Application of the equation of unification of physics to the different field of physics, astrophysics and the Complete Unified Theory.

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ABSTRACT   1

Complete unified theory is one of the searching points of science till now. No one can succeed since Clerk Maxwell when he shows that electric and magnetic forces are interlinked announced in the year of 1873. He described it Unified Theory now called Electromagnetism. The history passed away. Einstein spent most of his later life years searching for a unified theory, but time was not ripe enough to establish his phenomena[1]. The scientists are trying for this theory. The theory of every thing, singularity, string, super gravity concept[2] etc failed to solve the problem.

Ultimately, the thinking was turn to unification of physics. Lot of hard attempted were taken by the scientist, but no one succeed till now. Why the scientists failed to complete the complete unified theory? Obviously some reasons are there. The author of this article classify the mentioned points here easily and reach to explain all types of problems from the particle to the universe and find that there is no disgustful problems in anywhere in the materialistic universe and found that the calculated results are accurately consistence to traditional theories. There are two parts in this single theory ----- 1st is unification of physics and 2nd is complete unified theory. Why unified theory could not been solved, the points are there which are till unknown:

3) The mass of a photon is need to know accurately, 2) It is require to know that how many photons are responsible to create energy inside the atom and 3) What is the mass of a graviton particle by which gravitational force is occurred. After solving these problems, *The Complete Unified Theory* is observed & applicable to any fields.

Key Words: **Mass of a photon, Stark-Einstein equation, Planck equation, Eigen value of energy, Raman wavelength, birth of star, white dwarf, black hole, birth of magnetism, max. mass of the universe atc, unification of physics, complete unified theory.**

Determination of mass of a photon & unification of physics (1st part)

In this article we shall adopt an unusual and hitherto unknown concept involving the magic number (N_A = Avogradro number = 6.0221367×10^{23}) of molecules or atoms in one gram or one-gram atom of any substance & De-Broglie hypothesis.

According to the quantum theory, the energy has discrete nature having smallest possible value hv. From the theory of mass energy equivalence of Einstein, the total energy contain in an atom can be equivalently represented by means of the any atom in its lowest state. If each photon, according to the mass energy relation have equivalent mass σ & if these photons have behave like an ideal gas inside the atom, then we can put:

$E = ½ N_A σ c^2$ ------- (1) as its energy stored in its ground state.

However all tedious scientific effort both theoretical & experimental established the photon mass between 10^{-44} to 10^{-51} gm which is far below 10^{-65} gm as established[3] earlier but dispute several discrepancies in different experimental set up and theoretical approximation never it was claimed that the mass of a photon is exactly equal to zero.

Compton theory of photon scattering by an atom gives us Compton wavelength[4] $λ = h / m_e c$ where, m_e = mass of the electron. If the scattering element is represented by means of an hypothetical atom represented by atomic mass unit m_u, then Compton wavelength is given by $λ_u = h/m_u c$. The energy of an electron bounded in an atom in its ground state is given by $E = m_e c^2$ (electron rest energy), then let the hypothetical atom as $E_1 = m_e c^2 \times (λ_u / λ_c)$ --(2) based on assumption that total energy of the said atom can be expressed numerically as same multiple of electron rest energy. The equating two energies we get σ, the mass of a photon.

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$$\tfrac{1}{2}\,N_A\,\sigma\,c^2 = m_e\,c^2 \times \frac{\lambda_u}{\lambda_c} = \frac{h^2}{m_u\,\lambda_c^{\,2}} \quad (\text{where}, \; E = h\nu, \; \nu = \frac{c}{\lambda}, \; E = mc^2)$$

$$\sigma = \frac{2\,h^2}{N_A\,m_u\,\lambda_c^{\,2}\,c^2} = 1.65619614 \times 10^{-54}\;\text{gm} \;\text{----------------}\;(A)$$

$$\text{Or} \quad N_A\,\sigma = \frac{2\,h^2}{m_u\,\lambda_c^{\,2}\,c^2} = 9.994456186 \times 10^{-31}\;\text{gm}\;\text{--------}\;(B)$$

$$(\text{Where}, \; N_A\,\sigma = \; \text{mass of Avogadro number of photons})$$

When the equation of mass of a photon will pass through the theory of relativity of Einstein, then we can get the equation of the unification of physics as (changing the mass of atom by the mass of electron and h by $\hbar$ in the equation A, *details are not shown here*):

$$N_A\,\sigma' = \frac{m_e\,(m_o^2 - m_I^2)}{\pi^2\,m_I^2} \quad (C)$$

$$\sigma' = \frac{m_e\,(m_o^2 - m_I^2)}{\pi^2\,N_A\,m_I^2} \quad (D)$$

But the value of Pi will change at excited state of matter, before calculating the energy, it require finding the value of Pi from the following equation (*details are not shown here*): (Here, $m_1 = 4.033 =$ mass of Alfa particle $=$ constant in any field of unification of physics).

$$\pi_e = 3.152970491 \times \frac{\sqrt{(m_0^2 - m_1^2)}}{m_0} \;-\;-\;-\;-\;(E)$$

So, the proper equation of ***unification of physics*** will:

$\sigma_0' = \dfrac{m_e\,(m_0^2 - m_1^2)}{\pi_0^2\,N_A\,m_1^2}$ ---------- (F) (Mass of populated photons *at rest*)	$\sigma_e' = \dfrac{m_e\,(m_0^2 - m_1^2)}{\pi_e^2\,N_A\,m_1^2}$ ------(H) (Mass of populated photons *at excited state*)
$N_A\,\sigma_0' = \dfrac{m_e\,(m_0^2 - m_1^2)}{\pi_0^2\,m_1^2}$ ------------ (G) *at rest* (Mass of Avogadro number of populated photons)	$N_A\,\sigma_e' = \dfrac{m_e\,(m_0^2 - m_1^2)}{\pi_e^2\,m_1^2}$ ------(I) *at excited state* (Mass of Avogadro number of populated photons)
where, $\pi_0 = \pi = 3.141592654$ at rest of the particle	where, $\pi_e = 3.152970491 \times \dfrac{\sqrt{(m_0^2 - m_1^2)}}{m_0}$ at excited state of the particle

Again, we can give some examples for the support of the equation (2) as mentioned bellow as the quantity of R.H.S. of this equation is known,

$$E_1 = m_e c^2 \times (\lambda_u / \lambda_c) = 4.49128 \times 10^{-10}\,\text{erg} = 0.2803\;\text{Kev}\;\text{----------------------}\;(2)$$

Classification: 1) the energy 0.2803 Kev is showing the average energy of Eigen value of electron[5] between the first excited state (0.2256 Kev, when, $n_x = 2$, $n_y = n_z = 1$) and generating state (0.3354 Kev, when, $n_x = n_y = 2$, $n_z = 1$) which is 0.2805 Kev.

Classification: 2) If we multiply 0.2803 Kev by Avogadro number (N_A), we get energy range $= 1.68 \times 10^{17}$ Gev, the energy range for unified theory[6] (10^{17} Gev).

Classification: 3) During the experiment, Raman used the wavelength λ (2536, 3126, 3650 Å) and got the wavelength 30, 47, 63 Å respectively[7]. If we multiply simply by $\sqrt{2}$, 3/2, 2 with the result 0.2803 Kev, then we can get the Raman's experimental results as 31.27, 46.9, 62.58 Å

Classification: 4) If we replace λ_u by λ_H (Compton wavelength of Hydrogen atom) into the equation (2), then we will observed that the obtained result 278 ev and 1/20th of this value (13.9ev) is showing the energy of the ground state ($n = 1$) in the energy level diagram[8] which consists Lyman's value (13.6ev) and obeying Bohr`s theory).

Application of the equation of (A) or (B):(The NEW equation for photochemical relation).

The equation (A) or (B) can be arranged as $N_A h c = \dfrac{2 h^3}{m_u \lambda_c^2 \sigma c}$ ----------------(J)

Stark-Einstein equation for photochemical relation induced by expose of light is given by $E \lambda = N_A h c$, when E is the energy absorbed by one mole of the chemical substance and λ is the corresponding wavelength[9]. Hence the value of $E \lambda$ as calculated from Stark-Einstein law experimentally tallies with the value obtained here in terms of the mass of the photon σ. This shows that the hither to unknown concept plays some role whenever there exists any exchange of energy. It proves that the mass of a photon is correct which calculated from the equation (A)

Determination of unknown weight (W) of radioactive-elements by using the equation of unification of physics (H) at excited state of the elements:

a) We can determine the unknown weight of radioactive elements[10] by using the Curie equation:

$$W = \frac{m_0 \, Ci}{N_A \lambda} \text{ ----------- (K)}$$

 (The Traditional process)

Where, Ci = one Curie $=3.7 \times 10^{10}$ disintegration/sec, λ= disintegration const. & N_A = Avo.No. For example, on putting the mass of radioactive element in the equation (K) RaB(Pb^{214}) as $m_o = 214$ amu and $\lambda = 4.31 \times 10^{-4}$/sec, we get $W = 3.056165 \times 10^{-8}$ gm. This is well known to us.

The NEW process: We can calculate the above amount of unknown weight W of radioactive element by taking the mass of populated photons (σ') into the imaginative equation, when W is directly proportional to the square root of mass ($\sqrt{\sigma'}$) emitted from the particle of mass m_0 and inversely proportional to the disintegration constant λ, then

$$W \propto \frac{\sqrt{\sigma'}}{\lambda} \text{ or } W = \frac{N_A \sqrt{\sigma'}}{c \lambda} \text{ ----------- (L), where, } \frac{N_A}{c} = \frac{\text{Avo.No.}}{\text{velocity of light}} = \text{constant}$$

On putting the mass $m_0 = 214$ amu in the equation (F), we get $= 4.31375 \times 10^{-49}$ gm and on putting this mass and $\lambda = 4.31 \times 10^{-4}$ /sec in the equation (L), we get $W = 3.0611211 \times 10^{-8}$ gm. (when $\pi_0 = \pi = 3.141592654$ at rest of the particle). But the result of Curie is found $W = 3.056165 \times 10^{-8}$ gm. There is a small difference in decimal fraction in comparing both W, this is due to value of Pi taken as. If we calculate the value of Pi from the equation (J) of mass $m_0 = 214$ amu, then we will get $W = 3.056165 \times 10^{-8}$ gm (when, $\pi = \pi_e = 3.15241053$). Now we can calculate the unknown weight of other radioactive elements by using the equation unification of physics.

b) Classification of matter & Einstein's energy equation: The internal mechanism to radiate energy from matter or absorption fact is not known to us till now. Because we know $E = mc^2$. But in what way matter can produce energy or what is the internal function of matter during emission of energy by the effect of c^2, we do not know this. Actually, what is matter? It requires to know. When we know the equation of unification of physics, then we can define it easily. From the equation (K) & (L), we get $m_0 = N_A^2 \sqrt{\sigma'} / Cic$ --------(M). This will be the definition of matter. So, the Einstein's energy equation $E = mc^2$ will turn to

$$E = N_A^2 \sqrt{\sigma'} c \, / Ci \text{ --------------- (N)}$$

c) Determination of energy of fast neutron by using the equation of unification of physics:

The Traditional process: We know that during fission reaction, minimum 1.2 Mev is required for uranium $_{92}U^{235}$ (mass of uranium U^{235} during experiment is 235.1175 amu), because, neutrons with energies above 1.2 Mev are called fast neutrons & bellow 1 Mev are called slow neutrons. As a result, $_{92}U^{235}$ changes to $_{92}U^{236}$ and it will change to ^{141}Br and ^{92}Kr elements[11].
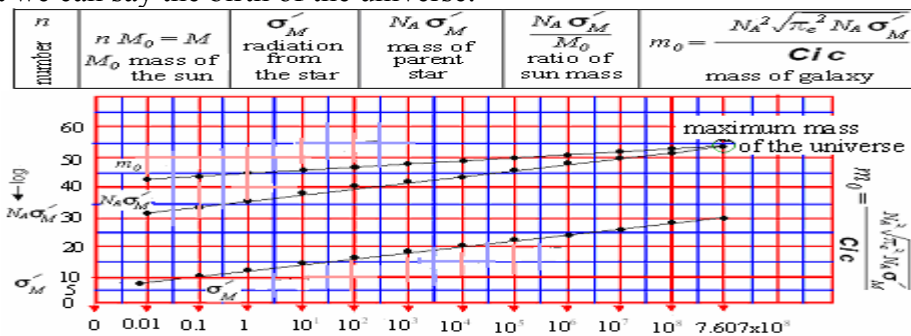
The NEW process: On putting the mass 235.1175 amu into the equation (G) at rest when π_0 = π = 3.141592654 & (I) at excited state when $\pi = \pi_e$ = 3.152506608, we get the difference of mass in terms of energy 1.215933 Mev. Hence, the equation of unification of physics is true.

d) Application of the equation of unification of physics in the field of the universe.
For the universe, the equation (H) be written as m_1 = mass of Alfa particle in numerator is neglected to compare to star's mass. Due to large mass, we can take maximum value of Pi as 3.15297049 & its multiple factor. Few examples are given here.

$$\text{For the universe, the equation will: } \sigma' = \frac{m_e \, m_0^2}{\pi^4 \, N_A \, m_1^2} \quad \text{---------------- (O)}$$

(1) In each condition, if we consider the mass of populated photons $\sigma' = m_0$, we can get the maximum mass of the universe 1.062667×10^{54} gm, which is 1.967902 times larger than the observed universe[12] (5.4×10^{53} gm). (2) When $\sigma' = m_e$ then from the equation (O) we get m_0 = 3.11131×10^{13} gm, again if we consider = 3.11131×10^{13} gm = σ' and put in the equation (M) as m_0, we get the sun mass as m_0 = 1.82368×10^{33} gm. (3) When π^4 treated as π^5 in the equation (O), we get 1.87×10^8 Kg, the mass of white dwarf 40 E. (4) If we can calculate the mass of a star as $E = \sigma' c^2$ and on putting this value in the equation (M), we will get the mass of that unknown star. (5) The mass of a star is generally measured by taking the mass of the sun (M_0) as a slandered mass. If we put $\sigma' M_0$ (let σ', the radiating energy of the sun in terms of mass) in the equation (M) as the mass of m_0, then the produce mass as will larger than the mass of sun when this mass will put in the equation (O). In this way, if we put the mass as $n\sigma' M_0 = m_0$, where n = any integer which is less than 1 or greater than 1 & n will not greater than 7.607×10^8, we will get the mass of millions of millions star, the mass will gradually increase and will reach to the mass of galaxy & then to the maximum mass of the universe that we can say the birth of the universe.

n number	$n M_0 = M$ M_0 mass of the sun	σ'_M radiation from the star	$N_A \sigma'_M$ mass of parent star	$\frac{N_A \sigma'_M}{M_0}$ ratio of sun mass	$m_0 =$	$\frac{N_A^2 \sqrt{\pi_e^2} N_A \sigma'_M}{C i \, c}$ mass of galaxy

How far true the mass of a photon? **A) Application of 10^6 photons:**
We know the value of Planck constant[13] is $h/2\pi = \hbar$ = $6.5821220 \times 10^{-16}$ev-s. If we multiply by the energy (energy of a photon = $\bar{\epsilon}$ = $9.3097779229 \times 10^{-22}$ ev) of 10^6 photons by $1/\sqrt{2}$ (where, $j = l + \frac{1}{2}$, angular quantum number, $l = 0$), then we get $\hbar$ = $6.583008021 \times 10^{-16}$ ev.

B) Birth of magnetism: In the coulombs law, if we put 10^6 photons for m_1 & m_2 respectively, the in terms of energy, we will get $F = 9.4456 \times 10^{-24}$ Jules, we know the value of magnetic momentum = μ_e = 9.28477×10^{-24} Jules, which proves that photon is responsible to create the field of magnetism and this idea is not known to us.

C) Energy produced by the electron: To classifying the Electron structure, it is observed that an electron has 9 orbits of which outer most orbit is unstable & can able to produce 1000 photons. These 1000 photons will give energy as Eigen value of electron as:
E_1 = {1000 / $2\sqrt{3}/2$ l^2} $\times \bar{\epsilon}$ = 38.0070 ev at zero state, where Eigen value at zero state is 37.603 ev. (Here l = Å = 10^{-10} m). It is applicable to other state also. So, photon follows quantum number and proves that photon is the ultimate energy source of all matter or the universe.

D) Now we go through the *Complete unified theory* (2nd part):

The complete unified theory ---a dream of science. After finding the mass of a graviton,

$$g = G \frac{m_e \times m_u}{(\lambda' \beta)^2 c^2} \times 10^{-14} \, Kg = 1.948428603 \times 10^{-75} \, Kg \quad \text{(the mass of a graviton particle)}$$

The mass of a photon is estimated as: (details are not given here).

$$\sigma = 8 \pi^2 g_\eta^2 G^2 \frac{m_e^2 \times m_u}{N_A \lambda_c^2 (\lambda' \beta)^4 c^2} = 1.659619615 \times 10^{-57} \, Kg \, ----- (P)$$

The mass of this photon is equal to the mass of a photon obtained from the equation (A), we can write this equation as:

$$\text{Or} \quad \frac{c^2}{8 \pi^2 G^2} = \frac{g_\eta^2 m_e^2 \times m_u}{N_A \lambda_c^2 (\lambda' \beta)^4 c^2 \sigma}$$

$$\text{Or} \quad \frac{c^2}{8 \pi G} \times \frac{c^2}{8 \pi G} = \frac{g_\eta^2}{8 N_A \sigma} \times \frac{m_e^2 \times m_u c^2}{\lambda_c^2 (\lambda' \beta)^4}$$

$$\text{Or} \quad \left(\frac{c^2}{8 \pi G} \right)^2 = \frac{g_\eta^2}{8 N_A \sigma c^2} \times \left(\frac{m_e c}{\lambda_c^2} \right)^2 \times \frac{m_u c^2}{(\lambda' \beta)^4}$$

$$\text{Or} \quad \left(\frac{c^2}{8 \pi G} \right)^2 = \frac{g_\eta^2}{(\lambda' \beta)^4} \times \left(\frac{h^2}{\lambda_c^4} \right) \times \frac{m_u c^2}{8 N_A \sigma c^2}$$

$$(\text{When, } m_e c = h / \lambda_c)$$

$$\text{Or} \quad \left(\frac{c^2}{8 \pi G} \right)^2 = \frac{g_\eta^2 h}{(\lambda_c \lambda' \beta)^2} \times \sqrt{\frac{m_u}{8 N_A \sigma}} \quad ------ (Q)$$

$$\text{Here, } \sqrt{\frac{m_u}{8 N_A \sigma}} = 455.72213 = \frac{m_u}{4 m_e}$$

$$= \frac{1}{4}^{th} \text{ ratio of mass of atom \& electron}$$

The equation (P) is showing the internal function photon that in what way the photon is producing with the effect of graviton particle, gravitational force and other particle as shown in the equation. If we classify this equation, we will get the quantum circulation of black hole.

$$\left(\frac{(\lambda_c \lambda' \beta)^2}{4 g_\eta} \times \sqrt{\frac{8 N_A \sigma}{m_u}} \right)^{1/2} = \left(\frac{2 \pi G h}{c} \right)^{1/2} = 3.0440727 \times 10^{-26} \, (meter)^2 \, sec^{-1}$$

The Planck quantum circulation constant[14] is known to us as $h/2m_e = 3.63694807 \times 10^{-4} \, m^2 s^{-1}$, it proves that the quantum circulation of black hole will $3.0440727 \times 10^{-26} \, m^2 s^{-1}$.
Now we can say that black hole is a type of star, which cannot radiate energy. In this regards, we cannot believe Hawking radiation in this field of black hole[15].

Classification of Einstein, Planck, De-Broglie equation:

We have the equation $E = mc^2$, $E = hv$, $v = c/\lambda$, we can put h as $h = 2\pi\hbar$ and on

replacing $\hbar$ by $N_A G \dfrac{m_e \times m_u}{(\acute{\lambda}\beta)2} \times 10^{-14}$ Jule we get the following equations of **Einstein**, **Planck, De-Broglie as**:

$E = hv = 2\pi\hbar v = mc^2$, *so,*

1) $E = N_A \acute{\sigma} c^2$, because, $\acute{\sigma} = \dfrac{m_e (m_0^2 - m_I^2)}{\pi_e^2 m_I^2}$

(*follows the equation of unification of physics in Part -1*)

$$E = hv = 2\pi\hbar v = mc^2$$

$$N_A \acute{\sigma} = 2\pi v g_\eta G \frac{m_e \times m_u}{(\acute{\lambda}\beta)^2 c^2} \quad \text{------------ } (c_1)$$

$$2\pi v g_\eta G \frac{m_e \times m_u}{(\acute{\lambda}\beta)^2 c^2} = \frac{m_e (m_0^2 - m_I^2)}{\pi_e^2 m_I^2}$$

$$v = \frac{1}{2} \times \frac{(\acute{\lambda}\beta)^2 (m_0^2 - m_I^2) c^2}{\pi \pi_e^2 g_\eta G m_u m_I^2} \text{ Hz } \quad (\text{ at excited state }) \text{------ } (c_2)$$

$$v = \frac{1}{2} \times \frac{(\acute{\lambda}\beta)^2 (m_0^2 - m_I^2) c^2}{\pi^3 g_\eta G m_u m_I^2} \text{ Hz } \quad \text{------------------ } (c_3)$$

(at rest, when $\pi = \pi_e^2$, then $\pi \pi_e^2 = \pi^3$)

Therefore, **the equation** $E = mc^2$, $E = hv$, $v = c/\lambda$, $m_0 = \dfrac{m}{\sqrt{1 - v^2/c^2}}$ etc under the control of gravitational constant (G), number of graviton particle

Lot of findings from the equation of mass of a photon in different fields tells us that it is the master key of the universe, which can explain the birth of the particle, stars, and universe. *All are not shown in this small script in details*. If any intellectual scientists want to know, may contact in my Email: nirmalgopa@yahoo.co.in

Conclusion: If the system of idea is correct and the law of nature satisfied thoroughly in our surroundings & the universe, then no need of think for any circumstances for developing mankind, need only apply it in proper way.

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