International Journal of Advanced Research in Physical Science (IJARPS)
Volume 1, Issue 5, September 2014, PP 27-42
ISSN 2349-7874 (Print) & ISSN 2349-7882 (Online)
www.arcjournals.org

Physics of the Giant Atom

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Abstract: *If a particle treated as charged sphere and then equalized its electrostatic energy with its rest energy $m_o c^2$ then, on the same model we can treat a collection of charges as a particle. So,*

(in the form of Einstein equation of the rest mass m_o of a particle with rest radius r_o)

we can put a collection of charges p, - obeying Coulomb force- in a closed sphere with a radius r as;

$(k\, e^2 \div r_o)\ [p\, r_o \div r] = m^{\backslash}_o c^2 + (\mathbf{0})$

Where; p is the number of the protons inside a sphere with a radius r, e is the magnitude of the charge in coulomb and k is the electric constant

Where also; the factor inside the big bracket = 1, while the small bracket of the right side is not absolutely empty.

Our work lies inside this small bracket.

INTRODUCTION

Our work is built on a proposal - which is in a separate next discussion would appear as common physics and not a proposal- says that; if the field is so great that the expected speed of the particles equal speed of light -and only if the expected speed equal speed of light- then the proposed factor; c_o would be introduced to prevent speed of the particles to reach speed of light as follow;

$$(c_o\, k)\, e^2\, p \div r = m(v\, \sqrt{c_o})^2 \div 2 = e^2\, p\, \mu (c\, \sqrt{c_o})^2 \div 4\pi\, r \tag{1}$$

Where; k is the electric constant $\equiv \mu c^2/4\pi$. Consequently the angular momentum form would be;

$$m\, (v\, \sqrt{c_o})\, d = \hbar\, \sqrt{c_o} \tag{2}$$

Where; d is the inter-particles distance = the reduced Compton wave length = $\hbar \div c\, m_o$

$= 2.09\times 10^{-16}$ m

The following intuitive equation of the rest mass of a particle like a proton has a field with expected v = c

$$k\, e^2 \div r_o = m_o c^2 \tag{3}$$

$$E_e^{\backslash} = (k\, e^2 \div r_o)\ [1] = m^{\backslash}_o c^2 + (\mathbf{0}) \tag{3}$$

$$(k\, e^2 \div r_o)\ [p\, r_o \div r] = m^{\backslash}_o c^2 + (\mathbf{0}) \tag{4}$$

Where; $m^{\backslash}_o$ is the field equivalent rest mass = $\hbar / c.r_o \equiv m_o$ while, m_o and r_o are the inertial rest mass and radius of a proton (or of a neutron).

Where, the factor inside the big bracket equal one while, the factor inside the small bracket in the right side is not null.

The small bracket could be analyzed by introducing the factor c_o as follow;

$$(ke^2 \div r_o)\ [p\, r_o \div r] = m^{\backslash}_o c^2 + (E^{\backslash}_e + Eg) \tag{5}$$

$(ke^2 \div r_o)\ [p\ r_o \div r] = m^{\backslash}_o c^2 + [(e^2 \mu c^2 c_o \ \div 4\pi\ r) + E_g]$ (6)

Where; E_g is the gravitational energy per a particle, and the factor inside the big bracket of the left side equal one and the resultant of the two terms of the big bracket of the right side equal zero

The above last equation is the electric sub-sphere form of Compton sphere.

This proposed Compton sphere is formed of a number of protons p, distributed homogeneously among much more number of neutrons n, with in-between particular distance equal the reduced Compton wave length d;

$d = \hbar\ \div c\ m_o = 2.09\times10^{-16}$ m (7)

The neutrons sub-sphere of Compton sphere could be written on the same way as;

$E_c = [\ \hbar^2 \div 2m]\ [3\pi^2\ (n\ \div V)]^{2/3} = mc^2$ (8)

Where, n over V is the density of matter inside this sphere.

$E_c = m^{\backslash} c^2 + [E^{\backslash}_c + E_g]$ (9)

$= m^{\backslash}_o\ c^2 + (\hbar^2\ c_o \div 2m)\ [3\pi^2\ (n \div v)]^{2/3} + E_g$ (10)

$= m^{\backslash}_o c^2 + (m_o c^2\ c_o + E_g)$ (11)

Compton sphere is -so- formed of two interfering sub-spheres with radius;

$r = (\ r_o\ d \div r_o)\ n^{1/3}$

The factor c_o is a proposed factor introduced inside (and only inside) Compton sphere whose speed of its particles is expected to equal speed of light. The factor c_o equals the rest mass of the average potential energy -in joule- of the ground state of Bohr model over Bohr radius d_b .

$c_o \equiv [(\ ke^2 \div d_b) \div c^2] \div d_b = 1.08\times10^{-24}$ (12)

It is clear that $E_e^{\backslash}$ is equivalent to Einstein equation of the rest mass of a particle like a neutron while, $E^{\backslash}_c$ takes the form of Fermi like Compton energy.

Now we can call the positively charged Compton sphere as the giant proton, while the negatively charged one as the giant electron.

Our work would be divided into two chapters; in the first one we would study the orbit of the ground state of the giant atom where we would discover that it is typically the orbit of the first planet in the solar system

Throughout the second section we will show that the common atomic laws would succeed to estimate many parameters of the solar system;

1-Speed and radius of the orbit of each planet

2- The elliptical orbits of the planets

3- The ratio between mass of the sun (M) to the summed masses of all the planets.

So, our work suggested that the solar system had begun its motion as units of giant atoms. Later on, the atomic model disappeared after it left behind the above mentioned parameters to refer to the past existence of the giant atomic model.

So, the giant charge had existence in the form of Compton state. Compton state had existence not by condensation of the particles but by a principle we called the equivalency.

Existence of such state needs to overcome the following problems;

1- Coulomb force which would not allow existence of much charges in a comparative narrow space like the giant charge

2- Pauli exclusion principle which never allow two typical fermions to exist in the same state.

3- Wave of matter and uncertainty principle which act against condensation of matter in such a state.

DISCUSSION

Approach to the giant atom

1- The hydrogen atom like system (h.a..ls.)

Consider an electron e, with a non relativistic mass m_e and a proton -p- with a mass m_p orbit each other.

The two body problem could be reduced as one body problem as;

$\mu = m_e m_p \div (m_e + m_p)$

$m = m_e + m_p$

If, $m_p >> m_e$

$\mathbf{F}_{ep} = m_e \mathbf{a} = \mu \mathbf{a}$ where, $\mathbf{a} = \mathbf{a}_e - \mathbf{a}_p$

If, $\mathbf{r} = \mathbf{r}_e - \mathbf{r}_p$

$ke^2 \div r = m_e (v_e)^2 \div r_e = m_p (v_p)^2 \div r_p$

The lagrangian, L_g could be written as;

$L_g = [\ m_e (v_e)^2 \div 2] + [m_p (v_p)^2 \div 2] - U(r_e - r_p)$

The angular momentum = L

$L = m_e v_e r_e + m_p v_p r_p \approx m_e v_e r_e = \hbar$

$$\mathbf{r_e} = \mathbf{r}\, m_p \div m \approx \mathbf{r} \qquad (13)$$

$\mathbf{r}_p = \mathbf{r}\, m_e \div m$

The ground state $|0>$ could be described by the Hamiltonian H in time dependent form as;

$H = -(\hbar \div 2m)\, \partial^2 / \partial x^2 + (E - U) = i \hbar\, \partial / \partial t$

The solution gives;

Expected radius $< r > = 5.29 \times 10^{-11}$ m

Expected speed $< v > = 2.18 \times 10^6$ m/s

2- The major atom; a proposed inversed atom[1]

Although it is a proposed system yet it is the mathematic base of the giant atom system. Suppose that we have a hydrogen atom like system (h.a.l.s) and we succeeded to bind its electron through imaginary energy with a number of neutrons = m_p / m_e = 1836 neutrons. And suppose –also- that this proposed binding energy ≥ the total energy between the proton and its orbiting electron such that the neutrons bound electron can orbit as one body. Once we can create this imaginary major atom we will notice that;

There would be shift of the centre of the masses towards the neutron bound electron.

There would be –also- respective relative shift from quantum to classic physics.

Let us study this inversed atom (i.a.) side by side with (h. a.l.s.) and let us use for the first the capital letters and for the second the small letters.

We did nothing except binding the electron with 1836 neutrons so;

$$ke^2 \div r = ke^2 \div R \qquad (14)$$

$R = r$

From (13);

$$\mathbf{R}_p = M_e \mathbf{R} \div \mu \approx M_e \mathbf{R} \div M_e = \mathbf{R} \qquad (15)$$

$$\mathbf{R}_e \approx M_p \mathbf{R} \div M_e \approx \mathbf{R} \div 1844 \qquad (16)$$

Where, M_e is the mass of the1836 neutrons bound electron = 1836 $(M_n \div M_p)M_p$

=1844 times the mass of the proton. And where, μ = the inverse of $(1/M_p + 1/M_e) = M_e \div 1845 = M_p \div 1.0005 \approx M_p$. Consequently;

$$R = R_p = r \tag{17}$$

$v = v_p$

From (14);

$$ke^2 \div r = ke^2 \div R = M_p\, v^2 \tag{18}$$

The angular momentum L obeys;

$$L = L_p + L_e = l\,\hbar \tag{19}$$

Where, l is an acquired inversed atom level number.

On substitution we get;

$$v = 2.18\times10^6 \sqrt{}\,(m_e \div m_p) = 2.18\times10^6 \div 43 = 5.06\times10^6 \text{ m/s} \tag{20}$$

$$l = 43 \tag{21}$$

We can get –also-; $\lambda_o = \lambda \div 43$

$$2\pi R = l\,\lambda_o = l\,\lambda \div 43 = \lambda \tag{22}$$

Where; λ is the wave length of Bohr radius.

3- The critical anti-escape energy

If a sphere A is formed of number of protons p, distributed among much more number of neutrons n, and if A is R distant from another sphere B which is formed of the same number of charges but with opposite sign –electrons- distributed by the same manner among n, and *if no binding energy inside each sphere* ***except*** *the gravitational* en*ergy* then we may have the following states of motions;

The particles p, move as singled particles by the electric field leading to escape of the charges so;

$(m.\ n)\ m\ G\ /r < k\ (e.\ p)e/R$

Where; r is the radius of the sphere A.

To prevent escaping or to make the centre of the spheres move toward each other or to make the electric energy distributed homogeneously among p and n then we need;

$0.6\ (m.n)\ (m.n)\ G \div r \geq k\ (e\ p)\ (e\ p) \div R$

To make the centre of mass of the sphere orbit –by the electric field- the other sphere then we need;

$D\ (m\ n)^2\ G \div r \geq k\ (e\ p)^2 \div R$

Definition of D needs two steps;

If ***a particle*** orbits another one then we need;

$(m\ n)m \div r \geq m(v_1)^2 \div 2$ where v_1 is speed of the orbit of the particle.

$$[2\ (m\ n)\ m]G \div r \geq k\ (e\ p)\ e \div R \tag{23}$$

If the ***sphere*** A orbits the sphere B by the electric field then we need;

$$0.6\ [2 \times 2(m\ n)^2\ ]G \div r \geq (m\ n)(v_o)^2 = k\ (e\ p)^2 \div R \tag{24}$$

$$2.4(m\ n)^2\ G \div r \geq k\ (e\ p) \div R \tag{25}$$

The factor 0.6 arises from integration throughout n particles as;

$E_g = -\int G\ \sigma\ (4/3)\ \pi\ r^2\ \sigma\ 4\pi\ r^2\ dr = (3/5)\ G\ M^2 \div r$

Where; the integration is defined from zero to r and where σ is the density.

The giant proton to prevent escape of its charges need;

$(m_n\ n)\ m_p\ G \geq (e\ p)e\ k\ c_o$ (26)

$(n \div p) \geq e^2\ k\ c_o \div m^2\ G$ (27)

Where the mass of a proton $m_p \approx$ mass of a neutron $m_n = m$

The giant electron needs;

$(n^{\backslash} \div p^{\backslash}) = [(n \div p)\ 1844]$ (28)

Where; $p^{\backslash}$ is the number of the electrons in the giant electron = p

The giant proton to orbit the giant electron needs;

$2.4(m\ n)^2\ G \div d\ n^{1/3} \geq (e\ p)^2\ k \div R$ (29)

Where, $d = \hbar \div m\ c = 2.09\times10^{-16}$ m.

And needs;

$(m.\ n)\ v^2 = k\ (e\ p)^2 \div R$, or in the form;

$m.\ (n \div p)\ v^2 = k\ e^2 p \div R$ (30)

Solution of (29) and (30) gives;

$2.4\ (m\ n)^2\ G \div r \geq (m\ n)\ v^2$ (31)

Although equation (31) is a net result of equations (29) and (30) yet it gives a new meaning as a fundamental relation between n and v. It gives a restricted relation between n and v (also p and v) so it could be written as;

$v^2 = (2.4m\ G \div d)\ n^{2/3}$

Where; $d = \hbar \div mc$

$v^3 = n\ (2.4mG \div d)^{3/2}$ (32)

It is useful to notice that any other equation gives mistake relation between n and v. Equation (30) as example is not a restricted relation between n and v because R could be analyzed into factors related to n and p while equation (31) depends on d which is independent fundamental constant.

4-The eccentricity e of the giant atom;

The aphelion = $R_p = (1-e)\ R$ (33)

The perihelion = $R_e\ (1+e)\ R$

$(R_p + R_e) \div 2 = R$ (34)

From (33) and ((34); $(v_x \div v)^2 = R \div R_p = 1 \div (1-e)$ (35)

If, e = 0.21;

$(v_x \div v)^2 = 1.26$ (36)

Where v_x and v are the maximum – at the aphelion- and average speeds respectively.

THE GIANT ATOM STRATEGY

If the above relations has infinite solution; the giant atom –forever- chooses the least amount so the giant atom rewrites the last mention inequalities as equalities.

The equality of equation (27) gives;

$n/p = 1.14\times10^{12}$ (37)

Now the giant proton is 1844 times lighter than the giant electron so it would orbit it. If the orbit is not circular then the elliptical orbit would have maximum speed at the perihelion v_x. Equation (32) guards against escape of the charges of the circular orbit with constant radius. The elliptical orbit needs to multiply equation (33) with a factor more than one. Later on we would see that this factor should equal 5/3.

$$n \div p = [\,(1.14\times10^{12})\ 5/3] = 1.9\times10^{12} \quad (38)$$

Now the gravitational energy can act against this accidental but expected v_x.

THE HUGE CHARGE[2]

Here we have to focus on equation (30) which supplies us with the physical unit of the giant charge; let us call it the huge charge. The huge charge which appears in equation (30) is the smallest unit of the orbiting charge. It has a mass m_u and a matter wave length λ_u.

$$m_u = m\,(n \div p) \quad (39)$$

$$\lambda_u = \lambda \div (n \div p) \quad (40)$$

where; λ is the wave length of Bohr radius.

Its angular momentum would be in the form;

$$(m\,n \div p)\,[(\lambda\,l \div l)\,(p \div n)]\,v = l\,\hbar \quad (41)$$

The circumference S of the giant orbit is the summation of the huge waves;

$$S = (\lambda\,p \div n)\,p = 2\pi\,R = \lambda\,(p^2 \div n) \quad (42)$$

THE INERTIA OF THE GIANT ATOM

From equation (29) and from strategy of the giant atom;

$$2.4m^2\,(n/p)^2\,G\div[d\,(n\,/p)^{1/3}\,p^{1/3}] = e^2\,k/R$$

$$P^{1/3} = (n/p)^{5/3}\,R_p \div 1.08\times10^{20} \quad (43)$$

Where; R_p is the radius of orbit at the aphelion.

From equation (30);

$$m\,(n/p)\,v^2 = k\,e^2\,p/\,R$$

$$p = m\,(n/p)\,(v_x)^2\,R_p \div e^2\,k = m\,(n/p)\,v^2\,R \div e^2\,k \quad (44)$$

$$p = 7.22(n/p)\,R\,v^2 \quad (45)$$

By dividing (45) over (43);

$$P^{2/3} = (p/n)^{2/3}\,[7.22\,(v_x)^2\,(1.08\times10^{20})]$$

$$P = (p/n)\,(7.8\times10^{20})^{3/2}\,(v_x)^3 = (p/n)\,(2.17\times10^{31})\,(v_x)^3 \quad (46)$$

From equation (20) and (36);

$$(v_x)^3 = (5.06\times10^4)^3\,(1.26)^{3/2} = (1.29\times10^{14})\,1.41 \quad (47)$$

$$p = (1/1.9\times10^{12})\,(2.17\times10^{31})\,(1.29\times10^{14}\times1.41) \quad (48)$$

$$p = 2.07\times10^{33} \quad (49)$$

$$n = p\,(n/p) = 2.07\times10^{33}\times1.9\times10^{12} = 3.94\times10^{45} \quad (50)$$

$$p^2/n = 1.09\times10^{21} \quad (51)$$

From equation (44);

$$R_p = (p^2/n)\,[(e^2/4\pi\varepsilon_o) \div m\,(v_x)^2] \quad (52)$$

$$R = (p^2/n)\,(e^2/4\pi\varepsilon_o) \div m\,v^2 \quad (53)$$

From the last equation or equation (42);

$$R = (1.08\times10^{21})\,(5.29\times10^{-11}) = 5.71\times10^{10}\ \text{m} \quad (54)$$

Notes;

1- From (42) and (53);

$\lambda = 2\pi\,(e^2/4\pi\varepsilon_o) \div m\,v^2$. Where $\lambda/2\pi$ = Bohr radius.

2- We have to notice that when R and v are related to each other in the same equation then we can write R and v or R_p and v_x as in equations (52) and (53) while if v related to p or n in the same equation (without R) then we have to write v_x as in equation (46)

So; n = [$(1.14\times10^{12})5/3$] to be meaningful in equation (29) the speed v should be written as;

$$m\,(v_x)^2 \equiv 4\,(0.6\,m^2\,G\,n^{2/3}) \div d\;=4\,E_G \equiv k\,(e^2\,p)\,(p/n) \div R_p \qquad (55)$$

This form speaks about the least possible gravitational energy which binds a particle inside the giant proton to enable the whole sphere to orbit as one mass where this giant proton is formed –in this stage- of neutrons (no atoms) and consequently no binding energy inside the giant proton **except** this gravitational energy. Because of the orbit is elliptical so the giant proton must have enough neutrons to act against escape of its charges at the accidental maximal v_x of the elliptical orbit.

Now the giant proton to orbit its giant electron is formed of;

$p = 2.07\times10^{33}$

$n = 3.94\times10^{45}$

And has orbit with;

$R = 5.71\times^{10}$ m

$v = 5.06\times10^4$ m/s.

Later on –in a separate discussion- we would see that each a planet was formed of number of these giant charges then in a next stage and after beta decay and formation of atoms the inter-particles distances would increase and consequently the radius of the giant charge would increase which would lead –by equation 29- to inability of the unit to keep its charges which would lead to escape of the charges and consequently attraction and unification of the units to form the planet where Newton's laws would receive the file of the motion as the same R and v.

Actually the astronomic known radius of the orbit of the mercury planet is the same as our estimated R. Also its known natal orbit speed is as our estimation. This encouraged us to go on with the solar system. But before we go on we need

to study the basic unit from which the giant charge is formed. We also need to ask if we can create such a unit so, the following discussion would be under the title the created giant charge.

THE CREATED GIANT PROTON (C. G. P.)

If many protons had formed a sphere then to apply our proposal we need;

The speed v of the proton = c and –also- we need; the rest mass $m_o \approx$ the relativistic m

It is impossible to realize these two conditions except if we considered the equation of the rest mass is our need model such that;

$k\,e^2/r_o = m_o\,c^2$ where; r_o and m_o are the inertial rest radius and mass of a proton respectively.

$$(ke^2/r_o)\,[1] = m_o^{\backslash}\,c^2$$

$$(ke^2/r_o)\,[p^{2/3} \div (d/r_o)\,(\,n/p)^{1/3}\,] = m_o^{\backslash}\,c^2 \qquad (56)$$

Where the net result of the factors inside the big bracket equal one and where m_o

is the field equivalent rest mass = $\hbar/r_o\,c \equiv m_o$.

The equation (56) is the only form which can act against the pressure of p, inside such sphere. This means that we can deal the left side of the equation as a field equivalent rest energy and –in the same time- as coulomb electric energy. So we can now estimate the number of the protons p, just enough to make v = c and to make –in the same time– the net result of the factors inside the big bracket equal one.

Put; $n/p = 1.9\times10^{12}$

And; $r_o = 2.09\times10^{-16}$ m

And; $m_o^{\backslash} \equiv m_o = 1.67\times10^{-27}$ kgm.

$$p = 2.23\times10^{9} \quad (57)$$

$$n = 2.23\times10^{9}\,(1.9\times10^{12}) = 4.24\times10^{21} \quad (58)$$

Once the condition is fulfilled (the field is so high that the expected v = c) then the factor c_o have to be introduced to prevent v to reach c as;

$$E_e^{\backslash} = k\, c_o\, p\, e^2/r = m_o^{\backslash}\,(c\,\surd c_o)^2 = 1.4\times10^{-34}\ j \quad (59)$$

The gravitational energy $E_G = 0.6\ (m\ n)\ m\ G \div r$

Put; $n = 4.24\times10^{21}$ and $r = d\ n^{1/3}$

$$E_G = 1.4\times10^{-34}\ j \quad (60)$$

$$E_G = -\ E_e^{\backslash} \quad (61)$$

Equation (56) could be written as;

$$(ke^2/r_o)\,[p^{2/3} \div (d/r_o)\,(n/p)^{1/3}\,] = m_o^{\backslash}\, c^2 + [\mathbf{0}]$$

Or could be written as;

$$(ke^2/r_o)\,[p^{2/3} \div (d/r_o)\,(n/p)^{1/3}\,] = m_o^{\backslash}\, c^2 + [E_G + E_e^{\backslash}] \quad (62)$$

$$(ke^2/r_o)\,[p^{2/3} \div (d/r_o)\,(n/p)^{1/3}\,]$$

$$= m_o^{\backslash}\, c^2 + [m_o^{\backslash}\, c^2\, c_o + E_G] \quad (63)$$

On the same way we can deal each neutron as follow;

COMPTON ENERGY

It is the Pauli term per a neutron $E_c^{\backslash}$ (Compton energy with introducing c_o) of the created giant charge[3] which is opposed by the gravitational energy acting on each a neutron of the smallest giant proton which we called the created giant proton as follow;

Number of states $N = (2/8)\,[4\pi n^3/3]$

$$E_c \text{ (Compton energy without } c_o) = (\hbar^2/2m)\,(3\pi^2\, N/V)^{2/3} \quad (64)$$

where; V is the volume.

Since $d = 2.09\times10^{-16}$ m, then the speed of a neutron = c, so we have to introduce c_o.

$$E_c^{\backslash} = [(\hbar\,\surd c_o)^2/2m]\,[3\pi^2\, N/V]^{2/3} \quad (65)$$

$E_c^{\backslash}$ of all neutrons = $\int E_c\, dN = (3/5)\, E_c^{\backslash}\, N$. where; the integration from zero to N.

Dividing on N gives the average Pauli term per a neutron = $E^{\backslash}$

$$E^{\backslash} = (3/5)\, E_c^{\backslash} \quad (66)$$

Put the density of states = $N_s = N/V = n/V$ is the number of neutrons in the defined volume.

$$N_s = n \div (4/3)\,\pi\,(2.09\times10^{-16})^3\, n = 2.61\times10^{46}\ m^{-3} \quad (67)$$

From (63), (64) and (65);

$$E^{\backslash} = 1.4\times10^{-34}\ j \quad (68)$$

$$E^{\backslash} = -\ E_G \quad (69)$$

Equation (63) could be written as;

$$E_c = (\hbar^2/2m)\,(3\pi^2 N/V)^{2/3} + [E^{\backslash} + E_G] \quad (70)$$

Where the result of the two terms of the big bracket = **0**

Or could be written as;

$$E_c = (\hbar^2/2m)\,(3\pi^2 N/V)^{2/3} + [m_o^{\backslash}\, c^2\, c_o + E_G] \quad (71)$$

$E_c = m_o^{\backslash} c^2 + [\ m_o^{\backslash} c^2\ c_o + E_G]$ (72)

From (63) and (72) the total energy E per a particle (proton or neutron) = E

$E = m_o^{\backslash} c^2 + [m_o^{\backslash} c^2\ c_o + E_G] = m_o^{\backslash} c^2 + [\mathbf{0}]$ (73)

It is clear that n is much more than p therefore $(n - 2p)^2 \div n = n$

Consequently, Pauli term (for all neutrons) = $(m_o^{\backslash} c^2\ c_o)\ n$

From all above; - as the estimations showed as in equations (59), (60) and (68) –;

$E_e^{\backslash} = E^{\backslash} = E_G$

This means that the created giant proton has residual energy equal zero as in (73).

In a coming discussion we would follow up two stages; in the first we would follow up the collection of the created giant protons to form the giant proton while in the second we will follow up the collection of the giant protons to form the planet.

THE REST ENERGY OF THE CREATED GIANT CHARGE

1- The equation;

$(k\ e^2 / r_o)\ [p^{2/3} \div (d / r_o)\ (n / p)^{1/3}\ ] = m_o^{\backslash} c^2 + [\mathbf{0}]$ is the key of the physics of the created giant charge.

2- $m_o^{\backslash}$ is not the real inertial rest mass -although it is equivalent to it- but it is the field equivalent rest energy = $\hbar\ \acute{\omega} / c^2$

$= \hbar / c.\ d$

3- Imagine a closed sphere with radius r, obeying the shell theory then an electric field would obey;

$\partial^2 E / \partial a^2 = - \sigma / \varepsilon_o$ where; σ is the density of the charges p, and a is the distance from the centre to the defined point. The solution would be in the form;

$E = k\ e^2\ p\ (3 - a^2/r^2) \div 2r$

This solution gives; E = E at the surface and $E_o = 1.5$ E at the centre.

At a defined point $a = (0.5)^{1/3}\ r = 0.79\ r$ the quantity of the charges $(p^{\backslash})$ would obey;

$p^{\backslash} = p\ (a / r)^3 = p\ (0.5)$. This gives -at the defined point a = 0.79 r- two potentials;

$m\ (v_1)^2 / 2 = k\ \sigma\ a^2 = k\ \sigma(0.79\ r)^2 = 0.62\ r^2\ k\ \sigma$ where v_1 refers to motion toward the surface.

$m\ (v_2)^2 / 2 = k\ \sigma\ a^2 = k\ \sigma(0.79\ r)^2 = 0.62\ r^2\ k\ \sigma$ where v_2 refers to motion toward the centre

This gives total potential = $m\ v^2 = 2\ (0.62\ r^2\ k\ \sigma)$ (74)

This means that the created giant charge looks to the particles of the sphere as if they

located in this defined point and if the half of the particles move toward the surface and the remainder of the other half move in the opposite direction with net motion equal zero although the potential = $m\ v^2$;

$\mathbf{v_1} \cdot \mathbf{v_1} = \mathbf{v_2} \cdot \mathbf{v_2} = v^2$

$\mathbf{v}_1 + (- \mathbf{v}_2) = \mathbf{0}$ (75)

4- A number u of particles each with a rest mass m_o when collect they do that by simple addition. If u = 8 then;

$\Sigma\ m_o = 8 m_o$. Also does $m_o^{\backslash}$. This means that;

$(k\ e^2 / r_o)\ [1]\ u^{2/3}\ u = u^{2/3}\ m^{\backslash}_o c^2\ u$ is error manipulation, the correct is;

$(k\ e^2 / r_o).[1]\ u = m^{\backslash}_o c^2\ u.$ (76)

*This means that $m^{\backslash}_o c^2$ per a particle is **constant** whatever the number of the units may be.*

THE RESIDUAL ENERGY OF THE GIANT CHARGE

The residual or zero point of energy of such ground state lies inside the big bracket of equation (73) whose net result equal zero. When the created giant charges collect in the form of giant charge then we are in front of higher state of the particles inside this giant charge. The giant proton is formed of unit's u, of the created giant proton.

$u = 3.94\times10^{45} \div 4.24\times10^{21}$

Because of each of the electric E_e and the gravitational E_G energy is central and infinite wile Pauli (Compton) $E^{\backslash}$ energy is finite so; the energy per a particle (either proton or neutron) = E.

$$E = m^{\backslash}_o c^2 + [(u^{2/3}\ E_G + u^{2/3}\ E_e) + (u^{2/3}\ E_G + E^{\backslash})] \quad (77)$$

$$E = m^{\backslash}_o c^2 + [(\mathbf{0}) + (u^{2/3}\ E_G)]$$

Where, $u^{2/3}\ E_G$ is much more than $E^{\backslash}$

E of all the particles A of the giant proton = E_A

$$E_A = Am^{\backslash}_o c^2 + A\ [(\mathbf{0}) + (u^{2/3}\ E_G)] \quad (78)$$

Where; A = p + n

It is clear that the definition of c_o would be modified here to become; when the field is so high that the expected classic speed equal or **exceed** speed of light then this factor have to be introduced to prevent speed of the particle to reach c.

THE PHYSICAL CONCEPT OF THE FACTOR C_O

Quantitative Method;

From relativity;

$m\ c^2 = m_o\ c^2 + \Delta m\ c^2$

$m\ c^2 = m_o\ c^2 + m_o v^2/2$

$\Delta m\ c^2 = m_o v^2/2$

$m = m_o v^2/2c^2$

$mc^2 = (\ m_o\ c^2/2\ )\ (v^2/c^2)$

If the medium was homogeneous with constant density

From above and equation (61)

$$E^{\backslash}_e = (\ m_o\ c^2/2\ )\ (A_u\ /A_x)^{2/3} \quad (79)$$

Where; A_u and A_x are the number of particles of the unit in which $E_G = E_e$ (the created giant charge) and number of particles – in Compton state- whose gravity gives the maximum speed c respectively as;

$0.6A_x\ m^2\ n\ G \div 2.09\times10^{-16}A^{1/3} = mc^2/2$

$$A_x^{2/3} = 1.4\times10^{38} \quad (80)$$

From (58);

$$A_u^{2/3} = (4.24\times10^{21})^{2/3} = 2.6\times10^{14} \quad (81)$$

From all above;

$$E^{\backslash}_e = m_o\ c^2\ (2.6 \div 2.8\times10^{24}) = m_o\ c^2\ (1 \div 1.08\times10^{24}) = m_o\ c^2\ c_o \quad (82)$$

Here the factor $c_o = 10^{-24} \div 1.o8$ appears as common physics.

Qualitative method;

$$\text{From (12); the factor } c_o = m_o \div d_b = E_o \div c^2 d_b = 4.36\times10^{-35} \div d_b \quad (83)$$

$$m_o = E_o \div c^2 \equiv m_e\ (5.3\times10^{-5}) \equiv m\ (2.9\times10^{-8}) \quad (84)$$

Where; m_e and m are the rest mass of the electron and neutron respectively.

But this proposed factor is introduced only when the field (electric) gives expected

v = c as;

$$E = E^{\backslash} c_o = m\, c^2 c_o \quad (85)$$

From above;

$$E = m\, c^2\, (m \times 2.9 \times 10^{-8}) \div d_b$$

$$E = (m^{\cdot}\, m / d_b)\; [\, c^2 \times 2.9 \times 10^{-8}] \quad (86)$$

This is a form of the gravitational energy where d_b is Bohr radius and the factors inside the big bracket are constants which we can factorize them as;

$$E = 0.6\, m\, (m.n)\; 6.67 \times 10^{-11} \div r \quad (87)$$

Where; n and r are constants equal the number of neutrons and radius of the created giant proton respectively (inertial constants for the unit of the giant proton)

THE FACTOR (5/3);

Let us write –inside the giant proton- the electric field as;

$$E_e^{\backslash} = k c_o e^2\, p \div r = A\, p^{2/3} = m\, c^2\, c^o$$

And the gravitational field as;

$$E_G = m^2 n\, G \div r = B\, n^{2/3}$$

Where A and B are constants. Integration of collection of p and of n gives;

$$\int A\, p^{2/3}\, dp = (3/5)\, A\, p^{2/3} \quad (88)$$

$$\int B\, n^{2/3}\, dn = (3/5)\, B\, n^{2/3} \quad (89)$$

From (61);

$$(3/5)\;\; k c_o e^2\, p \div r = (3/5)\;\; m^2\, n\, G \div r$$

The last form to take the form of the rest form we need;

$$k\, c_o\, e^2\, p \div r = (3/5)\;\; m^2\, (5/3)\, n^{\backslash}\, G \div r \quad (90)$$

where;

$$(5/3)\, n^{\backslash} = n. \quad (91)$$

such that, $n^{\backslash} = (1.14 \times 10^{12}\, p)$ and then, $n = 1.9 \times 10^{12}\, p$

This relation gives the explanation of equations (37) and (38)

CREATION OF THE CREATED GIANT PROTON;

It is the smallest giant proton so we can create it.

$$m\, c^2\, c_o = m\, v^2 / 2$$

$$v = c\, \sqrt{2} c_o = 4.08 \times 10^{-4}\ m/s \quad (92)$$

The angular momentum of a particle in Compton state would be;

$$m\, d\;\; (c\, \sqrt{2} c_o) = \hbar\, \sqrt{2} c_o$$

If we have a sphere containing;

$$n = 4.24 \times 10^{21}$$

$$p = 2.2 \times 10^{9}$$

And if we controlled the density of matter such that the in-between distance d =

$$2.09 \times 10^{-16} \div \sqrt{2} c_o = 1.5 \times 10^{-4}\;\; m \quad (93)$$

The corresponding principle can transform the contents of this sphere as;

$m\,(4.08\times10^{-4})\,(1.5\times10^{-4}\ ) = \hbar$

$m\,(4.08\times10^{-4})\,[(1.5\times10^{-4}\ )\,\sqrt{2c_o} = \hbar\sqrt{2c_o}$

$m\,(c\,\sqrt{2c_o})\,d = \hbar\sqrt{2c_o}$

From (90); the radius of the sphere = R

$R = 1.5\times10^{-4}\,n^{1/3} = 2.4\times10^{3}$ m. (94)

THE CORRESPONDING PRINCIPLE

This expression in the acknowledge of the giant charge means;

If a sphere has;

$v = c\,\sqrt{2c_o} = 4.08\times10^{-4}$ m/s

$p = 2.2\times10^{9}$

$n = 4.24\times10^{21}$

Then, the giant charge could be created by this principle .

So, if we have a sphere with homogeneous distribution and with these conditions then we can get a created giant proton.

If the density still the same but $p^{\backslash} = 2p$ then we get a doubled created giant proton.

If the density still constant but we have; $p^{\backslash} = A\,p$ such that A is the factor which allows $p^{\backslash} = 2.07\times10^{33}$ then we get a giant proton which can orbit a giant electron.

Once the giant proton orbits its giant electron and if we have –say- two giant atoms then the word two means space and space means different density between the inside and out side of the giant charge so the principle not act.

These two giant atoms need to collect beta decay and escape of the internal charges where the gravitational field can pull and collect them.

This suggested principle allows existence of matter in Compton state without gradual condensation.

THE CREATED GIANT ELECTRON;

Put the number of electrons in the created giant electron = O and the

inter-particles distances = d

$(e^2\,O) \div d\,(1844n/p)^{1/3} \approx m_p\,c^2 \div 1844$ (95)

$O = p \div 1844$

Number of neutrons in the created giant electron = $n^{\backslash}$

$n^{\backslash} = (p \div 1844)\,[(1844)\,n/p] = n$ (96)

Where n is the number of neutrons in the created giant proton.

The later to orbit the first as a giant atom in the ground state we need;

$O = p$

And consequently $n^{\backslash} = 1844n$. This means that if the giant proton needs u of units, then the giant electron needs 1844u.

As in equations; 79, 80, 81, and 96 we can estimate that;

A_x and A_u of the created giant electron = A_x and A_u of the created giant proton. Consequently, c_o is equal in both.

THE HIGHER GIANT STATES

The giant atom in its ground state is the smallest inversed giant atom whose giant proton can orbit its giant electron.

The inversed atom is the mathematic basis of the giant atom. The created giant charge is the physical unit of the giant charge while the huge charge is the physical basis of the giant orbit. So the ground state is formed of (p) of the huge wave length (λ_u) or p^2/n of λ as;

$(p^2/n)\ \lambda = (\lambda_u)\ p = 2\pi R.$

The higher levels -let us call; the complicated giant charge- could be constructed by the same above basis.

We suggest that; the higher states of the complicated giant proton have number of protons = p.d

Where d, –in this chapter- means multiplication of (p) of the giant proton by a factor lies between 1 and 10 and so it obeys the relation;

$$1< d < 10, \qquad (97)$$

Such that, p.d means protons of the giant proton times d.

We suggest for the complicated giant electron the factor D where D obeys the same relation as;

$$1< D < 10 \qquad (98)$$

Such that, D means electrons evacuated giant electron (neutral)

From above; we can conclude that the ratio between the mass of the complicated giant electron to that of the complicated giant proton is still = 1844

$$M_e \div Mp = 1844 \qquad (99)$$

In the giant atom (the ground state) $p = p^\backslash$ where p and $p^\backslash$ are the number of the protons in the giant proton and that of electrons in the giant electron respectively.

In the complicated atom the system allows that;

Number of the protons in the complicated giant proton = p_1 while the electrons of the complicated giant electron = p_2 such that;

$$P_1 = p\ d \qquad (100)$$

$$P_2 = p^\backslash = p \qquad (101)$$

THE EQUATIONS PACKET OF THE HIGHER STATES

The motion of the giant proton in a higher state is controlled by;

As a huge proton;

Its angular momentum obeys;

$$[\lambda\ (p/n)\ d]\ (v/d)\ (m.n/p) = l\ \hbar \qquad (102)$$

Where $\lambda = l.\lambda/l = \lambda$ = Bohr wave length and l is the level number = 43

The electric force gives;

$$(m.n/p)\ (v^2/d) = ke^2\ p^\backslash \div R.d^2 \qquad (103)$$

Where $p^\backslash$ = number of electrons in the giant electron = p

We can notice that the mass of the huge proton in the complicated giant proton is still = m.n/p

As a giant proton;

The electric force gives;

$$[(m.n)\ d]\ (v^2/d)^2 = k\ (e.p^\backslash)\ (e.p.d) \div R.d^2 \qquad (104)$$

Where the big bracket is its mass, $(e.p^\backslash)$ is the number of the electrons in the complicated giant electron while (e.p.d) is the number of the protons in the complicated giant proton.

THE COMPLICATED GIANT ELECTRON

Its motion is controlled by;

The electric force which takes the form;

$k\,(e.p^{\backslash})\,(e.p.d) \div (R.d^2)^2 = (m.n^{\backslash}\,D)\,(v_e / D)^2 \div R_e\,D^2$ (105)

where; $n^{\backslash} = 1844n$

$v_e = v \div 1844$

$R_e = R \div 1844$

$1 < D = d < 10$

By substitution as above;

$k\,(e.p^{\backslash})\,(e.p.d) \div (R.d^2)^2 = [(1844D)m.n]\,(v \div 1844D)^2 \div (R.D^2/1844)$

Simplification gives;

$k\,(e.p)^2 \div R^2\,.d^3 = (m.n)\,v^2 \div R\,D^3$ (106)

$k\,(e.p)^2 \div R = (m.n)\,v^2$

The angular momentum of the system

$L^{\backslash} = L_p^{\backslash} + L_e^{\backslash}$

$L^{\backslash} = (m.n.d)\,(v / d)\,(R.d^2) + (m.\,n^{\backslash}.D)$

$(v_e / D)\,(R_e.D^2)$ (107)

$L^{\backslash} = d^2.L_p + (D^2.L_p \div 1844)$ (108)

$L^{\backslash} = d^2.L_p\,(1 + 1 \div 1844) \approx d^2.L_p \equiv D^2.L_p$ (109)

Where; L_p is the angular momentum of the giant ground state.

The above form is related to the inversed atom base as;

$L^{\backslash} = d^2.L_p = d^2\,(m.n)\,v.\,R$

Substitute in above as; $R = [r\,(p^2 / n)]$ where r is Bohr radius.

$L^{\backslash} = d^2\,(.m.v.r)\,p^2$

Since; $m.v.r = l\,\hbar$

$L^{\backslash} = l.\hbar(p.d)^2$ (110)

The total energy of this higher system = $E^{\backslash}$

$E^{\backslash} = (1/2)\,(m.n.d)\,(v / d)^2 + (1/2)\,(m.n^{\backslash}\,D)\,(v_e / D)^2 + u(R)$ (111)

Where, u(R) is the potential.

$E^{\backslash} = (E_p / 2d) + (E_p / 1844) + u(R)$

$E^{\backslash} = E / 2d + u(R)$ (112)

Where $E \approx E_p$ = the kinetic energy of the giant ground state or approximately the kinetic energy of its giant proton.

We can notice that if d lies between 1 and 10 which consequently may be fraction of the giant charge yet it is actually arises from multiples of the unit (created giant proton) so actually there is no fractionation.of the unit.

THE BASIC DEVIATION FROM QUANTUM MECHANICS

We can summarize the basic deviation of the giant atom from quantum mechanics as follow;

Write the relation; $1 < D = d < 10$ we get the equation packet of the *higher states*

Put $D = d = 1$ we get the equation packet of the *giant atom*.

Put (n ⁄ p) of the giant proton = 1.9×10^{12} and that of the giant electron

= 1844 (n ⁄ p) and put the number of the protons = number of electrons = p =1 you get the equation packet of the *huge charge*.

Put (n ⁄ p) = 1(but we have remember that the electron of the inversed atom is bound by 1836 neutrons) you get the equation packet of the *major inversed atom*.

Remove the added neutron from the bound electron we get the hydrogen atom system.

THE END OF COMPTON STATE

The expression of collection means formation of the giant charge as multiples of the units which we called as the created giant charge. This occurs - in the initial medium which has a constant defined density- by the corresponding principle.

The giant charges themselves not collect by this abstract principle but by;

Beta decay of the neutron of the giant charge and consequently formation of the atoms and much increase of the inter particles distances (end of Compton state) which would –according to equation 29- results in escape of the charged of the giant charge which would so appears as evacuated giant charge (neutral body)

The above would results in attraction of these neutral bodies by the effective gravitational field to form the solar system.

THE SOLAR SYSTEM

We suggest for the solar system the following;

Each planet had its defined sun as units of the giant atoms where these units u

= M ⁄ m such that M is the astronomic mass of the planet while m is the mass of the giant proton.

The corresponding sun of the planet has the same number of the giant electron

If we speak about the ground state (mercury planet and its sun) then we suggest that;

The giant electrons lied in (0, y, 0) level

Each giant proton orbited it defined giant electron in the level; x, 0, z

The motion of the units had begun in the same time (t_o = constant).

The units of the same planet had the same R, v and t_o therefore after beta decay they pulled to each other and collect in one body mass. Also do the electrons evacuated giant electrons. So we would have one planet orbits its special sun.

The units of another higher state has another v and R therefore they collect in a higher level with radius of orbit = $R.d^2$

Because of the radii of the orbits of the units of the different suns are not so away from each other comparative with the units of the different planets so the collect in one mass that is; one sun and nine planets.

Mercury orbit represented the ground state of the solar system motion. It had;

Estimated speed of orbit (as in equation 54) = v = 5.06×10^4 m ⁄ s and had estimated radius of orbit = R = 5.7×10^{10} m

The higher planets obey;

$R^{\backslash} = R.d^2$

$v^{\backslash} = v/d$.

The actual astronomic radius of orbit of mercury coincides with our estimation while the actual astronomic speed of the orbit = 4.74×10^4 m ⁄ s. Actually the natal speed v was about 5 $\times10^4$ m ⁄ s. That is because it is known that the sun losses gradually some of matter in production of heat. It is known that it lost about seven percent of its natal mass(4). If the present mass of the sun = 1.99×10^{30} k.gm.

and its natal mass was A

$A - 0.07 = 1.99\times10^{30}$ k.gm.

$A (1- 0.07) = 1.99\times10^{30}$

$A = 2.14 \times10^{30}$ k.gm. (113)

$2.14 \times10^{30} G \div 5.7\times10^{10} = v^2$

$v = 5 \times10^4$ m/s. (114)

THE RATIO $M_S \div \Sigma M_P$;

It is the ratio between mass of the sun and the summed masses of all planets.

Our estimation gave; $Ms \div \Sigma M_p = 1844$

The astronomic ratio = 800 where the sun natal mass = 2.14×10^{30} k.gm.

Therefore there is error in our estimation = 1844 ÷ 800 = 2.3

So we suggest for this error the following;

There was about 5 orbiting giant protons for each 2 giant electrons

The spatial motion allows the following configuration;

$(x, 0, z)$ and $[x, \Delta y, (z - \Delta z)]$ for a giant electron and;

$(x, 0, z)$, $[x, \Delta y, (z - \Delta z)]$ and $[x, -\Delta y, (z - \Delta z)]$ for another next one.

CONCLUSION

The solar system has many parameters which ensure that it was created from giant atoms. We can create the smallest giant charge with $R = 1.5\times10^{-4} n^{1/3} = 2.4\times10^3$ m.

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