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Internal Functions of Matter (m) of Einstein Equation, $E = mc^2$ and Emission of Energy (E) after finding the Mass of a Photon, Graviton and Equation of Unification Physics

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Abstract: ***In 1905 Einstein introduced his famous equation $E = mc^2$ throughout the scientific world and scientists experimentally tested different ways even in the outer space that the speed of light is $2.99792458 \times 10^{10}$ cm/sec this is very unique equation for the mass equivalent energy system. This applicable to all fields for energy emission. Here the question is that matter is not alone, inside of it other particles are there. Which type of particles is responsible to create energy? Again, energy is composed of bunch or coagulation of photons, how many photons are responsible to create energy? We know the equation $E = h\nu$ and h is the Planck constant and according to De-Broglie, $\nu = c/\lambda$. But same question arises that one Planck is $6.6260755 \times 10^{-27}$ erg-sec, how many photons creates this energy? To solve all these facts, we need to think on the photon's mass. Because, energy is composed of number of photons which will depend the mass m. Again, in what way gravitational constant and the particle acts on it that internal mechanism is very important throughout the universe.***

Keywords: Mass of a photon, graviton, unification of physics, Planck constant, Einstein's equation.

1. Introduction

The electromagnetic energies are composed of photons as $E = h\nu$, so photon is the agent of energy. Like the graviton particle is the agent gravitational force in the field of gravitation. The mass of photon and graviton is treated as zero in our modern physics. The zero value is most important in the field of mathematical terms. But in the case of matter, we can't agree because it has mass whatever it may be negligible. So, we need to know the mass of a photon, graviton. Therefore we need to determine the mass of these particles first.

1) Basic Equation And Method To Determine The Mass Of A Photon

According to well known Compton's Theory, when scattering takes place from an electron tightly bound to the atom, collision is, in fact with the atom to which the electron is tightly bound. As the Compton wavelength $\lambda_c = h / m_e c$ is inversely proportional to the mass of the scattering particle. Its magnitude for atom is nearly 10^{-4} times the value of an electron [1]. (The symbols have their usual meanings).

From the above mentioned relation between an electron and atom is seen that electron is tightly bound to the atom. Therefore, according to Compton wavelength the atom (λ_u) and electron (λ_c) must also have close relations between them. Let the ratio of wavelength of atom and electron is directly proportional with the total energy of the system. From this view the following relation will produce energy of the total system as:

$$E_1 = m_e c^2 \times \frac{\lambda_u}{\lambda_c} = m_e c^2 \times 5.485798962 \times 10^{-4} = 4.491284593 \times 10^{-10} \text{ erg} \quad \ldots\ldots\ldots\ldots (1)$$

And $E_1/[e] = 4.491284593 \times 10^{-10}$ erg $/[e] = 0.2803$ keV, where, $[e] = 1.60217733 \times 10^{-12}$ erg

a) This energy 0.2803 KeV is showing the average energy of Eigen value of electron [2] between the first excited state and generating state as,

(0.2256 KeV, when, $n_x = 2$, $n_y = n_z = 1$) + (0.3354 KeV, when, $n_x = n_y = 2, n_z = 1$) = 0.561/2 = 0.2805 KeV.

b) Again, if we multiply 0.2803 keV by Avogadro number (6.0221467×10^{23}), then we get, $N_A \times E_1 = 1.68 \times 10^{17}$ GeV, this energy is the energy range for unified theory [3] (10^{17} GeV).

From the above two evidence (a) & (b), we can assume that when electron and atom tightly bound, then it has a good function in the microscopic field and justified energy of total system of the equation: $E_1 = m_e c^2 \times \lambda_u/\lambda_c$.

The mass of an atom is constant; there are many particles inside of it. Besides these particles there is also some energy inside the atom which is nothing but the bunch of photons. According to the mass energy equivalence, energy is coagulated or bunched of photons or quanta. So, it is essential to know how many photons are present in an atom having constant mass of a photon (mass of a photon is symbolized by σ. Because, the symbol of a PHOTON giving in many books as γ (gamma, mass = 0), but for different types of gamma rays or energies (e.g. 1.022 etc), the symbol makes complexity. So, for exceedingly small mass of a photon, the symbol σ (small sigma) is used. Avogadro's number is used in the different field of science as Avogadro number of atoms or molecules. If we consider, Avogadro number of photon are present in an atom having photon's mass σ and just before the scattering of energy, if atom is irritated, then it will follow gas law — $E = 1/2Nm\bar{c}^2$ (where, E = kinetic energy of gas atom, N = number of atom in a volume V, $\bar{c}^2$ = mean square velocity of the gas atom), then the particles inside the atom will follow the gas law. We can follow this gas law for the photon inside the atom and the energy considered as E_1. So,

$$E_1 = \frac{1}{2} N_A \sigma c^2 \quad \ldots\ldots\ldots (2)$$

Where, E_1 = Kinetic Energy of Avogadro number of photons, c = velocity of a photon or light, N_A= Avogadro number = 6.0221367 x 10^{23}.

If this energy, E_1 incorporates with the obtained energy from the equation (1) for balancing the mass energy equivalence, then we get mass of Avogadro number of photons of a particle (m_0) of wavelength (λ') in the form of:

$$N_A\sigma = \frac{2h^2}{m_0(\lambda')^2c^2} = 9.994456186 \times 10^{-31}\ \text{gm} \quad \ldots\ldots\ldots (3)$$

Here, $m_0 = m_u$ = mass of atom, $\lambda' = \lambda_c$= Compton wavelength of electron. So mass of a photon is,

$$\sigma = \frac{2h^2}{N_A m_u \lambda_c^2 c^2} = 1.659619614 \times 10^{-54}\ \text{gm} \quad \ldots\ldots\ldots (4)$$

Is the mass of a photon? Need to prove it through an example. We know the Stark – Einstein equation as $E\lambda = N_A hc$ = 0.11962658 Joule meter per mole. Where, λ = wavelength of the absorbed radiation. We can get this energy from the equation (4) by arranging as:

$$N_A hc = \frac{2h^3}{m_u \lambda_c^2 \sigma c} \quad \ldots\ldots\ldots (5)$$

The formation of L. H. S. of this equation (5), $N_A hc$ is showing the energy of $E\lambda$, so we can write,

$$E\lambda = \frac{2h^3}{m_u \lambda_c^2 \sigma c} = 0.11962658\ \text{Joule} \quad \ldots\ldots\ldots (6)$$

Therefore, the mass of a photon is true and we cannot treat as zero and its application is very wide from the particle to the universe. When the mass of a photon will be treated through the equation of theory of relativity of Einstein ($m = m_0/\sqrt{(1 - v^2/c^2)}$), then we will get another equation which is applicable to all fields from particle to the universe. This equation is termed as the equation of UNIPICATON OF PHYSICS. The equation is: (when, m_1 = 4.033 amu, mass of α)

$$\sigma = \frac{2h^2}{N_A m_u \lambda_c^2 c^2} = 1.659619614 \times 10^{-54}\ \text{gm}$$

(The equation of mass of a photon)

$$N_A \sigma = \frac{2h^2}{m_u \lambda_c^2 c^2}$$

(Mass of N_A number of populated photons)

$$N_A \sigma_1 = \frac{2h^2}{m_e \lambda_c^2 c^2}$$

(When m_u replaced by m_e, then σ changes to σ_1)

$$N_A \sigma_1 = \frac{4h^2}{m_e \lambda_c^2 c^2}$$

(Photons in reverse direction)

(h is replaced by $\hbar$ for spin of photons)

$$m_e v = \frac{h}{\lambda_c}$$

$$N_A \sigma_1 = 4 m_e v^2 / c^2$$

$$m > m_0 \qquad m = \frac{m_0}{\sqrt{(1 - v^2/c^2)}}$$

$$\sigma_1 = \frac{4 m_e (m_0^2 - m_1^2)}{N_A m^2}$$

$$\text{Or, } m = \sqrt{\frac{4 m_e m_0^2}{4 m_e - N_A \sigma_1}}$$

(Increased of mass)

$$N_A \sigma' = \frac{4\hbar^2}{m_e \lambda_c^2 c^2}$$

$$\hbar = h/2\pi$$

$$N_A \sigma' = \frac{h^2}{\pi^2 m_e \lambda_c^2 c^2}$$

$$m_e v = h/\lambda_c$$

$$N_A \sigma' = \frac{m_e v^2}{\pi^2 c^2}$$

$$v^2 = \frac{\pi^2 N_A \sigma' c^2}{m_e}$$

$$m_0 > m_1 \qquad m_1 = \frac{m_0}{\sqrt{(1 + v^2/c^2)}}$$

$$m_e v = \frac{h}{\lambda_c}$$

$$N_A \sigma_1 = 4 m_e v^2 / c^2$$

$$m_1 = \frac{m_0}{\sqrt{(1 + v^2/c^2)}} \qquad m_0 > m_1$$

$$\sigma_1 = \frac{4 m_e (m_0^2 - m_1^2)}{N_A m_1^2}$$

$$\text{Or, } m_1 = \sqrt{\frac{4 m_e m_0^2}{4 m_e + N_A \sigma_1}}$$

(Decreased of mass)

$$\sigma' = \frac{m_e (m_0^2 - m_1^2)}{\pi^2 N_A m_1^2} \quad \text{(The equation for all types of particles)} \ldots\ldots\ldots (7)$$

$$\text{Or, } N_A \sigma' = \frac{m_e (m_0^2 - m_1^2)}{\pi^2 m_1^2} \quad \text{(mass of Avogadro's number of populated photons)} \ldots\ldots\ldots (8)$$

$$\sigma' = \frac{m_e m_0^2}{\pi^4 N_A m_1^2} \quad \text{(for planets, stars, galaxies, Universe etc)} \ldots\ldots\ldots (9)$$

$$\text{Or, } N_A \sigma' = \frac{m_e m_0^2}{\pi^4 m_1^2} \quad \text{(mass of Avogadro's number of populated photons)} \ldots\ldots\ldots (10)$$

$$m_0 = \frac{\pi^4 N_A m_1^2}{m_e} = 1.047411319 \times 10^{54}\ \text{gm, when, } \sigma' = m_e \quad \ldots\ldots\ldots (11)$$

(Maxi. Mass of the Universe) When π = 3.141592654

(THE EQUATION OF UNIFICATION OF PHYSICS)

The equation (7) is applicable to particle, the difference of energy from rest to excited state is very important. But the value of Pi changes slightly from its normal value which is not shown here. the equation (9) for the heavy mass and applicable to universe.

2. Basic Equation and Method to Determine the Mass of a Graviton

We know the Newton Law of Gravitation is,

$$F = G\frac{m \times M}{r^2}\ \text{N} \quad \ldots\ldots\ldots (12)$$

When atom and electron is tightly bounded each other, we can ignore the distance between this two particles and if we consider the difference of wavelength (λ' =2.424979555x10^{-12} m) of an atom (λ_u = 1.331025216x10^{-15} m) and an electron (λ_c = 2.42631058x10^{-12} m) as a function of r (distance) and if we put the mass of atom and electron in place of M as m_u = 1.6605402x10^{-27} kg & m represents as m_e = 9.1093897x10^{-31} kg respectively in the equation of Newton law of gravitation, then we get 1.716393863x10^{-44} N and in terms of energy is 1.7163938x10^{-58} Joule and then, mass = m_0 = E/c^2 = 1.909745658x10^{-75} kg.

$$E = G\frac{m_e \times m_u}{(\lambda')^2} \times 10^{-14} = 1.7163938 \times 10^{-58}\ \text{J} \quad \ldots\ldots\ldots (13)$$

Where, $\lambda' = (\lambda_c - \lambda_u) = 2.429796x10^{-12}$ m, $G = 6.67259x10^{-11}$ m^3 kg^{-1} sec^{-2}.
This energy is almost near to

$$\hbar/N_A = 1.751160297x10^{-58} \text{ J} \ldots\ldots\ldots\ldots (14)$$

And then, mass = $m_0 = E/c^2 = 1.948428595x10^{-75}$ kg. This mass is $8.5177338x10^{17}$ times smaller than a photon's mass. Again, there is small difference of energy obtained from the equation (13) & (14) and the ratio is,

Ratio = $1.7163938x10^{-58}$ Joule / $1.751160297x10^{-58}$ J = 0.980146593 = $(0.990023531)^2$. Let, β = 0.99, a deformation of shape of the particle during reaction. Because at excited state matter will change its shape and as a result it may define as deformed shapes or the deformation parameter of the particle. Then we can arrange the equation (ii) in the form of:

$$E = G \frac{m_e x m_u}{(\lambda'\beta)^2} X 10^{-14} = 1.751160297x10^{-58} \text{ J} \ldots\ldots\ldots\ldots (15)$$

The equation (14) & (15) be treated as the energy of a graviton (E_g) and mass, g. Therefore, we can write the equation (14),
Energy of a graviton,

$$E_g = \hbar/N_A = 1.751160297x10^{-58} \text{ J} \ldots\ldots\ldots\ldots (16)$$

And mass a graviton,

$$g = \hbar/N_A c^2 = 1.948428595x10^{-75} \text{ kg} \ldots\ldots\ldots\ldots (17)$$

And for equation (15):

$$E_g = G \frac{m_e x m_u}{(\lambda'\beta)^2} X 10^{-14} = 1.751160297x10^{-58} \text{ J} \ldots\ldots\ldots\ldots (18)$$

$$g = G \frac{(m_e x m_u)}{(\lambda'\beta)^2 x c^2} x 10^{-14} \text{ kg} = 1.948428595x10^{-75} \text{ kg} \ldots\ldots\ldots\ldots (19)$$

Now, from this equation (17) & (19) we get,

$$\frac{\hbar}{N_A \cancel{c}^2} = G \frac{(m_e x m_u)}{(\lambda'\beta)^2 x \cancel{c}^2} x 10^{-14}$$

$$\text{Or,} \quad \hbar = G \frac{(m_e x m_u)}{(\lambda'\beta)^2} x N_A x 10^{-14} \text{ J-s}$$

$$\text{Or,} \quad \hbar = G \frac{(m_e x m_u)}{(\lambda'\beta)^2} x (6.0221367x10^9) \text{ J-s} \ldots\ldots\ldots\ldots (20)$$

$$\text{Or,} \quad \hbar = G \frac{(m_e x m_u)}{(\lambda'\beta)^2} x g_\eta \text{ J-s} \quad [\text{Let, } (6.0221367x10^9) = g_\eta]$$

$$\text{Or,} \quad \hbar = G g_\eta \frac{(m_e x m_u)}{(\lambda'\beta)^2} \text{ J-s} \ldots\ldots\ldots\ldots (21)$$

The R. H. S. of the equation (21) is expressing that in what way the gravitational constant (G), number of gravitons (g_η = $6.0221367x10^9$ gravitons) in a field of atom – electron interaction are functioning and showing the energy of Planck constant ($\hbar$) in L. H. S.

Non-observable or silent effect of the equation (21):

$$\hbar = g_\eta G \frac{(m_e x m_u)}{(\lambda'\beta)^2} \text{ J-s}$$

During emission of energy from the equation, $E = mc^2$ or $E = h\nu$, the effect of g_η and G to be neutralized. We have the equation,

$$E = h\nu = 2\pi\hbar\nu = 2\pi g_\eta G \frac{(m_e x m_u)}{(\lambda'\beta)^2} \nu \quad \ldots\ldots\ldots\ldots (22), \text{ but } \nu = m_0c^2 / \hbar,$$

$$\text{so, } E = 2\pi g_\eta G \frac{(m_e x m_u)}{(\lambda'\beta)^2} m_0c^2 = 1.000000002x\, m_0c^2 \ldots\ldots\ldots\ldots (23)$$

Because, g_η = $6,0221367x10^9$ gravitons. Due to non-variation of the equation (23), we may use $E = mc^2$ normally. For this reason, we cannot observe the effect of graviton and gravitational constant during emission of energy. But, we need to know the internal functions of m in Einstein's equation when c^2 will act on it. To reach that point we should think about matter on the subject determination of unknown weight of radioactive element.

3. Determination of Unknown Weight of Radioactive Elements

The intensity of radioactive elements has so far been considered in terms of atoms which disintegrate per unit time. In radioactivity, the slandered unit is the "Curie" which is $3.7x10^{10}$ disintegration / sec. we can calculate the unknown weight (W) of radioactive element by using Curie equation in which one Curie unit and disintegration constant has taken important part.

$$W = \frac{m_0 \, Ci}{N_A \lambda} \ldots\ldots\ldots\ldots (24)$$

For example [4]:
Mass of radioactive element RaB (Pb^{214}) = m_0 = 214. Disintegration constant, λ = $4.31x10^{-4}$ / sec, Avogadro number = N_A = $6.0221357x10^{23}$, one Curie = Ci = $3.7x10^{10}$ disintegration / sec. then we get unknown weight of radioactive element as,

$$W = \frac{m_0 \, Ci}{N_A \lambda} = \frac{214 \text{ x } 3.7x10^{10} \text{ dis./sec}}{6.0221367x10^{23} \text{ x } 4.31x10^{-4} \text{ / sec}} = 3.05616519x10^{-8} \text{ gm} \ldots\ldots (25)$$

How we can reach to this result to use the equation (7) or (8) for unification?
We can calculate the above amount of unknown weight (25) by taking the mass (σ') into the following imaginative equation.
If W is directly proportional to the square root of mass (σ′) emitted from the particle m_0 and inversely proportional to the disintegration constant λ, then

$$W \, \alpha \, \frac{\sqrt{\sigma'}}{\lambda} \quad \text{or} \quad W = \frac{N_A}{c} x \frac{\sqrt{\sigma'}}{\lambda} \ldots\ldots\ldots\ldots (26)$$

Here, N_A / c = Avogadro number / velocity of light = Constant. And where,
This equation (26) based on assumption only, but gives result same to Curie equation (25).

$$\sigma' = \frac{m_e \, (m_o^2 - m_1^2)}{\pi^2 N_A \, m_1^2} \quad (\sigma' = \text{Mass of populated photons}) \ldots\ldots\ldots\ldots (7)$$

Placing the mass of radioactive element RaB (Pb^{214}) = m_0 = 214 in the equation (7), we get,
σ′ = $4.31375778x10^{-49}$ gm, where, m_e = mass of electron, m_1 = mass of Alfa particle, π = 3.141592654. Again on putting the mass of populated photons (σ′) and λ = $4.31x10^{-4}$ / sec, value of N_A / c in the equation (81), we get,

$$W = \frac{N_A \sqrt{\sigma'}}{c \, \lambda} = 3.061121126x10^{-8} \text{ gm} \ldots\ldots\ldots\ldots (27)$$

Result obtained from the equation (25) and (27) is almost same, for the small difference in decimal fraction observed at excited state due to deformation of particle, in this state, the value of π will change according to mass of particle, which not included here in this stapes. Before discussing the actual value of deforming π with respect to mass of particle, we will classify the matter and the accurate values of these two equations (24) & (27) mentioned in Table – 1. When two results are same, then we can define matter (m_0) in better way.

$$\text{When, } W = \frac{m_0\, Ci}{N_A \lambda} \;\&\; W = \frac{N_A \sqrt{\sigma'}}{c \lambda} \text{ then, } \frac{m_0\, Ci}{N_A \lambda} = \frac{N_A \sqrt{\sigma'}}{c \lambda} \text{ or } m_0 = \frac{N_A^2 \sqrt{\sigma'}}{Ci\, c} \quad \ldots\ldots\ldots (28)$$

The equation (28) is indicating that m_o directly proportional to $\sqrt{\sigma'}$ (root of populated photon`s mass). Because, $N_A^2/Ci\ c$ is constant. This equation (28) is expressing the real definition of matter. We know the definition of matter which has mass, volume, occupying space, momentum etc. But the equation (28) is showing different picture for actual reason of matter. Therefore, we can put this mass (m_0) in the Einstein equation, $E = m_0\ c^2$ and the new energy equation will:

$$m_0 c^2 = \frac{N_A^2 \sqrt{\sigma'}}{Ci\, c} \times c^2 \text{ or, } E = \frac{N_A^2 \sqrt{\sigma'}\, c}{Ci} \quad \ldots\ldots\ldots (29)$$

$$\text{When, } m_0 c^2 = \frac{N_A^2 \sqrt{\sigma'}\, c}{Ci} \text{ then, } m_0 c = \frac{N_A^2 \sqrt{\sigma'}}{Ci} \quad \ldots\ldots\ldots (30)$$

The equation (29) expressing the internal functions of Einstein equation $E = m_0 c^2$ with velocity of light & divided by one Curie unit and the equation (30) indicating the momentum of particle.

To determine the accurate value of particle, we need to find the value of Pi at excited state. If it is possible to know the exact value of σ', then on putting this value in equation (7), the value of Pi at excited state to be obtained. To determine this result, we can arrange the equation (30),

$$\sigma' = \frac{m_0^2\, Ci^2\, c^2}{N_A^4} \quad \ldots\ldots\ldots (31) \quad \text{The equation (7) is, } \sigma' = \frac{m_e (m_o^2 - m_1^2)}{\pi^2 N_A\, m_1^2}$$

Equating bothe the equations (31) & (7), we will get the value of Pi at excited state is:

$$\pi_e = \frac{\sqrt{N_A^3\ m_e (m_o^2 - m_1^2)}}{m_0 m_1\, Ci\, c} \text{ or, } \pi_e = 3.152970491 x \frac{\sqrt{(m_o^2 - m_1^2)}}{m_0} \quad \ldots\ldots\ldots (32)$$

In this regards we need to dicuss about the Pi that what it is and why we call the value of Pi at excited state ? Normally, the value of π = 3.141592654 used if any field of science and measurement. But for deformation of particle at excitd state, the circumferrance and radius will not stay which the particle was at rest possition.

Archimedes Syracus, the greatest mathematician of antiquity, rigorously established the equivalence of the two ratios in his treatise “Measurement of a Circle”. He also calculate a value for Pi based on mathematical principles rather than on direct measurement of a circle`s circumference, area and diameter. What Archimedes did was to inscribe and circumscribe regular polygons (polygons whose sides are all the same length) on a circle assumed to have a diameter of one unit and to consider the polygons respective perimeters as lower and upper bounds for possible values of the circumference of the circle which is numerically equal to Pi. Accrding to his method for estimating Pi relied on inscribed and ciecumscribed regular polygons. The perimeter of the inscribed and ciecumscribed polygons served respectively as lower and upper bounds for the value of Pi. The sine and tangent functions can be used to calculate the polygons perimeters, as is shown here, but Archimedesnhad to develop equivalent relations based on geometric constructions using 96-sided polygons [5].

On the basis of this, we observed that perimeter of circumscribed polygon or perimeter of inscribed polygon, in both the cases, the value of P_i and P_c (= n tan 180^0 / n) has been changed (due to number, n) and showing that the numerical value are near to the value of Pi. When the shape of the circle changes (whatever by P_c or P_i), the value of π changes, this deformation of circle is important to the field of science. Because, the shape of the particle changes at excited state of it. As a result, energy absorbed or emits during that moment the nomal value of π to be changed into its working value, the change of which will depend on the mass of the particle and shape of the particle to be changed accordingly on the value of deviated π. In our traditional theories, the value of π has used as 3.141592654 as a constant to the equations $\hbar = h/2\pi$, $K = 2\pi/\lambda$, $F = m^1 \text{ x } m^2 / 4\pi$ to r^2, etc for examples. The value of π must be constant in the case of uniform shape that is when particle will take place at rest and then, $\hbar$, K, F etc will more appropriate definitions for particle. so, we need to deviated value of π at excited state of matter.

Therefore, the equation (32).

$$\pi_e = 3.152970491 x \frac{\sqrt{(m_o^2 - m_1^2)}}{m_0}$$

the equation (32) has important role at excited state of matter. Now we can symbolised π at excited state as π_e and π in normal or at rest of the particle, may denoted by π_0 in all equations in this field. If the mass of Alfa particle (m_1) become constant, then the value of Pi will be change viz with respect to to the mass of particle (m_0), the emission of coagulation of photons (σ’) or populated photon`s mass remain same. But due to effect of one Curie and velosity of light, the equation

$$\pi_e = \frac{\sqrt{N_A^3\ m_e (m_o^2 - m_1^2)}}{m_0 m_1\, Ci\, c}$$

will express the deviated Pi value at excited state of matter, the difference of this state (π_e) and at rest (π_0 = 3.141592654) is important. Because, “on the stability of rotating nuclei against fission through crevices shapes” [6]. G.Royer and F.Haddad shows that during fission process even at very high spins, an intermediate angular monents, the deformation energy is relatively constant up to β = 0.99 (β = 0, 0.2, 0.4, 0.6, 0.8, 0.99). where, β is the deformatiom parameter. In the first path, shape keeps almost sherical ends and the formation of a deep neck occurs before the elongation of the nuclear system. To get the result of β =0.99, we can consider the value of Pi as, $\beta = 1 - (\pi_e - \pi_0)$ for heavy nucleus like uranium, thoriun etc. to consider the value of 3.152970491 (refer equation – 32).

If we put m_0 = mass of uranium = 235 in the equation (32), then we will get the value of π as π_e = 3.152506608, therefore,

β = 1 – (3.152506608 - 3.141592654) = 0.989086045 = 0.99.

in this regards we can compare β with π as,

β = 0 or π_0 = 3.141592654, (The shape of particle will take place almost spherical ends)

β = 0.99 or $\pi_e = 1 - (\pi_e - \pi_0)$, (the maximum deformation of paticle (U^{235}) will be obtained).

So, it can be said that other deviated value of Pi will take place between 0.2 to 0.8 during excitation of matter. Therefore,we can write the equation of **"Unification of Physics"** in two forms as at rest and excited state of the particle sited here. the difference of energy in impotant in the case of liberating of energy. For example, if we putting the mass of uranium 235.1175 amu in this equation at rest and excited state, we will get the **energy of fast neutron as 1.215933 Mev.** The energy greater than 1.2 Mev is called the fast neutron.

$$\sigma'_0 = \frac{m_e(m_o^2 - m_1^2)}{\pi_0^2 N_A m_1^2} \quad \text{..............} (33) \qquad \text{or,} \qquad N_A \sigma'_0 = \frac{m_e(m_o^2 - m_1^2)}{\pi_0^2 N_A m_1^2}$$

(Mass of populated photons at rest) (Mass of Avogadro num

$$\sigma'_e = \frac{m_e(m_o^2 - m_1^2)}{\pi_e^2 N_A m_1^2} \quad \text{..............} (35) \qquad \text{or,} \qquad N_A \sigma'_e = \frac{m_e(m_o^2 - m_1^2)}{\pi_e^2 N_A m_1^2}$$

(Mass of populated photons at excited state) (Mass of Avogadro numb

On putting the value of Pi in the equations (33) &(34) at rest and (35) & (36) at excited state, the difference between two energy, say ($N_A\sigma'_0$ - $N_A\sigma'_e$) mast give result and we will get a new idea of internat functions of matter from the view of particle side that in what way energy is yielding from the rest after reactions. Application of the equation (35) is given here for example to determine the unknown weight of radioactive elements. We can compare the results of the Curie equation (24, group -4 in table-1) and new equation (26, group -5 in table-1), there on variation in decimal fractions. This evidance is supporting that the equation of unification of physics is applicable to microscopic fields and the equation (26) is perfectly true. So, this (26) equation is the parallel euation of (24).

In this regards following constants cosidered to find the unknown weight of radioactive elements.

1. Fundamental constants:

Mass of electron (m_e) = 9.1093897x10^{-28} gm, Avogadro number = 6.0221367x10^{23}, One Curie (Ci) = 3.7x10^{10}dis./sec, c = Velosity of light = 2.99792458x10^{10} cm/sec, Value of Pi at rest ($\pi = \pi_0$) = 3.141592654, Mass of Alfa particle (m_1) = 4.033 amu, φ = Curie Photon = 2.94x10^5 photons.

2. Calculated results taken as constants:

Mass of a photon (σ) = 1.659619614x10^{-54} gm, Energy of a photon [ε] = 9.309779229x10^{-22} ev, ∑ = σ′/σ = Populated Photons yields from the mass m_0 to follow the equation (35), this is constant per particle based on mass. Value of Pi at excited state (π_e) = 3.152970491 x $\sqrt{(m_o^2 - m_1^2)}/m_0$. (Change of Pi depend on the mass of m_0).

The results of group – 8 in this table-1 is showing between ½ and 1/3 of energy of Planck constant ($\hbar/[e]$) = 6.5821220x10^{-16} ev and value of Pi at excited state shown in group (9).

DETERMINATION OF UNKNOWN WEIGHT OF RADIOACTIVE ELEMENTS BY NEW PROCESS (TABLT - 1)

Radio-active ELEMENTS AND NUCLIDE	MASS m_0	DISINEGRATION CONSTANT λ /sec. TYPE OF DIS.	$W = \frac{m_0 \, \Omega}{N_A \lambda}$ gm	$W = \frac{N_A \sqrt{\sigma'_e}}{c \lambda}$ gm	$\sigma'_e = \frac{m_e(m_o^2 - m_1^2)}{\pi^2 N_A m_1^2}$ gm	EMITTED PHOTONS FROM THE MASS m_0 $\sum_{m_0} = \sigma'/\sigma$ = mass of populated photons	$E = \sigma' c^2 \times \bar{\varepsilon}$ $\bar{\varepsilon}$ = energy of a photon ev	VALUE OF π_e AT EXCITED STATE
(REFERENCE VALUES)			(Curie equation)	Eqn. based on assumption				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ra $_{88}Ra^{226}$	226	1.374x10^{-11} α	1.0105849 (no variation	1.0105849 in two results)	4.7781x10^{-49}	2.87906x10^5	2.6803x10^{-16}	3.152468421
Ac $_{88}Ac^{227}$	227	1.08x10^{-9} α· β	0.0129137 (no variation	0.0129137 in two results)	4.8205x10^{-49}	2.90459x10^5	2.7041x10^{-16}	3.152472853
MsTh$_1$ $_{88}Ra^{228}$	228	3.81x10^{-9} β	3.6767x10^{-3} (no variation	3.6767x10^{-3} in two results)	4.8630x10^{-49}	2.93024x10^5	2.7279x10^{-16}	3.152477192
Th $_{90}Th^{232}$	232	1.56x10^{-18} α	9.1372x10^6 (no variation	9.13722x10^6 in two results)	5.0352x10^{-49}	3.03395x10^5	2.8245x10^{-16}	3.152494057
					$\Phi = \frac{3.7x10^{10}}{4\pi(100)^2}$ = 2.94436644x10^5 (Reference value)		2.7411x10^{-16}	3.141592654

We dicussed about the equation (28) that how the mass of a particle acts and defined Einstein's equation $E = mc^2$. But we do not know the effect of the particle graviton and gravitational constant. The equation (23) is expressing the side effect of mc^2, here we observed that the action of gratiton and gravitational constant works as silent or non – observable mode. We did not include σ′, the mass of populated photons (7) or in the form of σ'_0 or σ'_e when the particle m at rest or at excited state which comes out after interacting with the mass of electron, alpha particle showing in the equation (33) & (35). The Avogadro number of σ′ as $N_A\sigma'_0$ or $N_A\sigma'_e$ is expressing in the mass of Avogadro number of populated photons in the equation (34) & (36) at rest and excited state respectively. So, we need to find the real formation of matter (m) in Einstein equation $E = mc^2$ by the action of σ' both in rest and excited state with graviton and gravitational constant.

We formed the equation,

$$E = 2\pi g_n G \frac{(m_e \times m_u)}{(\lambda' \beta)^2} \nu \quad \text{.....................} (22)$$

From the equation De-Broglie, ν = c/λ, on putting the value of ν in the equation (22), we get,

$$E = 2\pi g_\eta G \frac{(m_e x m_u) c}{\lambda (\lambda'\beta)^2} \text{ .... (37) but, } E = \frac{N_A^2 \sqrt{\sigma'} c}{Ci} \text{ .... (29)}$$

For actual internal functions of m_0 is given here with effect of gravitons, gravitational constant, Planck constant, one Curie, velocity of light, with deformed condition of electron & atom. For this enveronment need two equations (37) and (29) while come in contact.

$$\frac{N_A^2 \sqrt{\sigma'} c}{Ci} = 2\pi g_\eta G \frac{(m_e x m_u) c}{\lambda (\lambda'\beta)^2}$$

$$\text{or } \lambda = 2\pi g_\eta G\, Ci \frac{(m_e x m_u)}{N_A^2 \sqrt{\sigma'} (\lambda'\beta)^2} \quad \text{Again, } \lambda = h / m_0 c \text{, therefore,}$$

$$m_0 = \frac{h N_A^2 \sqrt{\sigma'} (\lambda'\beta)^2}{2\pi g_\eta G (m_e x m_u) Ci\, c} \text{ .... (38)}$$

The equation (38) is explaining the internal mechanism of m_0 perfectly interactions in the denominator with the effect of gravitons(g_η), G, m_e, m_u, Ci, c, and in numinarator, populated photons (σ') obtained from the equation (7), difference of wavelength of electron & atom (λ') with deformation paremiter (β) as a functions of $(\lambda'\beta)^2$ and Planck constant with Avogadro number^2 as h x N_A^2. If we put this m_0 in the equation $E = mc^2$, then we get internal functions of m_0 by acting c^2 and finally we can explain the energy E as:

$$E = \frac{h N_A^2 \sqrt{\sigma'} (\lambda'\beta)^2 c}{2\pi g_\eta G (m_e x m_u) Ci} \text{ .... (39), where, } \sigma' = \frac{m_e (m_o^2 - m_1^2)}{\pi^2 N_A m_1^2}$$

The equation (39) will function at rest and at excited state both changing π as π_0 at rest and π as π_e at excited state in the equation (33) & (35) respectively. In this condition, the mass of populated photons will change from σ' to σ'_0 and σ'_e at rest and at excited state respectively. Therefore E will change accordingly.

So, we can arrange the equation (39) for two states as:

$$E_0 = \frac{h N_A^2 \sqrt{\sigma'_0} (\lambda'\beta)^2 c}{2\pi g_\eta G (m_e x m_u) Ci} \text{ .... (40) and } E_e = \frac{h N_A^2 \sqrt{\sigma'_e} (\lambda'\beta)^2 c}{2\pi g_\eta G (m_e x m_u) Ci} \text{ .... (41)}$$

The value of graviton (g_η) in M.K.S. system, g_η = 6.0221367x10^9 gravitons and in C.G.S. system, g_η = 6.0221367x10^{11} gravitons is applicable. For example, we can take an element, Platinum (At. No. – 78) of mass (m_o) is 195.084 amu for verification of the following equations:

$$\text{(A) } E = mc^2, \text{ (B) } E = \frac{N_A^2 \sqrt{\sigma'} c}{Ci}, \text{ (C) } E = 2\pi g_\eta G \frac{(m_e x m_u) c}{\lambda (\lambda'\beta)^2}, \text{ (D) } E_e = \frac{h N_A^2 \sqrt{\sigma'_e} (\lambda'\beta)^2 c}{2\pi g_\eta G (m_e x m_u) Ci}$$

Applications of Pt in the form of (a) m_0 = 195.084 gm.
and (b) m_0 = 195.084 amu x 1.6605402x10^{-27} kg = 3.239448244x10^{-25} kg
or 195.084 amu x 1.6605402x10^{-24} gm = 3.239448244x10^{-22} gm when required.

For equation (A): when, $E = mc^2$, then, E = 2.91147 x10^{-8} Joule in M.K.S. system or E = 0.291147 erg in C.G.S. system.

And when, when, m_0 = 195.084 gm, then, E = 1.75332755x10^{23} erg, (when, c in centimer/sec) or E = 1.75332755x10^{19} Joule (when, c in meter/sec), c = 2.99792458x10^{10} cm/sec in C.G.S. system.

For equation, (B):

Befor determining the mass of populated photons (σ') at excited state, we need to calculate the value of π at ecxited state. The equation (32) is,

$$\pi_e = 3.152970491x \frac{\sqrt{(m_o^2 - m_1^2)}}{m_0}$$

When, m_0 = 195.084 amu and m_1 = 4.033 amu, then, π_e = 3.15296661 and so, to follow the equation (35), we get, σ'_e = 3.560292829x10^{-49} gm and on putting the value of σ'_e in the equation (B) when $\sigma' = \sigma'_e$, then, E = 1.75332755x10^{23} erg for mass 195.084 gm & in terms of atomic mass, E = (195.084 amu x 1.6605402x10^{-24} gm) x c^2 = 0.291147 erg or 2.91147 x10^{-8} Joule. There is no veriation of result between the equation (A) and (B).

For equation (C):

To determine the energy, E, we need to find the value of λ for the mass m_0 = 195.084 amu through the equation $\lambda = h / m_0c$. = 6.82245x10^{-18} m. on putting the value of λ in the equation (C), we get, E = 2.91147 x10^{-8} Joule, when, G =

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6.67259x10^{-11} m^3 kg^{-1} sec^{-2}, λ' = difference of wavelength of electron and atom = 2.424979555x10^{-12} m, g_η = 6.0221367x10^9 gravitons, m_e = 9.1093897x10^{-31} kg, m_u = 1.6605402x10^{-27} kg, β = 0.990023531, c = velocity of light = 2.99792458x10^8 m and π = 3.141592654.

For equation (D):

We find the mass of σ'_e = 3.560292829x10^{-49} gm and in C.G.S. system, G = 6.67259x10^{-8} cm^3 gm^{-1} sec^{-2}, accordingly, we should use all values of the equation (D) in C.G.S. unit and then we will get, E = 1.75332755x10^{23} erg for mass 195.084 gm and then for Pt - atom, 0.291147 erg.

i) Planck constant (6.6257055x10^{-27} erg-s):

This unit is very active and applicable to all energy fields. We can classify the Planck constant from the equation (41) that how graviton & gravitational constant played role with the σ'_e, Ci, and other particles.

$$h N_A^2 \sqrt{\sigma'_e} (\lambda'\beta)^2 c = 2\pi g_\eta G (m_e x m_u) Ci\, E_e$$

$$h = \frac{2\pi g_\eta G (m_e x m_u) Ci\, (m_{excited} x c^2)}{N_A^2 \sqrt{\sigma'_e} (\lambda'\beta)^2 c}$$

$$(\text{When, } E_e = m_{excited} x c^2, m_0 \rightarrow m_{excited} = m)$$

$$h = \frac{2\pi g_\eta G (m_e x m_u) Ci (mc)}{N_A^2 \sqrt{\sigma'_e} (\lambda'\beta)^2} \text{ .... (42)}$$

$$\text{When } \sigma'_e = \frac{m_e (m_o^2 - m_1^2)}{\pi_e^2 N_A m_1^2} \text{ and } \pi_e = 3.152970491x \frac{\sqrt{(m_o^2 - m_1^2)}}{m_0}$$

For example: Mass of Thorium, Th = 232.03806 = m = m_0, on putting this mass in the equation of finding the value of Pi at excited state, we get, π_e = 3.152494213. Again, on placing the value of π_e and m_0 in the equation of unification, get, σ'_e = 5.036871453x^{-49} gm. On putting all values of the equation (42), we get, h = 6.6246586x10^{-27} erg. Hence, the equation (42) is showing the internal functions of Planck constant. Where, g_η = 6.0221367x10^{11} gravitons and all values are in C.G.S. system.

ii) Determination of Planck constant by using one million photons:

We calculated the mass of a photon σ = 1.659619614x10^{-54} gm, accordingly the energy, $\bar{\varepsilon}$ = 9.309779229x10^{-22} ev.

If 10^6 photons are able to form Planck constant, then we can come to a conclusion that the equation mass of a photon and the equation of unification of physics is true. Because, this equation obtained from photon's equation through the equation of relativity of Einstein and already mentioned in a chart of equations stage by stage of formation of the equation of unification physics. According to Somerfield, the expression for the energy and electron moving in a region of uniform potential is given by,

$$E = \frac{h^2 k^2}{8\pi^2 m} \text{ ……………… (43) Where, } k = \text{wave number of particle} = \frac{2\pi}{\lambda}$$

For an electron, let $m = m_e$, $\lambda = \lambda_c$ = 2.42631058 x 10^{-10} cm (Compton wavelength of electron). Then, K = 2.589604711 x 10^{10}. So the above equation brings, E = 0.2554995364 x 10^6 ev. It is ½ of the total energy of electron. So, for total energy of electron is:

$$E = \frac{2 h^2 k^2}{8\pi^2 m} = \Sigma_e \text{ (Total photons of electron) or } E = \frac{h^2}{4\pi^2 m_e} = \frac{\Sigma_e}{k^2} \text{ ………… (44)}$$

But Σ'_e, the residual photons emits 1000 photons at excited state and acts with quantum number ($j = l \pm ½$) as a function of $\sqrt{j} = \sqrt{(l \pm ½)}$, l =1 that is if we put $\sqrt{3/2}\ \Sigma'_e$ in place of Σ_e in R.H.S of the equation (42), then we will get,

$$\frac{\sqrt{\frac{3}{2}} \times \Sigma_e}{k^2} = \sqrt{\frac{3}{2}} \times \frac{547.8841 \times 10^{24}}{(2.589604 \times 10^{10})^2} = 1.000110 \times 10^6 \text{ photons ……… (45)}$$

L.H.S of this equation (45) is showing $h^2 / 4\pi^2 m_e$, in it $h/2\pi$ factor is known as the spinning of photon. Therefore, for escape of photons from an electron, the equation (45) will turn to

$$\left[\frac{\sqrt{\frac{3}{2}} \times \Sigma_e}{k^2}\right]^{½} = 1000.307956 \text{ photons …………… (46)}$$

We can omit the decimal fraction, and then we can come to the point that an electron can emit or absorb 1000 photons at excited state of it. Where we can use these 1000 photons which may come out an electron? Let us try to solve this problem to give some examples.

If 1000 electrons functioned at excited state and each electron liberates 1000 photons, then we get 10^6 photons or we will get same value from the equation – 45 which linked to Summerfield's equation. If we divided 10^6 photons by $\sqrt{2}$ as quantum number (l = 0), then we get 6.5830x10^{-16}ev which will almost equal to Planck constant ($\hbar$ /[e] = 6.5821220x10^{-16}ev-s). In case of emission of photons, quantum number functioned as the $\sqrt{j} = \sqrt{(l \pm ½)}$, when, l = 0, then, we get, $\sqrt{j} = \sqrt{½}$, and Planck energy $\hbar$ /[e]:

$$\text{Planck constant} = \frac{10^6 \text{ photons}}{\sqrt{2}} \times \bar{\varepsilon} = 6.5830 \times 10^{-16} \text{ ev ……………… (47)}$$

Where, the value of Planck constant = 6.5821x10^{-16} ev – sec. So, the mass of a photon is very important in the microscopic field of particle.

4. Conclusion

After finding of mass of a photon and graviton, it brings a new knowledge of internal functions of matter that energy liberates from matter using Einstein's equation. Again Planck constant also related to energy equation, as a result this simple theory knocked us as a lesson that all matter is made by the photons thus the universe. The equation of unification is vital one as it can explain many known and unknown phenomena from the particle to the universe. The populated photons are responsible to describe all facts. For example, we can determine the unknown weight of radioactive elements, Planck constant is composed of one million photons and electron liberates 1000 photons, if we keep this photons in a box of $Å^2$ in meter with effect of quantum numbers, then this energy will almost same to Eigen's value of electron. This proves that electron emits energy from its outermost shell. Photon and graviton is interlinked in our surroundings in every reaction. All of we are floating in the ocean of photons and gravitons. The application of this theory has no end. Actually this theory is "Endless Theory of the Universe (Complete Unified Theory)". So, lot of scope of research in this single subject from particle to the universe.

References

[1] [2]C.L. Arora, Modern physics & electronics, S.Chand & Company.Ltd, Ram Nagar, New Delhi-110055, 1983, Page-52 , 111.
[3] Paul Davies, THE NEW PHYSICS, The Pitt Building, Trumpington Street, Cambridge CB2-IRP, 1989, P 71
[4] Irving Kaplan, Nuclear Physics, 2nd edition, 1987, Narosa Publishing House, New Delhi- Madras, Bombay, Page- 253
[5] Scientific American, V – 258, No. 2, February, 1988, P-112.
[6] G. Royer & F. Haddad, Journal of Physics, G: Nuclear & Particle Physics, ISSN: 0950 – 3899, Vol – 21, No. – 3, P – 21 (1995) 339-349 March 1995.