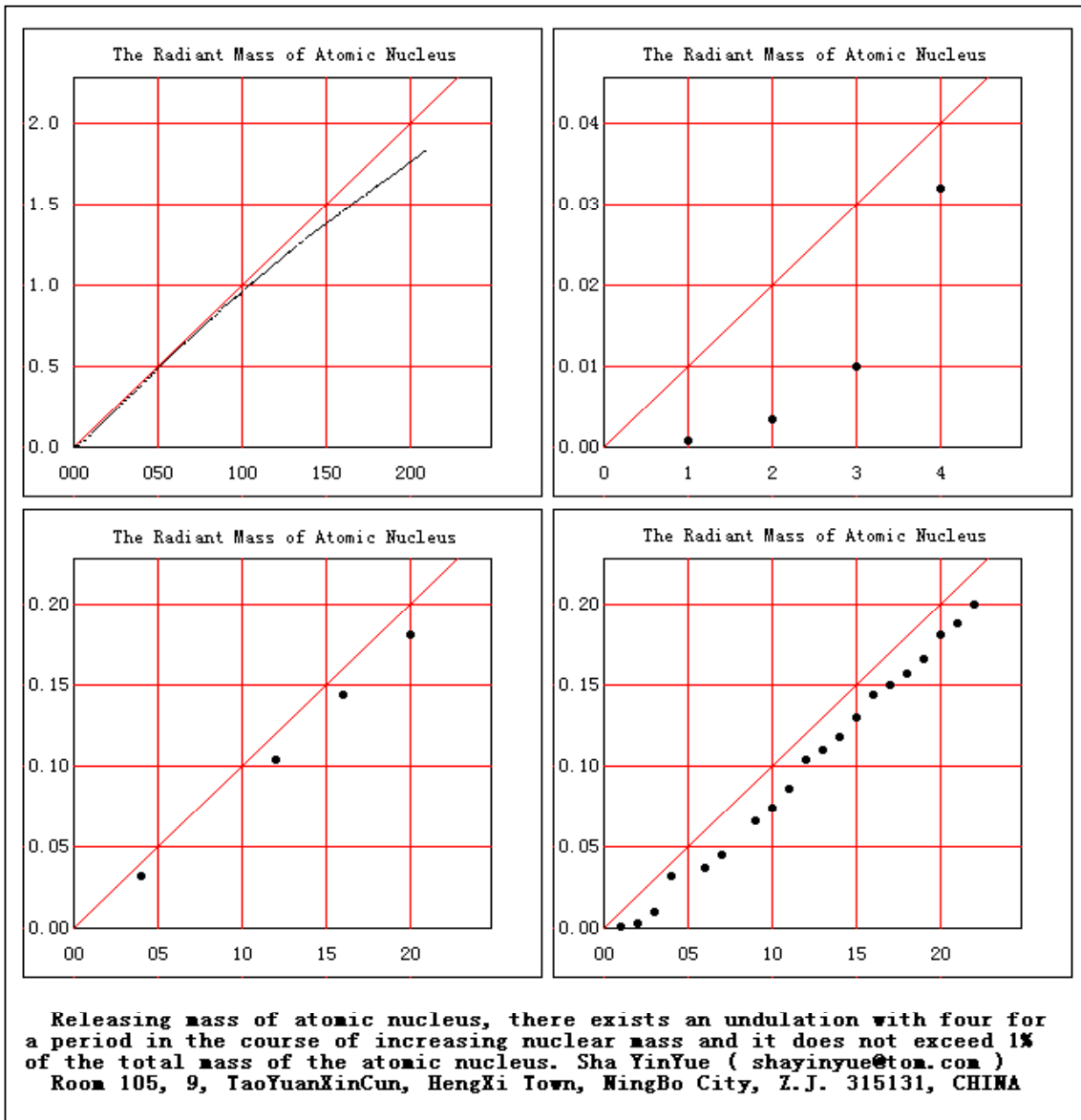
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Abstract

The neutron can spontaneously produce disintegration and turn into the proton, at 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:

$$F = K \times Q_p \times Q_e / (R_n \times R_n) = (M_n - M_p) \times C \times C / R_n \text{-----(1)}$$

Where the K is the electromagnetic constant; the Q_p is the electric charge of the proton; the Q_e is the electric charge of the electron; the M_n is the mass of the neutron; the M_p is the mass of the proton; the R_n is the radius of the neutron; the C is the light velocity.



The mass and radius of the neutron, proton, electron, light photon and the atomic mass unit:
 $M_n = 1.674954386 \times 10^{-27} \text{ Kg}$; $R_n = 1.113284057367 \times 10^{-15} \text{ m} = 1.113284057367 \text{ fm}$;
 $M_p = 1.672648586 \times 10^{-27} \text{ Kg}$; $R_p = 1.112772961016 \times 10^{-15} \text{ m} = 1.112772961016 \text{ fm}$;
 $M_e = 9.10953447 \times 10^{-31} \text{ Kg}$; $R_e = 9.087345835484 \times 10^{-17} \text{ m} = 0.09087345835484 \text{ fm}$;
 $M_l = 1.04646166 \times 10^{-35} \text{ Kg}$; $R_l = 3.254863392638 \times 10^{-18} \text{ m} = 0.00325486339264 \text{ fm}$;
 $M_u = 1.6605655 \times 10^{-27} \text{ Kg}$; $R_u = 1.110086953716 \times 10^{-15} \text{ m} = 1.110086953716 \text{ fm}$.

Key Words: Neutron; Proton; Nucleon; Electron; Mass; Radius; Frequency; Density; Physical Constant.

One: The disintegration of the neutron

The neutron can spontaneously disintegrate and turn into a proton and at same time, send out an electron and some matter.

$$M_n = 1.674954386 \times 10^{-27} \text{ Kg}; M_p = 1.672648586 \times 10^{-27} \text{ Kg}; M_e = 9.10953447 \times 10^{-31} \text{ Kg}.$$

where the M_n is the mass of the neutron, the M_p is the mass of the Proton and the M_e is the mass of the electron.

The total mass for releasing from neutron disintegration is $M_n - M_p$ as follows:

$$M_n - M_p = 1.674954386 \times 10^{-27} - 1.672648586 \times 10^{-27} = 2.3058 \times 10^{-30} \text{ Kg}$$

Two: The radius of the neutron

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

$$R_n = K \times Q_p \times Q_e / ((M_n - M_p) \times C^2) \text{-----} (2)$$

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

$$K = 8.987551786262 \times 10^{+9} \text{ m/F}, Q_p = Q_e = 1.602189246 \times 10^{-19} \text{ C}, C = 2.99792458012 \times 10^{+8} \text{ m/s}$$

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

$$R_n = K \times Q_p \times Q_e / ((M_n - M_p) \times C^2) = 1.113284057367 \times 10^{-15} \text{ m} \text{-----} (3)$$

Three: The frequency of the neutron

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

$$F_n = C / (2 \times \pi \times R_n) = 4.285829054907 \times 10^{+22} \text{ 1/s} \text{-----} (4)$$

Four: The density of the neutron

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

$$D = M_n / (4/3 \times \pi \times R_n^3) = 2.897986816995 \times 10^{+17} \text{ Kg/m}^3 \text{-----} (5)$$

Five: The radius of the proton

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

$$R_p = (M_p/M_n)^{(1/3)} \times R_n = 1.112772961016 \times 10^{-15} \text{ m} \text{-----} (6)$$

Six: The radius of the electron

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

$$R_e = (M_e/M_n)^{(1/3)} \times R_n = 9.087345835484 \times 10^{-17} \text{ m} \text{-----} (7)$$

Seven: The radius of the atomic nucleus

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

$$R_a = (M_a / M_n)^{(1/3)} \times R_n \text{-----} (8)$$

where the M_a is the mass of the atomic nucleus and R_a is the radius.

$M_u(1.6605655 \times 10^{-27} \text{ Kg})$ is the atomic mass unit and R_u is its radius.

$$R_u = (M_u / M_n)^{(1/3)} \times R_n = 1.110086953716 \times 10^{-15} \text{ m} \text{-----} (9)$$

$$R_a = R_u \times A^{(1/3)} \text{-----} (10)$$

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

CONCLUSION

Releasing mass $(M_n \times (N_n + N_p) - M_a)$ of atomic nucleus, there exists an undulation with four for a period in the course of increasing nuclear mass and it does not exceed 1% of the total mass of the atomic nucleus.

The ratio $(N_n / (N_n + N_p))$ of the amount of neutrons to the amount of nucleons inside the heavy atomic nucleus approach the divine ratio 0.618 $((M_n - M_p - M_e) / (M_n - M_p) = 0.605)$. where N_n is the amount of neutrons inside the atomic nucleus and N_p is the amount of protons inside the atomic nucleus, giving the combined total of nucleons.

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