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The Giant Atom Like System

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Abstract

I considered the "giant atom" as a historical stage in stages of development of the solar system. I used the quantum physics when I looked at the microscopic particles from which the giant atom is formed, and used the classic physics when I looked at the global macroscopic form of the giant atom. I put the orbital radii and speeds of the planets and also the ratio between mass of the sun to mass of its famous nine planets as a scale for testing this method of analysis. I found complete congruency between my estimations of these variables and the known astronomic data. Any way, in this paper, we declare the discovery of a new object (the giant charge) formed of charged massive compact cold ordinary matter and having intercity with slow motion, low temperature and low pressure. The experiment which we have to do is done in the sky lab. In a definite sentence, the solar system had left within its parameters many documents which refer to its grandparents (the giant atoms). Not only this but also we searched in the sky to find objects having similarity with the giant charge. Also the principles of the giant charge gives explanation for some physical phenomena like prolongation of the life time of the strange quark. From all the above we have to be courage to declare the discovery of the giant atom (at least, as historical existence). This work is built on a proposal assumes prolongation of the life time of the virtual particles which have finite life time (partition of energy inside the giant charge). This proposed partition factor (which is not arbitrary factor) gives the least possible potential energy (of space). In other definite words; the least possible potential energy (E_o) which arises from the effect of uncertainty due to density of the baryonic matter in the space (about one hydrogen atom mass per cubic meter) is a probable eigen value. So my paper puts this fact as a base for the physical principle of the giant atom like system. So this partition factor gives the stable particles with the lowest possible energy and consequently gives the particles which can condensate to construct the ionized giant atom like system (the giant charge). So the giant charge is not more than expression for this least possible potential energy.

Not only that above but also – at the end of this paper – I discovered surprising relation ties between the giant atom and the simple one to say, at the end, that the giant atom has a physical existence (at least) as a historical stage in stages of evolution of the solar system.

I - The major atom (a proposed inversed atom)

We can create a giant atom from simple hydrogen atom- like system

"s.h. l.a."

In between these two stages there is a basic theoretical stage, let us call it "the major atom".

Suppose that we succeeded –theoretically– to bind the electron of "s.h.l.a." –Through a certain binding force– with a number of neutrons equal $\frac{m_p}{m_e}$ = rest mass of the proton / rest mass of the electron = 1844. And suppose that this proposed binding energy is just equal or more than the total energy between the electron and proton of this s.h.l.a. Now such an electron would behave as one body with one mass. Once we create such a major atom we will notice that the centre of mass of this atom would move towards the major electron.

In addition to such a displacement (of the centre of mass) there are other changes occur in the relative motion. Before going in mathematics of this chapter we have to ensure the following:-

The major atom supplies us by the classic estimations of the relative motion of the giant charges (of the giant atom) as well as supplies us with the relative position of the centre of mass of the giant atom.

Also we have to ensure that the estimations which we are going to conclude concerning the major atom are classic estimations which would be so convenient and suitable for the big masses of the giant atoms. That is to say;

$$\text{Uncertain estimations} \xrightarrow{\textit{giant atom}} \text{classic estimations.}$$

Now the relative motions of the major atom obey the following:-

1) $M_e \quad R_e = M_p \quad R_p$

2) $M_e \quad v_e = M_p \quad v_p$

3) $R_e + R_p = R$

4) $\dfrac{v_p}{R_p} = \dfrac{v_e}{R_e}$

5) $\dfrac{e^2}{R^2} = \dfrac{M_e v_e^2}{R_e} = \dfrac{M_p v_p^2}{R_p}$

6) No changes occur on the electric force of the major atom

$\therefore \dfrac{e^2}{R^2} = \dfrac{e^2}{r^2}$ (Where the capital letter symbolizes the major atom, while the small one symbolizes "s.l.h.a")

7) The total energy also has no changes.

$$\left[-\frac{e^2}{R} + \frac{1}{2} M_e v_e^2 + \frac{1}{2} M_p v_p^2\right] = \left[-\frac{e^2}{r} + \frac{1}{2} m_e v_e^2 + \frac{1}{2} m_p v_p^2\right]$$

(Where the capital letters symbolize the major atom, while the small ones symbolize "s.l.h.a")

From these equations we can estimate "classically": -

$$v_p = \left(2.18 \times 10^6\right) / \sqrt{\frac{m_p}{m_e}} = 2.18 \times 10^6 / 43 \quad m/\sec \qquad (1\text{-}1)$$

$$v_e = \left(2.18 \times 10^6\right) \div \left(\frac{m_p}{m_e} \times \sqrt{\frac{m_p}{m_e}}\right) \quad m/\sec$$

$$R = R_p = 5.3 \times 10^{-11} \quad m \qquad (1\text{-}2)$$

$$R_e = \left(5.3 \times 10^{-11} \div \frac{m_p}{m_e}\right) \quad m$$

8) The angular moment obey the following equation:

$M_p\, v_p\, R_p + M_e\, v_e\, R_e = k.h$

On substitution we find that ($M_e\, v_e\, R_e$) could be ignored so:

$M_p\, v_p\, R_p = k.h$

On substitution;

$\therefore M_p\, v_p\, R_p = 43\, h$ (1-3)

$\therefore$ k = 43 (Where; k is the quantum number of the major atom). These equations mean that; after we bind the electron of the hydrogen atom-like system by 1840 neutrons, its mass would be 1840 times as much as the proton mass. So this major electron and its proton will exchange their positions (relative to the center of mass). This means that the lighter charge of the inversed system (the proton) would have radius of orbital = the value of the radius of the electron of the hydrogen-like atom = the distance between the two charges (of either of the two systems). The inversed major atom is only a hypothetical system supplies us with the cardinal lines of an inversed atomic system and so it supplies us by the classical value of the speed of the particles on the lowest orbit of such system. So when we substitute this value of "R" & "R_p" in the equation of equilibrium; $\therefore\ v_p = 5 \times 10^4$ m/sec

This –from definition of the inversed hydrogen atom – means;

1- It is a hydrogen atom like system; so the radius R would still equal Bohr radius.

2- It is inversed; so the positions of the charges relative to the center of mass would be inversed. So;

3- R_p = R = Bohr radius.

We can go further as follow;

1- The major atomic system is a proposed hypothetical system would be a base for the relative estimation of the inversed giant atom. This giant atom would be suitable to use the physical descriptions in a separate form & with certainty. So we would use the mean linear momentum (as example) as the cross "m.v".

2- To understand well the meaning of the inversed hydrogen atom-like system and its first quantum number which we called k = 43, we have to follow up the following:

a) Put the physical descriptions of a hydrogen atom-like system (we can call – for the purpose of comparison – the old system) in front of you, so it has:

An electron with electrostatic potential energy in the field of the proton given by [(7), (14)];

$$E_p = -\frac{e^2}{r}$$

And total energy;

$$E_t = -\frac{e^2}{2r}$$

And, $mvr = n\hbar$

And so, $mv^2 r = e^2$

$$\frac{1}{mr} = \frac{4\pi^2 e^2}{h^2} \cdot \frac{1}{n^2}$$

Where; n is the first quantum number of this system. So,

$$E_n = -\frac{2\pi^2 e^4 m_e}{h^2} \cdot \frac{1}{n^2}$$

Where; m_e is the mass of the electron.

b) Put in your mind that our aim is to deal with a giant atom, so use the physical description of the old system with the same principles of the giant atom. That is to say; use these physical descriptions as separate & defined ones!

So we can use the mean value of the speed as a defined & separate value as a function for the energy state.

So, for n = 1

$\therefore E_1 = 4.3 \times 10^{-18}$ j

$\therefore v_e = 2.18 \times 10^6$ m/sec

$$v_p \ of \ proton = 2.18 \times 10^6 \div \frac{m_p}{m_e}$$

This is the irrelative speed of the proton of the simple atom.

The relative speed (relative to that of the electron) of the proton;

$$= -v_e + v_p \approx -v_e = 2.18 \times 10^6 \text{ m/sec}$$

c) The new system (the major one) has the irrelative motions:

$v_p = 5 \times 10^4$ m/sec

$$v_e = 5 \times 10^4 \div \frac{m_p}{m_e} \text{ m/sec}$$

d) The relative v_p of the new system is :

$$5 \times 10^4 - \left(5 \times 10^4 \div \frac{m_p}{m_e}\right) \approx 5 \times 10^4 \text{ m/sec}$$

e) The meaning of (k) arises from the comparison between the values of the relative speed of the proton of the two systems. This value in the old system was; 2.18×10^6 m/sec while in the new one it becomes;

$$5 \times 10^4 = 2.18 \times 10^6 \div \sqrt{\frac{m_p}{m_e}} = 2.18 \times 10^6 \div 43$$

f) This means that the proton from the side of view of the relative motion when put in the new system has acquired or rose to the shell number 43 of the new system

$\therefore$ k (quantum number of the new system) = 43

This means that to transmit the proton from the first orbital of the old system to the first orbital of the new system we have to put $k = 43$

Furthermore, this means that the process of transmission (from the old to the new) itself, means $k = 43$

3- Now the proton of the new system has total energy;

$$E_k = -\frac{2\pi^2 e^4 m_p}{h^2} \cdot \frac{1}{k^2} \qquad \text{(where } k = 43\text{)}$$

4- For the purpose of comparison put the electron of old system which has:

$$E_n = -\frac{2\pi^2 e^4 m_e}{\hbar^2} \cdot \frac{1}{n^2}$$

5- *Put* in the above two equations; $m_p = (1840) m_e$ & $k^2 = \left(\sqrt{1840}\right)^2$

For; n = 1 $\therefore E_k = E_n$ (where $k = 43$)

This means that when transmit from the old system to the new inversed atomic system, the electron of the old system would be replaced by the proton of the new system from the side of view of the centre of mass and side of view of the electric potential & total energy.

6- We can go further – for the purpose of comparison – and conclude the frequency of the energy emitted due to transmission of the old system from the second to the first orbital and that energy emitted due to transmission of the proton of the new system from the second to the first orbital in its own measurement (or from the 44th to 43th orbital from the side of view of the old system)

$$\upsilon_{mn} = \frac{E_m - E_n}{h} = \frac{2\pi^2 e^4 m_e}{h^2}$$

"υ" of the new system relative to the measurements of the old system

$$= \frac{2\pi e^4 m_p}{h^2} \left[\left(\frac{1}{43}\right)^2 - \left(\frac{1}{44}\right)^2 \right]$$

7- Consequently the speed – as a separate & defined physical property – of the proton of the new system relative to the measurements of the old one would be

$$\frac{2.18 \times 10^6}{43}, \frac{2.18 \times 10^6}{44}, \ldots \frac{2.18 \times 10^6}{43 + n}$$

Where; n is integer ≥ 1. This means that the new system would see its consequent speeds (in the consequent shells) move from the value of a shell to the value of the consequent shell without fractionation. The old system – with its own measurements – has another global view "I see fractionation of your different speeds"

8- The wave number *(k+1), k* which is corresponding to $\upsilon_{(k+1)(k)} \div c$ is

$$\left[\frac{2\pi^2 e^4 m_p}{ch^3}\right]\left[\left(\frac{1}{44}\right)^2 - \left(\frac{1}{43}\right)^2\right]$$

9- The "orbit length" of the first orbit of the new system (from the side of the old one it is the 43) = λ

$$\because \lambda = c \div \upsilon \quad \therefore \quad \upsilon = E/h$$

Where E is the work done need to pull the proton from this orbit to infinite

$$\therefore \lambda = \frac{ch^3 \cdot (43)^2}{2\pi^2 e^4 m_p} \equiv \frac{ch^3}{2\pi^2 e^4 m_e}$$

$\therefore \lambda \equiv$ Bohr radius

10- If we put De Broligie relation of the 43th. orbital of the new system (the first one from its side of view)

$$\therefore m_p v_p \lambda_o = h$$

$$\because m_p = 1.7\times10^{-27}\ k.gm\ \&\ v_p = 5\times10^4 \quad \text{m/sec}$$

$$\therefore \lambda_o = \frac{5.3\times10^{-11}}{43} \quad \text{m}$$

The relation has to be put on the form:

$m_p v_p (\lambda_o \cdot 43) = h \cdot 43$ This one gives information that;

$$\lambda_o = \frac{5.3\times10^{-11}}{43}$$

λ = (orbital length) $= \lambda_o \cdot 43$ & $k = 43$

11- We can summarize and clarify the meaning of the factor "k" as follow:

The relative classical speed of the proton of "s.h.l.a" is;

2.18×10^{6} and the wave length of "the relative motion" has according to De Broligie relation;

$$\lambda = \frac{5.3\times 10^{-11}}{1.8\times 10^{3}} \qquad \& \qquad \left(1.7\times 10^{-27}\right)\cdot\left(2.18\times 10^{6}\right)\frac{\left(5.3\times 10^{-11}\right)}{1.8\times 10^{3}} = h$$

The proton of the major atomic system –from the side of view of this relative motion –would be raised 43 shells, so the relative motion would be decreased by the factor 43 to become;

$$\frac{2.18\times 10^{6}}{43} = 5\times 10^{4} \text{ m/sec}$$

Consequently the wave length of this relative motion would increase by the same factor to become;

$$\lambda_o = \left(\frac{5.3\times 10^{-11}}{1.8\times 10^{3}}\right)\times 43 = \left(\frac{5.3\times 10^{-11}}{1.8\times 10^{3}}\right)\times\sqrt{1.8\times 10^{3}} = 5.3\times 10^{-11} \div 43$$

This gives a defined meaning for the factor "43" The orbital to be formed – according to the equation of equilibrium – a bound state have to be formed by orbital length;

$$\lambda = 43\lambda_o = 5.3\times 10^{-11} \text{ m}$$

12- The above relation would be the physical base of "the inversed giant hydrogen atom – like system" or simply, "the giant atom".

The major system is a hypothetical system; we do not – in our paper – need from it more than the mentioned above. Any way, we can give just a suggestion for the energy binding its electron with 1840 neutrons as follow;

The electron which has a rest radius about 3×10^{-15} m lies in the centre of the cavity of a sphere whose surface is formed of 1840 neutrons. The in-between distances of these neutrons are in the range of the short force. Such a construction can supply the electron with the hopeful binding energy.

<u>De Brogilie wave of the orbital of the major atom</u>:-

The major electron has a mass equal 1844 times that of the proton which rotates around the major electron supplying the length of the orbit. So the proton of the major atom obeys:

$$(m_p.\ v_p)\ \lambda_o = h$$

(Where the factors between the bracts is the momentum of the proton of the major atom)

Putting the classic value of $v_p = 5 \times 10^4$

$\therefore\ \lambda_o = 2\pi\ [(5.3 \times 10^{-11}) \div 43]$

From definition of *"k"*

$\therefore k\lambda_o = 2\pi R\ = 2\pi k\ [(5.3 \times 10^{-11}) \div 43]$

Put "*k*" = 43

$\therefore\ R = 5.3 \times 10^{-11} \quad m$

If λ is the wave length of the "s.h.l.a" and if λ_o is that of the major atom

$\therefore \lambda_o = \lambda \div k$

$$\therefore R = \frac{\lambda}{2\pi} = \frac{k\lambda_o}{2\pi} = Bohr \quad radius = \text{Radius of the major atom}$$

At the end of this chapter we have to ensure that the matter wave of the proton of the major system would be forever the base of the matter wave of the giant proton so we will use forever:-

The orbital speed $= 5 \times 10^4\ m/sec$

$\lambda_o = \lambda \div 43 = 2\pi\ [(5.3 \times 10^{-11}) \div 43]$

So, $\quad m_p\, v_p\ \lambda_o = h$

That is to say –from the side of view of displacement of the centre of mass – the major atom could be named as "the inversed atom". This inversed atom is the physical & mathematical base of the giant atom. The following chapter is another base for constructing the giant atom.

II- γ-photon as an electromagnetic string

(1) γ-photon is a mass less subatomic particle responsible for the elec. force. Its life time could be concluded from the field of the first orbit of the s.l.h.a. as follows.

$$E = A\frac{e^2}{r} = 4.36\times10^{-18} \qquad j \tag{2-1}$$

$$\Delta E\, \Delta t = \hbar \tag{2-2}$$

Put $\quad E = \Delta E$ (2-3)

$\therefore \Delta t = 10^{-16} \div 4.36 \quad sec$ (2-4)

(2) Now suppose that we succeeded classically & theoretically to arrest such a particle and suppose that we dealt with it as a true particle i.e. has a mass in kilogram and a length in meter that is to say the extended distance "Δx" would be replaced classically by the length "ℓ" and the value $\frac{\Delta E}{c^2}$ would be replaced by the mass "m" expressed in kilogram.

Then suppose that we divided such a mass homogeneously over its length. We can give the following explanatory example: suppose we have a mass equal "4" kilogram and its length equal "100"m we want to distribute such a mass (homogeneously) on such a length, then we have to divide each k.gm into $\frac{100}{4}$ units.

That is to say we began as $m \neq \psi(\ell)$ then we succeeded to make $m = \psi(\ell)$

In the last example we can say that the ratio of partition $(u) = \frac{100}{4}$

On the same way regarding γ-Photon:-

$$u = \frac{\Delta x}{\Delta m} = \frac{\ell}{m} = \frac{c\Delta t}{\Delta m}$$

$$But, (\Delta m \quad c)\Delta x = \hbar$$

$$\therefore \Delta m = \frac{\hbar}{\Delta x.c} = \frac{\hbar}{c^2 \Delta t}$$

$$\therefore u = \frac{c^3 (\Delta t)^2}{\hbar} \tag{2-5}$$

put $\Delta t = 10^{-16} \div 4.36$

$$\therefore u = 1.4 \times 10^{26} \tag{2-6}$$

(3) We concluded the energy of γ-photon from Coulomb law as follow [9]:

$$E = \frac{e^2}{4\pi\varepsilon_o x} = \frac{Ae^2}{x} = \frac{2.3 \times 10^{-28}}{x} \tag{2-7}$$

$$\because \Delta E = \frac{\hbar}{\Delta t} = \frac{c\hbar}{\Delta x} = \frac{2.3 \times 10^{-26}}{\Delta x} \tag{2-8}$$

$\therefore x \neq \Delta x$ *At* $E = \Delta E$

From (2-6), (2-7), (2-8) $\therefore \Delta x = (130)x$

Equation (2-7) resembles the law of the energy of the rest mass which is:

$$E_o = m_o c^2 = \frac{Ae^2}{r_o} \qquad (2\text{-}9)$$

Where r_o could be considered as the rest radius of γ-photon. This means that to deal actually with γ-photon as a true particle i.e. as a matter we have to put its equation on the form of [4]:

$$E_o = \frac{Ae^2}{x_o}$$

$$So, \quad x_o = \Delta x \div 130 \qquad \mathbf{(2\text{-}10)}$$

$$u_o = \frac{x_o}{m_o} = 1.4 \times 10^{26} \div 130 = 1.076 \times 10^{24}$$

$$let \quad us \quad coll \; the \; factor \frac{1}{u_o} \quad as \quad c_o$$

$\therefore c_o = 10^{-24} \div 1.08$ (2-11)

Now γ-photon is formed of a big but limited number of spheres equal "n" and in between there are "n +1" number of strings. Each string in a rest manner i.e. under inertial tension equal "t_o". This string like group is put-say-in *x*-direction and so it can vibrate under the effect of "t_o" in y-direction (transverse vibrations) so the direction of motion of its particles is along *x*-direction.

Such a group behaves as "string" (except in that it has a big but limited spheres i.e. not infinite) so it obeys [4], [5]

$$\frac{\partial^2 y(x,t)}{\partial x^2} - \frac{c_o}{\tau_o}\frac{\partial^2 y(x,t)}{\partial t^2} = 0$$

Its wavy form is:

$$\frac{\partial^2 y(x,t)}{\partial x^2} - \frac{1}{v^2}\frac{\partial^2 y(x,t)}{\partial t^2} = 0$$

Regarding " γ- photon" as a wave

$\therefore \quad v = c$

$\therefore t_o = c^2 c_o$

$= (9 \times 10^{16})(10^{-24} \div 1.08) = 8.3 \times 10^{-8} \quad N.$ (2-12)

If we re back to the ordinary form of γ- photon i.e. as a mass less particle and if we concluded its effective force from the first orbital of "s.h.l.a."

$$\therefore F = \frac{Ae^2}{x^2} = \frac{2.3\times 10^{-28}}{(5.3\times 10^{-11})^2} = 8.3\times 10^{-8} \qquad N. \qquad (2\text{-}13)$$

From the last two equations; $\therefore F = t_0$

This means that we succeeded to return $F \rightarrow t_o$

And consequently this ensures that we succeeded to arrest such a particle and deal with it as a true particle.

Now the ordinary " γ-photon " exhibits its effective force throughout its motion by the speed $"v" = c$

Our γ-photon (which we deal with it as string like group) has the same motion and the same speed

$v = c$ *(where* $c^2 = t_o \div c_o$*)*

But because γ- photon is now divided by the ratio $\frac{1}{c_o}$ so its effective force would be multiplied by the factor "c_o".

On the same discussion we can postulate that a factor like "c_o" is also introduced on the nuclear force leading to diminution of its energy.

$$\because \Delta E\, \Delta t = \hbar$$

∴ The process of partition of energy would lead to elongation of "Δt". So the particles which have a finite life time (γ-photon & meson) would be partitioned while the particles having infinite life time (graviton) would not be partitioned. We have to ensure that such partition of the subatomic particles having a finite life time is a special property for the field "inside the giant charge".

III - Approach to the giant charge

1- If we have particles distributed homogeneously with a high density forming a spherical shape, then we have total binding energy equal[1]: 0.6 (m.n).(m.n) (Γ/r)

Where; r is the radius of the sphere, and Γ = Newtonian constant.

This E_B is about 1.2 times as much as the energy bringing the two parts of the sphere from infinity to the geometrical centre of this sphere [1].

If another far and heavier sphere lying R distance from the first and exhibiting with it electric force, and if the first orbits the centre of mass of the two spheres then there would be a condition have to be fulfilled to deal with the system as two bodies (not as particles). This condition is $E_B \geq E_T$ or mathematically

$$0.6\frac{(m.n)^2\Gamma}{r} \geq \frac{1}{2}\frac{(e.p)^2}{R} \qquad (3\text{-}1)$$

Where; e is the value of a charge. This law can give a relation between r & R of a circular orbit.

We would notice through the following discussion that "the giant atom tends – forever– to occupy the minimal possible quantity of matter" so the equation above would be:

$$0.6\frac{(m.n)^2\Gamma}{r} = \frac{1}{2}\frac{(e.p)^2}{R}$$

2- If we have a much number of identical charges occupying a comparatively so small volume that the electric energy produced is so great that the speed v of each of these charges exceeds the speed of light c. This is physically forbidden by the principle; no body motion exceeds c. If such a medium had a natural existence, then it has to find a solution for this contradiction. The solution arises from the following principles:

a- No body motion exceeds c.

b- The charges of any system have to be conserved.

c- The cross of the conjugate $\Delta E.\Delta t$ is conserved.

So, for solution of this contradiction and obeying all the above principles; the life time of the virtual sub-atomic particles which has finite life time would be elongated by its own elongating factor.

We estimated such factor of γ photon to be equal $\frac{1}{c_o}$

It is easy to estimate the elongating factor of the strong force transmitter.

The gravitational particle (graviton) has infinite life time [(9)] and so could not be elongated, and so would be outside the process of partition. It is easy to conclude that the total fractionated binding energy of the short force per a particle (E_S) is much less than the total gravitational energy per a particle $(E_t)_g$ and so the first one is comparatively negligible.

Primordial historical bodies had existence in the old past and from which the solar system had created. These bodies which we call the giant atoms had met the same contradiction and had solved it by the same lines of solutions.

This idea is not arbitrary proposal. We will show that the giant atom had left in the solar system many evidences that ensure its past existence.

3- The last point leads also to consider that the total binding energy of the gravity of the whole sphere is more than the repulsive energy due to the elec. field and consequently is much more than the binding energy of the short forces.

$$(E_t)_g > E_t)_e >> E_s$$

4- From the last point and because of $(E_t)_g >> E_s$ then the distance of the short force is broken, and because of the negative pressure due to uncertainty is reduced by the mechanism mentioned in the following chapter so we expect that the range of the in-between distance is Compton wave length (see later). So it is convenient to put this length relative to the radius of the sphere (r) as fallows.

$$Compton \quad w.l. \sim \frac{\hbar}{m_o c} = 2\times10^{-16} \qquad m$$

$$\therefore r = r_o \quad n^{\frac{1}{3}} = \left(\frac{2\times10^{-16}}{2}\right) \quad n^{\frac{1}{3}} = (10^{-16}) \quad n^{\frac{1}{3}} \qquad (3\text{-}2)$$

E_t = total binding energy $= A \dfrac{n^2}{r}$ where "r" is the radius of the sphere.

IV- The giant charge and energy of vaccum

Einstein have put the expression zero- point energy to refer to the minimal value of energy of a system or a body and refer also to energy of vacuum. This zero point energy is relevant to the cosmologic constant and also to the density of the dark energy which is found by the cosmologists to equal 10^{-29}gm/cc (6) which gives vacuum fluctuation with minimal ΔE value. This value supplies the universe with its baryonic matter density which –again- is found by the cosmologist to equal 10^{-29} gm/cc. This last ratio is equivalent to one hydrogen atom per a meter or one neutron mass- particle / meter which gives from De Broligie relation;

$v_o = h \div 1.7\times10^{-27} = o.6\times10^{-7}$ m/s

$E_o = (1.7\times10^{-27}).\ (0.6\times10^{-7})^2 \approx o.5\times10^{-41}$ j (4-1)

This is the lowest potential energy which vacuum (I mean with vacuum; space of the universe) can supply for a system.

Actually the giant charge, under the effect of partition of energy, has the least possible quantized energy and the least possible internal motion so it is cold matter object. The factor $\Delta m/\Delta x_o$ is introduced on all the mediator virtual particles with finite life time to prolong its life time by the inverse of this factor. The electromagnetic mediator would exposed, inside the giant charge, to the factor $c_o = 10^{-24}$ so this factor has the biggest value among the other similar factors. So we can expect that the classical potential electromagnetic energy of the simple hydrogen atom inside the giant charge has the same value E_o of vacuum energy. (E_o), and the second is; it allows formation of the

Now let us look at a simple hydrogen atom and introduce a factor makes its energy equivalent to (E_o) of vacuum:

By coulomb law;

$e^2 . © \div r.4\Pi\epsilon_o = E_p$

If we put: r = Bohr radius.

$E_p = E_o \approx o.5\times 10^{-41}$ j (4-2)

So, © is the equivalent factor which makes the energy of this simple system equivalent to (E_o) of vacuum. From the last equation we can estimate: $© = 10^{-24} = c_o$

<u>The negative pressure of the giant charge:</u>

Inside the giant charge there is mechanism of prolongation of life time of the "finite time- virtual particles" (reduction of energy) which yields two factors:

Factor which acts, as we discussed, by partition of γ photon and other mediators. And another factor acts on the virtual particles causing the negative pressure of uncertainty.

So the neutron mass- particle have a partition factor = it's mass over its rest radius = $\Delta m/\Delta x_o = 1.7\times10^{-27} \div 1.6\times10^{-18} = 10^{-9} = p_o$ (4-4)

This p_o acts to prolong the life time by the following suggested mechanism. Put v = speed of the particle and ω = speed of the wave matter so from De Broligie relation; $h = m(v.p_o)\ (\lambda \div p_o) = mc^2/\upsilon = m(v.p_0).(\omega/p_o)\ t$

From uncertainty relation; $(\hbar.p_o) \div 2 = \Delta\{ m(v.p_o)\}\Delta x = \Delta\{m.(v.p_o)\}\ \Delta\{(v.p_o)(\ t_o/p_o)\}$ (4-5)

So this factor gives slow motion, small –ve pressure, small uncertainty and small quantization so the fermionic particles can cluster and clump. This gives explanation for the existence of:

The giant charge (as cold baryonic matter), the neutron clusters (neutronium) as hypothetical element and the small strange matter like strangelet and massive compact halo object.

V- The giant charge and the strangelet with atomic number equal or less than 10^7 and radius = 2×10^{-13} m

This strangelet with the last mentioned parameters is small cold dark strange matter bound at zero temperature and pressure. [8] Its quark does not form individual baryons but have wave functions ranging over the entire system[8] so it acts as one body whose main energy is due to uncertainty of one body having a mass equal –at most- $10^7\times1.7\times10^{-27} = 1.7\times10^{-20}$ k.gm. Put $\Delta x = 2\times10^{-13}$ m.

From equation (4-4) uncertainty gives; $\Delta v \approx 0.3\times10^{-11}$ m/s

And consequently $\Delta E \approx (1.7\times10^{-20})\ (0.3\times10^{-11})^2 \approx o.2\times10^{-41}$ j

This is equivalent to the lowest energy fluctuation of the space (ΔE_o). Increase the atomic number more than 10^7 in this body is forbidden by the last equations. From this chapter and the next one we have to notice that we are going with the unified field theory on the form of equivalency (inside the giant charge) of the lowest potential energy of vacuum with that of electromagnetism and that of gravitation. This great result is not strange. Alfonso Rueda and Bernhard Haisch have published that the atomic structure could be attributed to the interaction between a charge and vacuum energy [(7), (13)]. Other scientists stated also that the virtual particles of the electroweak and strong forces bit from vacuum the corresponding energy [(2)]. In 1997 Rueda and Haisch published that the inertial mass interacts with vacuum energy to give the expression of gravitation [(9)].

Other scientists published many researches about condensations and clumping of fermionic matter forming super fluid, superconductors and super atoms [(10)]. On the same way we can explain the prolonged time of the strange quark;

The life time of the quark which forms the ordinary matter $\approx 10^{-23}$ second while that of the strange quark $\approx 10^{-10}$ second with prolongation factor $\approx 10^{-13}$ times. This prolongation could be estimated from the principles of the giant charge as follow

From equation (4-4) put mass of meson over its range of action as follow;

$P_o = \Delta m / \Delta x = 2.5\times10^{-28} \div 1.5\times10^{-15} \approx 10^{-13}$ times.

VI- The giant atom[(3)]

The giant charge to be present, the following condition have to be fulfilled that is; the binding energy between the particles have to be more than or just equal the energy (per a proton) elicited from the electric field.

If we put, $c_o = 10^{-24} \div 1.08$

n = number of neutrons of the giant proton

$'n$ = number of neutrons of the giant electron

$P_1 = P_2 = P$ = number of the charges inside the giant charge.

$M_p = m_n = m$ = mass of a proton or a neutron

e = value of a charge in coulomb.

T = the gravitational constant

$$\therefore (m.n)m_pT \geq (e.p)\ e.\ c_o \div 4\pi\varepsilon_o \qquad (6\text{-}1)$$

$$(m.'n)m_eT \geq (e.p)\ e.\ c_o \div 4\pi\varepsilon_o \qquad (6\text{-}2)$$

$$\therefore \frac{n}{p} = 1.14\times10^{12} \qquad (6\text{-}3)$$

$$\frac{\bar{n}}{p} = (1.14 \times 10^{12})1844 \qquad (6\text{-}4)$$

This means that the mass of the giant proton is less than that of the giant electron by the value $\frac{m_p}{m_e}$ so the first rotates around the second. (Giant inversed atom).

The giant proton to orbit the giant electron or by other wards: The centre of mass of the first to orbit the centre of mass of the system, the following condition have to be fulfilled that is; the total binding energy of the all particles inside the giant charge have to be just equal or more than the total electric energy between the giant proton and its giant electron.

$$(0.6)\frac{(m.n)(m.n)T}{r_o n^{\frac{1}{3}}} \geq \frac{(e.p)(e.p)}{4\pi\varepsilon_o R}.(1/2) \qquad (6\text{-}5)$$

Where; "$r_o.n^{\frac{1}{3}}$"$= r =$ radius of the "giant proton" and "R"= the distance between the two giant charges of the giant atom (i.e. the radius of "giant atom".

If the last condition was fulfilled then the giant proton would orbit the giant electron as follow:

$$(m.n)v^2 = \frac{(e.p)(e.p)}{4\pi\varepsilon_o R} \qquad (6\text{-}6)$$

This could be written as:

$$\left(m.\frac{n}{p}\right)v^2 = \frac{(e.p)e}{4\pi\varepsilon_o.R} \qquad (6\text{-}7)$$

Where in all above; the mass of a neutron = mass of a proton = m

From (6-5) & (6-7)

$$\therefore (m.n)v^2 = (1.2).\frac{(m.n)(m.n)T}{r_o.n^{\frac{1}{3}}}$$

$$\therefore v^2 = (1.2)\frac{(m.n)T}{r_o.n^{\frac{1}{3}}} \quad = (1.2)\frac{m.T}{r_o}n^{\frac{2}{3}} \qquad (6\text{-}8)$$

From all above

$\therefore$ $v = 5 \times 10^4$ *m/sec* (6-9)

$n = 2.6 \times 10^{45}$ (6-10)

$p = 2.3 \times 10^{33}$ (6-11)

$R = 11 \times 10^{10}$ *m* (6-12)

We have to put these results in our mind till we study the second stage of the giant atom. It is useful at the end of this chapter to estimate and conclude from equations 4-4 and 6-10 that the gravitational binding energy in the giant charge is greater than the positive energy of the –ve pressure due to uncertainty. Also it is important to suppose from all the above successful results that the minimal distance for action of the prolongation factors is Compton wave length so the particles are forbidden to be pulled further by the action of uncertainty where v = c.

VII-The huge charge

Equation (6-7) supplies us with an important physical meaning that is "the huge charge". The huge charge is the unit of the giant charge. That is to say; the giant atom is formed of a number equal "p" of the huge charges. Each huge charge has;

$$\text{mass} = m_u = \left(m.\frac{n}{p}\right)$$

& a matter wave length equal $\lambda_u = \lambda_o \div \frac{n}{p} = \frac{\lambda}{43} \div \frac{n}{p}$

And so it has the relation;

$$\left(m_p \cdot \frac{n}{p}\right)\lambda_u \cdot v = h$$ Or in the form:

$$\left(m_p \cdot \frac{n}{p}\right)\left(\lambda_o \cdot \frac{p}{n}\right) \cdot v = h$$ Or in the form:

$$\left(m_p \cdot \frac{n}{p}\right)\left(\frac{\lambda}{43} \cdot \frac{p}{n}\right) \cdot v = h$$

The circumference of the orbital (if it is circular) = 2πR equals "summation of the waves of the huge protons" times 43 or equal the length λ_u multiplied by the number of λ_u

$$\therefore 2\pi R = \{(\lambda_u \cdot p)\cdot 43\}$$

Where; p = number of the protons which is equivalent to number of the huge protons and consequently equivalent to number of their waves.

$$\therefore 2\pi R = \left[\left(\lambda_o \cdot \frac{p}{n}\right)43\right]p$$ Or in the form:

$$2\pi R = 43\cdot\frac{\lambda}{43}\cdot\frac{p}{n}\cdot p = \lambda\cdot\frac{p^2}{n} \qquad (7\text{-}1)$$

Where λ is the wave length of the first orbit of "s.h.l.a"

$\lambda = (2\pi)\ 5.3\ \times 10^{-11}$

Put $p = 2.3 \times 10^{33}$

$n = 2.6 \times 10^{45}$

$$\therefore R = 11\times 10^{10}\ m \qquad (7\text{-}2)$$

(This is the same result we got before)

The scale

Now we are approach to the main idea of our work. Our work supposes existence of what we can call "giant atom". Realization of this model depends on congruency of the data which we gain form this giant atom, on the data of the solar system. Our work is formed of two interfering parts, the first, supposes presence of this model then follows up to conclude data on this giant atom, like radius of orbit, velocity … etc. Here we are in front of the question, what is the scale, which decides validity of this proposal?

We supposed presence of this model (the giant atom) which is formed of giant proton and giant electron. And supposed entering of the factor ($c_o = 9.3 \times 10^{-25}$) on the electric constant inside the giant proton and the giant electron. Then what is the scale which decides validity of this supposition? Here we are in front the second part of our work. This is the laboratory allowed for verification of presence of this model. We now go back to the past i.e. to the starting point of creation of the solar system. If we considered the solar system was formed of units, each unit was a giant atom, and if we concluded atomic data for this giant atom then compare it with the astronomical data of the solar system, and if the two data are typical, then this is the scale of validity of our model.

We know that the solar system is formed of nine planets rotate around the sun. The nearest one to the sun is mercury which has a radius of orbit about $5.8\ \times 10^{10}$ m/sec.

The following table shows the system which the planets obey [(11), (16)];

	Mercury	Venus	Saturn	Pluto
v	1	1/1.36	$\frac{1}{5}$	$\frac{1}{10}$
R	1	$(1.36)^2$	25	100

Table -1-

Our suggestion states that:-

1) Each planet had formed (historically) of similar and homologous units. The number of the planet units could be concluded by dividing the planet mass over the mass of the giant proton
2) Each of these units had behaved as a giant proton.
3) Each planet unit had a sun which had behaved as a giant electron.
4) The planet unit had rotated–on a base of quantum mechanics – around its sun unit forming a system of "giant atom".
5) After a time, a second stage (see later) had begun. The electric field of the giant atom disappeared and an effective Newtonian field replaced it.
6) The old system had finished by union of all the sun units to form one "sun" and union of the typical planet units to form one planet. So the different planet units had formed nine planets. So – now – we have one sun and nine planets.

<u>The ratio between mass of the Sun and that of all the planets.</u>

This ratio (u) could be estimated from:-

1- Number of units of the giant protons = number of units of the giant electrons. So, number of the planets units = number of the suns units.

2- d = D (for the meaning of d and D see later)

3- From above:- u = 1840

The astronomic data reveal that this ratio is only about 750. So there is error factor in our estimation about $\frac{1}{2.4}$

Also we estimated (R) of the planet Mercury as; $R=11\times10^{10}$ m

The astronomic data reveal that (R) is only about 5.8×10^{10} m with error factor about 1/2

The following chapter is analysis for this error factor.

VIII- The error factor

The giant atom requires;

1- $\frac{n}{p} = 1.14 \times 10^{12}$ This is a condition required for existence of the giant proton.

2- $\frac{\bar{n}}{p} = (1.14 \times 10^{12})1844$ This is a condition required for existence of the giant electron.

3- $v^2 = \frac{(m.n)T}{r_o . n^{\frac{1}{3}}}$ This is a condition required for orbiting the giant proton on the lowest orbital of the giant atom.

Consequently; number of the protons of the giant proton = number of the electrons of the giant electron = $p = 2.3 \times 10^{33}$

From above we estimated: R = 11×0^{10} m.

u = 1840

We put a principle that: the giant charge in its existence and orbiting tends to occupy the least probable value of matter.

Equation (6-4) had put the condition required for orbiting the giant proton in a circular orbit, so it neglected that the orbital is not a circular. It is elliptical. We showed that the planet Mercury on its birth was a giant atom with the same "v" and "R" of the giant atom. So let us begin from the end of the story.

Mercury does not orbit in a circular orbit but it orbits as elliptical with [15]; eccentricity (e) = 0.2, mean value of orbiting speed = $(v_m) = 5 \times 10^4$ m/sec, mean value of radius of orbital = R = $(R_m) = 5.8 \times 10^{10}$ m and speed at perihelion = $(v_p) = 6.3 \times 10^4$ *m/sec*. Now from the above astronomic data we can discover a modification in the principle which we put to control all the equations of existence and orbiting of the giant proton. This modification should be; the giant proton have to occupy the least probable matter just enough to persist its existence and orbiting, and just enough to resist any external factor which may threat its existence and orbiting on the level of time (motion) and level of space (dimensions).

The external factor here which threats the orbiting of the giant proton (as one rigid body) is (v_p) = speed at perihelion. This needs; the equation (6-4) has to be modified as: $v = (v_p) = 6.3 \times 10^4$ *m/sec*

So; n = $2\ (2.6 \times 10^{45})$ (8-1)

If the estimations of all the planets (the giant protons) have the same error factor and so its (n) is multiplied by the factor (2) then; the mass of all the planets should be multiplied by the same factor. This would lead directly to;

u = 1840 /2 = 920 (8-2)

In addition to above, if we put in consideration the astronomic data which state that: the Sun during its life have lost (from consumption of fuel and may be from the so called stellar wind) some ratio of its mass then we can consider:

u = mass of Sun at its birth: mass of all the planets = 750

This gives complete congruency between our estimations and the astronomic data.

Now if (p) is not affected by this factor (as we will see) then;-

R (of equation 6-12) and the same R (of equation 6-14)

Would be divided on the same factor to be modified as:-

$R = (11 \times 10^{10}) /2 = 5.5 \times 10^{10}$ m (8-3)

This gives also, congruency between our estimations and the astronomic data

We saw that the estimated (n) in equation (6-8) should be multiplied by a factor equal (2). This factor consequently, either followed by increase of "p" by the same factor (that is when "n/p" not affected by this factor) or "n/p" is affected by the same factor if "p" not affected at all. We will study the second solution as follow;

Affection of "n/p" by the factor "2" means existence of some factor or some term acts inside the giant proton and works as centrifugal force or actually, works as a kinetic energy beside the repulsive electric kinetic energy due to the mutual interaction of the protons inside the giant proton.

This later one is opposed (as in equation"6-1") by the gravitational potential energy. If such new kinetic energy is arising from the charges inside the giant proton then we need additional persisting matter to oppose such new kinetic energy. So we expect appearance of a new term have to be summated with the electric field (of equation 6-1) leads to increase of the value of the ratio n/p.

Now let us begin from the end of the story by using the new data (the factor 2 and its sequences).

The giant proton (Mercury) orbits in elliptical like shape having speed at aphelion = $v_a = 4.3 \times 10^4$ m/sec

$\Delta v = (v_p) - (v_a) = 6.3 \times 10^4 - 4.3 \times 10^4 = 2 \times 10^4$ m/sec

Let us study the effect of this Δv on the charges inside the giant proton.

The giant proton (the planet Mercury) is orbiting in elliptical like shape and has:-

1- Circumference of orbital = $2\ \pi$ R = 36×10^{10} m (astronomic data).

2- Diameter of the giant proton = 2r = 2 $\{(10^{-16})\ (n^{1/3})\}$

$= 2\ (10^{-16})\ \{2(2.6 \times 10^{45})\}^{1/3} = 0.35$ m (8-4)

3- Each particle travels from ($\nu_{p)}$ to ($\nu_{a)}$ would have

$$\Delta E_k = \frac{\Delta m v^2}{2} = \frac{\Delta v^2 m}{2} = \frac{(2\times10^4)^2(1.7\times10^{-27})}{2} = 3.4\times10^{-19} \quad \text{j} \qquad (8\text{-}5)$$

Now let us put this giant proton on its orbital and study its motion within the half of the length of circumference of this orbital. The transitional (v) would be affected from (ν_p) to (ν_a), or in the opposite direction, by the value $\Delta\nu$

Now let us fix the time, so no motion but only the giant proton occupies a part of the length of the half of this circumference . This part equals the length of the diameter of the giant proton.

Each particle of the giant proton during its motion on the half of the circumference (without fixation of time) would acquire (or loss):-

$$\Delta E_k = \frac{\Delta m v^2}{2} = \frac{\Delta v^2 m}{2} = \frac{(2\times10^4)^2(1.7\times10^{-27})}{2} = 3.4\times10^{-19} \quad \text{j}$$

If we fix the time and study the effect of this additional kinetic energy on the charges of the giant proton then we have to put (2r) on a part of the length of the half of the circumference π R.

ΔE_k on the level of this part is:-

$(10^{-19}\times 3.4)\{\ (2r) \div (\pi\ R)\}$

$\Delta E_k = 3.4\times10^{-19}\ \{(0.35) \div (18 \times 10^{10})\} = (3.4\times 10^{-19})(2 \times 10^{-12}) = 6.8 \times 10^{-31}$ j (8-6)

To study the effect of such value of energy on the charges inside the orbiting giant proton we have to study two points, one of them is the kinetic energy of the repulsive electric field (E) inside the giant proton (that is to know the comparative effect of ΔE_k on equation 6-1). The second point arises from; if we imagine a non rigid body lies on the same elliptical orbit and is affected, during its motion, by $\Delta\nu$ and if we fix the time and look at one of the two edges of this body which lies nearer to ν_p and look, at the same time, to the particles which lie on the opposite edge we will find that the two edges travel by two different transitional velocities and consequently the body ,if it doesn't have enough binding energy, would travel as particles not as one body. This means directly that; the giant proton –which is built on the base of the least probable matter and consequently cannot loss any of its matter otherwise it as a whole and as existence would be lost– to preserve its existence against this risk factor should have a binding energy per a particle equal

6.8×10^{-31} j

Of course, the particles lie away from the edges would have smaller value of (ΔE_k) in a differential function and consequently need smaller binding energy than that of the edges. This differential function should not be a cause for the giant proton to have a binding energy per a particle smaller than ΔE_k otherwise the edges would be broken and the existence of the body would be threaten and may be lost.

The last discussion reveals that; if the electric repulsive energy inside the giant proton have to be opposed by gravitational binding energy which appeared in equation (6-1) as the ratio "n/p", then the new kinetic energy which aroused from the external factor due to putting the giant proton in elliptical orbital (with eccentricity about o.2) have to be opposed by excess of this gravitational energy which will appear as modification in the ratio n/p (in equation 6-1).

Now let us go to the point in which we see the considerable effect of this ΔE_k if compared with the electric repulsive energy inside the giant proton.

As in equation (6-1):-

$(0.6)\ m_p\ (m.n).\ T/r = (0.6)\ e(e.p)\ c_o \div (4\pi\varepsilon_o)r = 1.5\times10^{-18}$ j

This is the energy of the electric repulsion per a charge. To conclude this energy per a particle of the giant proton we have to divide this value on (n/p) to be equal: - $1.5\times10^{-18} \div 2(1.14\times10^{-12})$

$$=6.7\times10^{-31}\ \text{j} \qquad (8\text{-}7)$$

Compare this value with that of equation (8-6)

(8-6) = (8-7)

This means, directly, that we have to modify equation (6-1) and add a term, in its right side, equivalent to the value of the energy of the electric repulsion. By other wards: we have to multiply the right side by the factor (2). This result, directly, means that; the ratio n/p has to be multiplied by the same factor.

It may be useful to estimate –at the end of this chapter– the total binding energy inside the giant proton as:-

$E_B = 2(6.7\times10^{-31}).p.\ n/p - (6.7\times10^{-31})\ n.\ n/p = -(6.7\times10^{-31})n^2/p$ j.

IX- The complicated giant atoms (hyper-giant atom)

The typical giant proton was determined by:- $\frac{n}{p} = 2(1.14\times10^{12})$

The number of its neutrons has a minimal value equal

$n = 2(2.6 \times 10^{45})$ at the mean value of the orbiting speed v = 5×10^4 m/sec

This value of (v) was determined by the basic skeleton of the giant atom which is the major atom. Consequently, we estimated (p) and (R). The orbital with higher energetic states –in the expression of the giant atomic system–is formed by independent separate systems. These higher systems would be called the hyper-giant atom. They obey the following:

Nothing forbid the nursing medium to produce hyper-giant atoms with $n = \{2\ (2.6 \times 10^{45})\}.d$ *Where* $d > 1$

Now the typical giant atom has a wave matter in two forms:

That of the whole body (which has mass equal "m_p .n") with consequently, orbiting speed v = $(v_m) = 5 \times 10^4$ m/sec

The giant proton, as a whole, had acquired this speed from the mutual electric field of the giant atom. This speed was defined, initially, by the original system which is the major atom.

This speed of the whole body would be offered to its units which are the huge protons. This huge proton which has $\text{a mass} = m_u = \left(m.\frac{n}{p} \right)$ –with this acquired speed– will define $\text{a matter wave} = \lambda_u = \lambda_o \div \frac{n}{p}$

The orbital length is determined by multiplication of (43 λ_u) by number of these waves which means (in the expression of the giant atomic system) number of the huge protons.

Now a hyper-giant proton with the factor (d) leads to decrease of its orbiting speed by the same factor and consequently, decrease speed of its units (the huge protons) and so consequently, increase of λ_u and λ_o by the same factor.

The orbital length of this hyper-giant atom is formed by multiplication of wave length of the huge proton (which increased by the factor d) by number of these waves which means number of the huge protons which increased by the same factor due to increase p (where; n/p is forever constant).

So; the orbit of the hyper-giant atom is not forbidden:

1- By the relation of the wave matter of the body as a whole (because of its wave length is so small that it is not comparable with the big λ_u of the huge proton. So the wave length of the whole body does not share initially, in the length of the orbit)

2- By the relation of the wave matter of the huge protons.

The orbital is not also forbidden by the law of equilibrium of the forces of the hyper-giant atom as:-

$$(e.\ P_2)\ (e\ .\ p) \div R = (m\ .\ n)\ v^2$$

Where; P_2 is the number of the electrons of the giant protons (this number is not affected because it, forever, equals

2.3×10^{33}). Increase "n" of the hyper-giant atom by the factor "d" in the right side of the equation is balanced by increase "p" of the left side by the same factor where (n / p) is constant. So the equation can take the form of the huge proton as:

$e\,(e.\,P_2) \div R = \{ m\,.\,(n/p)\}\,.\,v^2$

So; ($R.\,v^2$) is conserved.

Each hyper-giant atom represents (wherever the above relations are conserved) independent system with its own energetic state.

These lines explain why the different planets (the hyper-giant atoms with different energetic states) orbit with different speeds in a fractional ratio (1, 1/1.36, 1/1.6 …). That is because no thing forbids the nursing medium to produce hyper-giant protons with;

n = 1, 1.36, 1.6 …..

So mathematically, the giant atom is able by its packet of laws to create the following laws of the hyper-giant system:

1) The giant proton has a mass equal M = pX Where "X" is the mass of the huge proton

$$\therefore M = p(m.\frac{n}{p}) \qquad (9\text{-}1)$$

The giant electron has,

$$\therefore M_e = p(m.\frac{n}{p})1844 \qquad (9\text{-}2)$$

Put the factor "d" as a number varies from "1" to "10".

Now multiply "d" in equation (9-1).

$\therefore$ The hyper- giant proton has a mass $= \left[p(m.\frac{n}{p}) \right] d$ (9-3)

We have to notice that the factor between the small brackets is the huge proton mass.

Now we can conclude that "d" means addition of huge protons inside the giant atom so:

d = A. P (where; "A" has value from 1 to 10).

2) Put "D" = "d" and multiply in equation (9-2)

$\therefore$ The mass of the hyper- giant electron = $p(\frac{m.nD}{p})1844$

This means that the huge electron mass would increase by the factor "D". That is to say "D" is an equivalent number to d (varies from 1 to 10) and means additional neutrons (no additional charges) .when "D" is introduced on the giant electron and when "d" is introduced on the giant proton.

$\because$ D = d

$\therefore$ We are still conserving the centre of mass of the hyper-giant atom.

The motion of the giant proton obeys the following

$$1-(m.\frac{n}{p})v^2 = \frac{e^2.p}{4\pi\varepsilon_o R}$$

This is the first one obeyed by the giant atom. We have to notice that the mass of the rotating body is the mass of the huge charge $= m\frac{n}{p}$ so this mass is accompanied by a wave whose length = $\lambda_o \frac{p}{n}$ and so the motion would obey:

$$2-(\lambda_o \frac{p}{n}).\left(m.\frac{n}{p}\right)v = h$$

This is De Broligie formula but in a huge form.

3- The summation of the waves of the giant proton would form the length of the orbit as:-

$$\lambda \cdot \frac{p^2}{n} = 2\pi R$$ Where; $\lambda = \lambda_o \cdot 43$

These laws are able to deal with the orbitals of all the planets as follow;

$$\bar{1}- \quad \left(m.\frac{n}{p}\right)\left(\frac{v}{d}\right)^2 = \frac{(e.p_2)e}{4\pi\varepsilon_o.(R.d^2)} \qquad (9\text{-}4)$$

We have to notice that adding new huge protons (d) does not change the mass of the huge proton so it is still equal $\left(m.\frac{n}{p}\right)$. Also we have to notice that adding the factor "D" which means additional neutrons added to the giant electron would not change its number of charges ($P_2 = P$)

$$\bar{2}- \quad \left[\left(\lambda_o.\frac{p}{n}\right)d\right]\left(\frac{v}{d}\right)\left(m\frac{n}{p}\right)=h \qquad (9\text{-}5)$$

We have – again – notice that the factor "d" would not affect the huge proton mass, but when it leads to decrease "v" by the factor "d" it would consequently lead to elongation of λo by the same factor.

$$\bar{3}- \quad \left[\left(\lambda_o.\frac{p}{n}\right)d\right](p.d)=2\pi(R.d^2) \qquad (9\text{-}6)$$

This means physically that the factor "d" would result in elongation of λ_o by the value "d" as well as increase of the number of λ_o by the same value. This and that lead to increase of "R" by the value d^2.

By this way the giant atom succeeds to deal with nine different orbits throughout a packet of laws of classic & quantum physics. Now put (d) & (d^2) as follow:

		Mercury	Venus	Saturn	Pluto
1/d	v	1	1/1.36	$\frac{1}{5}$	$\frac{1}{10}$
d^2	R	1	$(1.36)^2$	25	100

Table -2-

On the same discussion we can put the factor "D" in the general equation as follow:-

1) The huge electron obeys:

$$\frac{\left(m.\frac{n}{p}\right)1844}{r}v^2 = \frac{(e.p_1).e}{R^2(4\pi\varepsilon_o)}$$

Where: P_1 = number of the charges in the giant proton

e = value of a charge in coulomb.

R = the distance between the centre of mass of the giant electron and that of the giant proton.

r = the distance between the giant electron and the centre of mass of the giant atom.

v = the speed of rotation of the huge electron (around the centre of mass of the giant atom)

2) The complicated (higher energetic state) huge electron obeys: -

$$\frac{\left[\left(\frac{m.n.D}{p}\right)1844\right]\left(\frac{v}{D}\right)^2}{r.D^2} = \frac{(e.p_1.d).e}{(R.d^2)^2.4\pi\varepsilon_o} \qquad (9\text{-}7)$$

Put $D = d$

∴ The law of equilibrium of forces is still conserved by the hyper-giant atom. Also it is clear that the complicated atom still conserve the (reversed) centre of mass as well as the relative motions. The radius of the orbital of the complicated giant atom is, still, defined by the summation of the matter waves of the complicated giant proton.

At the end of this chapter we have to notice: d = D, so the system is still conserving its centre of mass as well as its relative motion.

By these factors (d and D) we can estimate R and v of each planet. Our estimations showed that:-

$$u = \frac{M_s}{M_p} = 750$$

$R_1 = 5.8 \times 10^{10}$ m

$v_1 = 5 \times 10^4$ m/sec

These mathematic conclusions which based on the so called "giant atom" are completely congruent with the astronomic data which are well known about the solar system. It is well known that:

1) The mass of the sun to the total masses of the nine planets is about "750" times.
2) It is well known that the radius of rotation of the nearest planet (to the sun) is about "5.8×10^{10}" m.
3) It is well known that the speed of rotation of the nearest planet is about "5×10^4" m/sec

The system of the giant atom also can provide us with the radius and speed of rotation of each planet. This means that the solar system provides us by [(2 × 9) + 1] = 19 evidences which ensure the existence of the giant atom as a historical stage in evolution of the solar system.

X - The Second Stage

When the neutrons of the giant charge decay into "s.l.h.a"

$$n \rightarrow p + e + E_f$$

So the radius of the giant charge would elongate and consequently (E_B) would decrease to be ($\bar{E}_B$).

Consequently ($\bar{E}_B$) < E_p (see eq. "4-5") so the charges of the giant charge would not rotate – around the centre of mass of the giant atom as huge charges. So they would be attracted directly to each other ($\overrightarrow{e} \quad \overleftarrow{p}$)

So, the giant charges would be evacuated from the charges.

The repulsive elec. field between the units would disappear while the attractive gravitational force would pull them to each other. This would lead to the solar system. (As in fig. 1)

The second stage is the stage of union of the units of the same planet and also union of units of the "suns". If no considerable masses and if no energy lost or giant and when the old elec. System replaced by a new effective Newtonian system then,

$$v_1^2 M_p = \frac{A \quad P^2.e^2}{R_1}$$

$$= \frac{\bar{A} \quad P^2}{R_1}$$

$$\therefore v_1^2 R_1 = \frac{\bar{A} \quad P^2}{M_p}$$

2) The last equations would be replaced, after union, by:

$$\therefore v_2^2 \sum_1^n M_p = \frac{B}{R_2} \sum_1^n M_p \sum_1^n M_s$$

Where, n & s are the number of the units of the same planet and the number of units of the "suns" respectively.

$$put \sum_1^s M_s = M_{\copyright} \quad (Where \quad M_s = mass \quad of \quad the \quad Sun$$

$$\therefore v_2^2 R_2 = B \quad M_{\copyright}$$

So, from above:-

$$if \quad M_p B \quad M_{\copyright} = AP^2$$

$\therefore \ v_1 = v_2$

$R_1 = R_2$

The equation above could be put as;

$M_p \ B \ (1844 \times 9 \times M_p) \ n = A \ p^2$

(Notice that M© is formed of units of suns of nine planets)

$$\therefore \left(n.M_p^2\right)\bar{B} = (p^2)\,\bar{A}$$

$$\therefore \left(\frac{M_p}{p}\right)^2 = \frac{\bar{A}}{\bar{B}.n} = H \cdot \frac{1}{n}$$

The last mathematic discussion could be summarized physically as follow:

If no considerable masses or energy are lost or giant during the stage of union

$\therefore \quad v_1 = v_2 ,$

$R_1 = R_2$

By other wards: if no considerable masses or energy are lost or giant then the angular moment are conserved.

XI-The minor giant atomic system

We studied the story from the simple atom to the inversed major atomic system and then we studied the giant atom till we arrived to what may be called the hyper-giant atoms. Then we have to ask if there is what may be called the minor-giant atoms.

We studied in detail, the story of the hyper-giant proton which began by increase of (n) by the factor (d) and consequently decrease (v) of each of the whole body and the huge protons. This resulted directly, in increase (λ_u) by he factor (d). Increase each of (λ_u) and (p) by the factor (d) would result in increase (R) by (d^2).

The position here, in the minor-giant atoms, has to differ completely. That is because if we considered the number of (n) of the giant atom as the unitary value then decrease (n) of the minor-giant atom would result in increase (v) which is forbidden by the basic system of the giant atom which is the major atomic system. The major proton and consequently, the giant proton had occupied the highest value of (v) which may decrease with the other systems but not increase.

The solution of equations of the minor-giant atom necessities decrease (v) by the factor (d) when (n) increases by (d^3). The following studying shows the above relation in comparison to the giant and hyper-giant atoms:-

The giant atom:-

The orbiting speed (v) is determined by the force of the inversed atomic system where (v) took the highest value.

Number of neutrons of the giant proton (and consequently, the mass of the giant proton) is defined by substitution of the above (v) in equation (6-8) which could be put on the form:-

$$v^2 = \frac{m.T}{r_o} n^{\frac{2}{3}}$$

The hyper-giant atom:-

Due to increase (n) and consequently the mass of the whole body by the factor (d), the orbiting speed of the whole body would decrease by the same factor. This would result in decreasing speed of orbiting of the huge proton and increasing its wave matter length (where the huge proton mass is constant because "d" means only additional huge protons). So De Broligie

relation is conserved on the level of the whole mass and level of the huge proton.

The equilibrium equation (6-6) is also conserved on both levels.

Now (n) is defined by the ability of the nursing medium to produce arbitrary masses (wherever number of neutrons of the hyper-giant atom is more than those of the giant atom and wherever the ratio "n/p" is constant).

From all above; equation (6-8) does not define (v) nor (n) but only put the minimal allowed value of (n) in the form :-

$$\frac{m.T}{r_o} n^{\frac{2}{3}} > v^2$$

The minor-giant atom:-

The story of the minor-giant atom should obey the following:-

Reduction of (n) by any arbitrary factor, wherever n/p is constant, would take the form; $n = n_1 / d^3$

Where; n_1 is number of neutrons of the giant proton.

If (n) is defined from above, then (v) would be defined, axially, from equation (6-8) in the form:-

$$\therefore v^2 = \frac{m.T}{r_o} n^{2/3} = f.\, n^{2/3}$$

$$\because \quad n^{2/3} = (n_1 \div d^3)^{2/3} = n_1^{2/3} \div d^2$$

$\therefore f\,(n_1 \div d^2) = v_1^2 \div d^2$ Or in the form;

$A\,(n_1^{1/3} \div d) = v_1 \div d$

$\because\ n_1^{1/3}.r_o = r_1$

$\therefore$ B ($r_1 \div d$) = $v_1 \div d$ (where; B is a constant and r_1 is the radius of the giant proton)

$\therefore$ *Generally*; B.r = v (11-1)

$\because\ m_u\, v\, \lambda_u = h$

$\therefore\ v = h \div m_u\, \lambda_u$

From all above;

$\therefore$ r. λ_u = F (Where; F is constant) (11-2)

Actually, the minor giant charge is not in contact relation with our studying so we will end talking about it and go, only, with the above relation; r. λ_u = F

It would be surprise to estimate this cross to find for the giant atom: r. λ_u = "c_o".

If we put; λ_u = λ = (Bohr radius of the simple hydrogen atom-like system)

And; r= rest radius of the electron = 2.8×10^{-15} m.

$\therefore$ r. $\lambda = 10^{-24} \div 1.08 = c_o$ (11-3)

To do correct comparison between the cross of the giant and simple atom we have to estimate for a circular orbital of the giant atom (like that of the simple atom). So for the giant atom put;

$\frac{n}{p} = 1.14\times 10^{12}$ n = *(2.6 × 10^{45})*

r = $10^{-16}\times(2.6\times 10^{45})^{1/3} = 0.14$ m

$$\therefore \lambda_u = \frac{2\pi\times 5.28\times 10^{-11}}{43}\cdot\frac{1}{1.14\times 10^{12}}$$

$$\therefore \lambda_u \cdot r = \left(10^{-24}\right)1.1 = C_o\,(1.2)$$

For the simple atom:

$$\lambda_u \cdot r = \frac{10^{-24}}{1.08} = C_o$$

This is a good expected congruency. To do more accurate estimation we have to do the following. From equation 6-1:

$$\therefore C_o = \frac{m^2}{e^2}\cdot\frac{n}{p}\left[\Gamma\left(4\pi\varepsilon_o\right)\right]$$

From equation (6-5):

$$4\pi\varepsilon_o = \frac{e^2 \cdot p^2 \cdot r}{m^2 \cdot n^2 \cdot R \cdot \Gamma(0.6 \times 2)}$$

$$= \frac{e^2}{m^2} \cdot \frac{p^2}{n^2} \cdot \frac{r}{R} \cdot \frac{1}{\Gamma(0.6 \times 2)}$$

$$\therefore C_o = \frac{m^2 \cdot n \cdot r \cdot e^2 \cdot p^2 \cdot \Gamma}{e^2 \cdot p \cdot R \cdot m^2 \cdot n^2 \cdot \Gamma(0.6 \times 2)}$$

$$= \frac{r \cdot p}{R\, n(1.2)}$$

Put (for a circular orbital of the giant atom):

r = 0.14 m R = 11 × 10^{10} $\frac{p}{n} = \frac{1}{1.14 \times 10^{12}}$

$$\therefore C_o = \left(\frac{r \cdot p}{R \cdot n}\right) \cdot \frac{1}{1.2} = \frac{10^{-24}}{1.08}$$

From above:

1) This above (second) form is a special form for the giant atom because of $\frac{p}{n}$ is meaningless regarding the simple atom

2) The variables $\frac{r \cdot p}{R \cdot n}$ of the second form have to be equivalent with the variables of the first one

$$\therefore \frac{r \cdot p}{R \cdot n} \equiv \lambda_u \cdot r$$

$$\therefore \frac{r \cdot p}{R \cdot n} \times \frac{1}{1.2} \equiv (\lambda_u \cdot r)\frac{1}{1.2}$$

Where; the magnitude "1.2" arises as a special factor (from equation 6-5) for a case like the giant atom.

So from all above:

$$\frac{r \cdot p}{R \cdot n} \times \frac{1}{1.2} \equiv (\lambda_u \cdot r)\frac{1}{1.2} = C_o \quad \text{For the giant atom}$$

$\lambda_u \cdot r = C_o$ For the simple atom

This congruency of the cross "$\lambda_u \cdot r$" of the giant and simple atom give another physical & astrophysical meaning for the factor c_o This factor has to be introduced as in equation "4-1" to solve a physical contradiction. The magnitude of c_o is not only defined by equations "2-11" & "6-1" but also – by a way or another – it is defined and has a physical concept on the level of the simple atom.

So, this factor as a magnitude is not –at all– arbitrary proposal. The results & the congruent estimations –which we obtained– between the variables of the giant atoms and those of the solar system ensure the above.

Summary

1) The major atom could be built as inversed atom having a mass equal about 1844 times as much as the "s.h.l.a".

   From this side of view we can build such inversed atom.

2) The giant atom is inversed atom but with much more mass so we can build the giant atom from the same laws of the major atom.
3) The factors d, d^2 & D when introduced on the giant atoms $\rightarrow$ complicated giant atoms.
4) The factor "c_o" is a special property for the electric field "inside" the giant charge. This factor could be understood when we study γ-photon particle" as electromagnetic string like group".
5) The solar system provides us by "19" evidences that ensure the historical existence of the giant atoms.

Conclusion:

We put a proposal says that under a definite conditions the

Sub-atomic particles would shift into classic physic behaviors. This proposal succeeds to build huge charges and giant atoms. Also succeeds to build the solar system. The scales of the solar system succeeded in testing this proposal

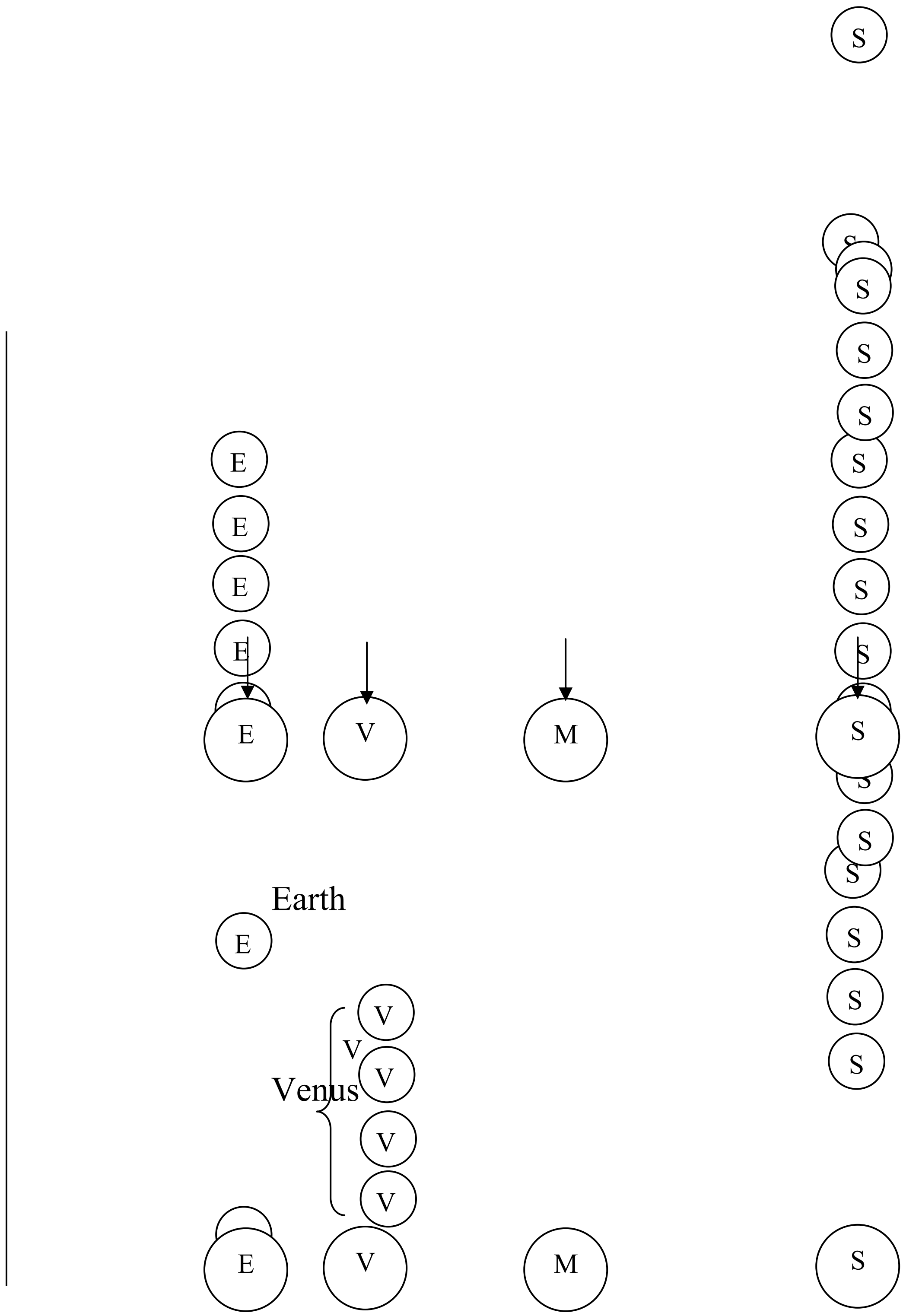

Fig. -1-

Notice that, (M) is a symbol for a unit of the planet "Mercury", each unit rotates around its sun unit "s".

"V" is a symbol of the Venus. The second stage results in formation of one sun and nine planets.

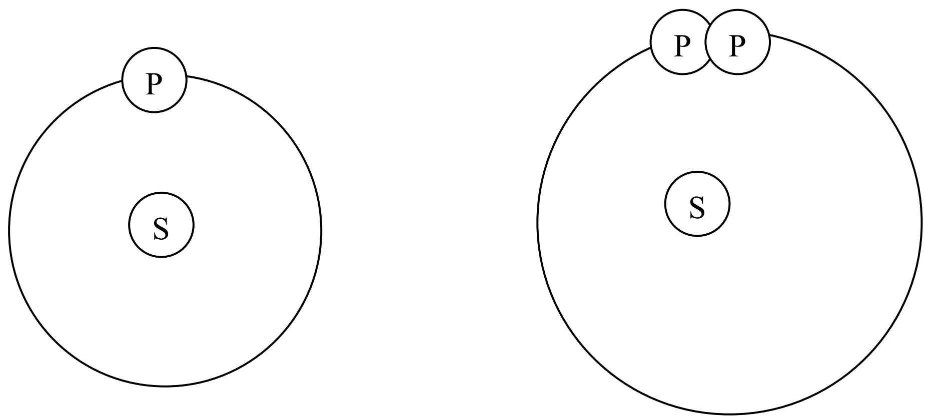

Fig. -2-

A model of (d=1)

A model of (d=2) for a planet while d of sun is forever= 1.

This is the quantum basis of the way by which the planets differ from each other.

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