Spermatophoton

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Abstract: Identification of sub atomic particles, its properties and connecting it with our universe is a matter of concern, since photon is the most common and abundant particle in our universe and a lot of its properties are under study, this theoretical study was done in a try to reveal some of its properties and its relation with other particles and constants.

Keywords: Photon properties, Photon and nature constants.

Contents

1 Introduction

Many researches have been done on light to recognize its nature and properties, it was described by Huygens as a wave then his theory was approved by the discovery of Young and Fresnel for interference and diffraction, Plank put a formula for the black body radiation and introduced a new constant h which then called quantum of action [1], it was shown by Lenard in 1902 in the photoelectric effect that the energy of the electrons does not depend on the intensity of light but depends on its wavelength [2], Einstein illustrated Lenard's discovery by suggesting that light energy is distributed in space in the form of localized light quanta [3] with this suggestion Einstein renewed Newton's point of view for the particle nature of light, in 1923 Compton confirmed the particle nature by scattering of X-rays on electrons [4], Einstein in his special relativity theory derived the energy-mass equivalence principle $E = mc^2$ [5], according to this principle particle versus antiparticle annihilation process results in producing photons e.g. electron and positron annihilation and creation process [6], proton and antiproton annihilation into electron-positron pairs and gamma ray

pairs [7]. In a try to understand some of photon properties this theoretical study has been done to determine some of its fundamental properties like structure, mass, velocity, length, and the method of interaction with each other and with other particles also to understand why photons are the final product in the annihilation processes.

2 Photon structure

There are some properties for light which lead us to an imagination for the photon structure such as photon spin, dual nature of light (particle and wave) and the constant velocity which do not depend on the nature of the source or on the frequency, so we can deduce a structure for the photon as a sperm consisting of three parts: head, spiral tail, and a connecting part between them which we can call a separator. From this point of view the photon can act as a particle with the head part and behaves as a wave due to the spiral tail which gives it the spin property and the momentum by the continues motion.

3 Photon and other particles

In electron-positron annihilation and creation process electron and positron turn into 2 γ rays with equal wavelengths and vice versa. Also in proton and antiproton annihilation process gamma ray pairs are produced. From these observations we can postulate that electron, proton and other particles may be formed from photons in a definite structure. But how are photons interact to form a particle?

To answer this question we have to postulates some rules:

- All photon body is responsible for its mass.
- The spiral tail is responsible for motion and reaction with other particles.
- The spiral tail has two directions of motion: clockwise and anticlockwise.
- Head do not interact with head.
- Head can penetrate tail in the same phase at its end.
- Tail interacts with tail in an opposite phase.
- Wavelength concept is the linear distance between 2 successive photons.
- Frequency is number of photons passes through definite point per second.

Now let us imagine 2 rays of spermatophotons released in an opposite direction to each other, they will make collision in a definite point so according to the second low for Newton each action has a reaction equal to it in quantity but opposite in direction; we can imagine that the first 2 opposite photons will colloide with heads which do not interact with each other so they will stop each other, then the second 2 photons in each ray will colloid with the first one in its ray through head to tail so penetration will occurs till the head of the second one meets the separator and makes a branch and so on with a definite number of

photons forming a particle with branches of heads and a condensed one tail. At this point 2 particles have been formed with the same mass but opposite in motion phase (clockwise and anticlockwise) which we can interpret as charge sign: positive or negative.

With this concept for the particle as a condensed tail and branches of heads gives it both the wave and particle nature.

4 Photon mass

Since the charge magnitude of the electron and the proton is the same (1.6×10^{-19} c), this make us back to the meaning of the charge in coulomb unit, coulomb is the charge transported by a constant current of one ampere in one second so coulomb is connected with time and number of charge carriers (electrons or protons) where each 1 coulomb contains 6.24×10^{18} (reciprocal of 1.6×10^{-19} c) electrons or protons in one second, which gives us the concept of frequency, so we can deduce that the charge 1.6×10^{-19} c means the part of time from the second which one electron or proton takes to pass a definite point.

By comparison between particle mass and its time (charge) with the photon time (reciprocal of frequency) produced from its annihilation we can calculate the mass of the photon e.g. photons from electron-positron annihilation (γ_e) have a frequency 1.24×10^{20} Hz so the time of one photon to pass a definite point is 8.08×10^{-21} s while the time for one electron with a mass 9.1×10^{-31} kg is 1.6×10^{-19} s so the photon mass from electron can be calculated as

$$\begin{aligned} \text{Electron mass} &\longrightarrow \text{photon mass?} \\ \text{Electron time} &\longrightarrow \text{photon time} \\ \text{photon mass} &= \frac{\text{Electron mass} \times \text{photon time}}{\text{electron time}} \\ &= 4.6 \times 10^{-32} \text{ kg} \end{aligned}$$

In the same way as electron-positron annihilation if we imagine proton and anti-proton annihilation and creation process in a specific energy level according to mass-energy equivalence principle for Einstein we can imagine 2γ rays with equal wavelengths 1.5×10^{-15} m and vice versa into 2 equal masses 1.67×10^{-27} kg, equal in charge magnitude 1.6×10^{-19} c but different in charge sign. By doing the same calculations with the proton and the photons produced from its annihilation (γ_p) as proposed we obtain the same mass for the photon, this means that photon has a definite mass $m_\circ$ equals 4.6×10^{-32} kg. the ration of particle mass to photon mass $M_\circ/m_\circ$, could be considered as number of photons (n) forming the particle e.g. electron mass/photon mass = 19.8 and proton mass/photon mass = 36383.4.

5 Photon velocity and motion path radius

Einstein's energy-mass equivalence equation $E = mc^2$ plus Plank's black body radiation equation $E = h\nu$ resulted in $h = mc\lambda$, by introducing the constant photon mass in this equation we obtain $h/m_\circ = c\lambda = 1.44 \times 10^{-2}$ from this result we can conclude that c is not

constant; it is inversely proportional with λ so in this equation we have to exchange c by V.

$$\frac{h}{m_\circ} = V \times \lambda = 1.44 \times 10^{-2} \tag{5.1}$$

we can understand equation (5.1) by imagining the spiral motion for one photon from the source to its first station at distance equals to its wavelength and calculating its angular velocity $\omega = 2\pi\nu$, e.g. γ_e with a wavelength 2.42×10^{-12} m and a frequecy 1.24×10^{20} Hz, $\omega = 4.46 \times 10^{22}$ rad.s^1, according to equation (5.1) $V = 5.95 \times 10^9$ m/s, since $V = \omega r$ where r is spiral motion radius so $r = 1.33 \times 10^{-13}$ m, the same with γ_p with a wavelength 1.36×10^{-15} m and a frequency 2.2×10^{23} Hz, $\omega = 8.1818 \times 10^{25}$ rad.s^1 and $V = 1.09 \times 10^{13}$ m/s so $r = 1.33 \times 10^{-13}$ m and so on with all wavelengths we obtain the same radius, from this results we can conclude that photon velocity which varies with wavelength but keeps the same motion path radius is its spiral velocity.

6 Photon length

From the previous data we can calculate the spermatophoton length where each photon has its velocity and time to pass a certain point, since (distance = velocity $\times$ time) in our case distance will be the length of photon($L_\circ$) which pass through hypothetical point from its head to the end of its tail e.g. γ_e has $V = 5.95 \times 10^9$ m/s and $t = 8.08 \times 10^{-21}$ s so $L_\circ = 4.8 \times 10^{-11}$ m, also γ_p has $V = 1.09 \times 10^{13}$ m/s and $t = 4.4 \times 10^{-24}$ s so $L_\circ = 4.8 \times 10^{-11}$ m, the same with any radiation type we find that the photon has the same length. For a specific annihilation process the ratio of photon length to its wavelength $L_\circ/\lambda$ is the same as the ratio of paticle mass to photon mass.

$$\frac{L_\circ}{\lambda} = \frac{M}{m_\circ} = n$$

$$m_\circ \times L_\circ = M \times \lambda \tag{6.1}$$

7 Particle length

If each particle is formed from n photons with n number of condensed tails, according to Einstein's special relativity theory the length of a particle changs by changing its velocity so if elongation and contraction occurs for the condensed tail maximum length will be $nL_\circ$ and minimum length will be $L_\circ$ hence we can put a formula for a particle length L with respect to its velocity (v) and light velocity (c).

$$L = \frac{L_\circ(nc - nv + v)}{c} \tag{7.1}$$

8 Relation with other constants

As a conclusion there are some new constants as photon mass, length, velocity and path radius also new concepts which could enable us to explain some other constants in nature.

8.1 Plank's constant

Since $E = h\nu$ where E is the total energy in one second, h Plank's constant, and according to section 3 ν is number of photons in one second, in this case h is the energy of one photon in second.

$$h = m_\circ \times L_\circ \times c = 6.62 \times 10^{-34} \text{ kgm}^2/\text{s} \tag{8.1}$$

8.2 Constant linear light velocity

From equation (5.1)

$$V = \frac{h}{m_\circ \lambda}$$

From equations (6.1) and (8.1)

$$\begin{aligned} \lambda &= \frac{m_\circ L_\circ}{M}, \text{and } h = m_\circ L_\circ c \\ V &= \left(\frac{M}{m_\circ}\right) c = nc = \left(\frac{L_\circ}{\lambda}\right) c \\ c &= \frac{V\lambda}{L_\circ} \end{aligned}$$

This equation indicates that as V changes with respect to λ, the final linear velocity c will be constant because $V\lambda =$ constant and $L_\circ$ is constant.

8.3 Boltzmann constant

If we divide plank constant h by photon length $L_\circ$ we obtain Boltzmann constant K_b

$$K_b = \frac{h}{L_\circ} = \frac{m_\circ c L_\circ}{L_\circ} = m_\circ c = 4.6 \times 10^{-32} \times 3 \times 10^8 = 1.38 \times 10^{-23} m^2 kg s^{-2} K^{-1}$$

since

$$\begin{aligned} E &= K_b T \\ E &= \left(\frac{h}{L_\circ}\right) T \\ &= h\left(\frac{T}{L_o}\right) \end{aligned}$$

According to Plank $E = h\nu$ So,

$$\begin{aligned} \frac{T}{L_\circ} &= \nu \\ T &= L_\circ \nu \\ &= \frac{L_\circ}{t} \end{aligned}$$

with m/s unit the same unit as velocity so $T = V$ with this concept temperature could be described as the velocity of the released photons from a body.

8.4 Magnetic permeability constant for free space

Since

$$B = \frac{\mu_\circ}{4\ \pi}\frac{qv}{r^2} = \frac{f}{qv}$$

where B is the magnetic field, q is the charge, $\mu_\circ$ is the magnetic permeability constant for free space and f is the force.

$$f = \frac{\mu_\circ}{4\ \pi}\frac{q^2v^2}{r^2} \tag{8.2}$$

From section 4 we have postulated that q is the time taken by a particle to pass a definite point so $qv = L$ where L is the particle length So

$$f = \frac{\mu_\circ}{4\ \pi}\frac{L^2}{r^2}$$

If $r^2 = L^2$ so $f = \frac{\mu_\circ}{4\ \pi}$

From this postulate we can deduce that the constant $\frac{\mu_\circ}{4\ \pi} = 1 \times 10^{-7}$ is the force which the charged particle effects on another point or particle, in another word the resistance which a point or particle affected by a charged particle so we can use Ohm's law to calculate this resistance R:

$$R = \frac{V}{I} = \frac{E.t}{q^2} = \frac{f.r.t}{q^2} = \frac{f.r^2}{q^2v} \tag{8.3}$$

where V is the potential difference, I is the intensity of current and r is the distance. Since

$$\frac{\mu_\circ}{4\ \pi}\frac{qv}{r^2} = \frac{f}{qv}$$

$$\mu_\circ = \frac{4\ \pi f r^2}{q^2v^2} \tag{8.4}$$

By equating equations (8.3) and (8.4) we obtain: $\mu_\circ = \frac{4\ \pi R}{v}$ so $\frac{\mu_\circ}{4\ \pi} = \frac{R}{v} = f$

If $v =$ light velocity so $R = 30\ \Omega$

8.5 Coloumb constant

From equation (8.2), if $v = c$, so

$$f = \frac{\mu_\circ c^2}{4\ \pi}\frac{q^2}{r^2}$$

where $\frac{\mu_\circ c^2}{4\ \pi} =$ coulomb constant, since q is the time so $q \times c = L$ and from section 7 at light velocity $L = L_\circ$ so coulomb's law could be written as

$$f = \frac{\mu_\circ}{4\ \pi}\frac{L_\circ^2}{r^2}$$

8.6 Gravitional constant G

Newton's law for gravitation is

$$f = G\frac{m_1 \times m_2}{r^2}$$

In this part we want to know the origin of the constant G: If we concentrate on this law we find that it's a problem between 2 masses so we can solve it using the reduced mass concept but her we are dealing with 2 forces between the two masses so we can unify them as a one reduced force

$$F = \frac{f_1 \times f_2}{f_1 + f_2} \tag{8.5}$$

$$f_1 f_2 = G^2\frac{m_1^2 m_2^2}{r^4} \tag{8.6}$$

$$f_1 + f_2 = 2G\frac{m_1 m_2}{r^2} \tag{8.7}$$

By introducing equations (8.6), (8.7) in (8.5)

$$F = G\frac{m_1 \times m_2}{2r^2}$$

From this step we can make some postulates to find G value, Since photon mass is $m_\circ$ and its length is L_o

$$F = \text{constant}\frac{L_\circ^2}{2m_\circ^2}\frac{m_1 \times m_2}{r^2}$$

By taking the square root for $L_\circ^2/2m_\circ^2$

$$F = \text{constant}\frac{L_\circ}{\sqrt{2}m_\circ}\frac{m_1 \times m_2}{r^2}$$

By comparing G value (6.67×10^{-11}) with $(\text{constant}L_\circ/\sqrt{2}m_\circ)$ value where $L_\circ$ and $m_\circ$ are constants

The constant value can be calculated to be $9.2 \times 10^{-32} = 2\,m_\circ$, So Newtonian gravitational law could be written as

$$F = \frac{2\,m_\circ \times L_\circ}{\sqrt{2}\,m_\circ}\frac{m_1 \times m_2}{r^2}$$

Where $G = \frac{2\,m_\circ \times L_\circ}{\sqrt{2}\,m_\circ}$.

Suppose $\frac{m_1 \times m_2}{m_\circ} = n$ (number of spermatophotons forming the 2 masses)

$$F = \frac{2\,m_\circ}{\sqrt{2}}\frac{nL_\circ}{r^2} \tag{8.8}$$

According to equation (8.8) by increasing the distance between the 2 masses till $r^2 = nL_\circ$, force between them decreases to be $F = \frac{2\,m_\circ}{\sqrt{2}}$, and this is the least force value could be available between 2 masses.

9 Conclusion

This theoretical study has introduced a point of view for the photon intrinsic fundamental constant properties like mass, length, velocity and motion path radius and with correlation with other particles it was found that photon may be the origin of matter then by exploring other constants in nature and forces it was obvious that photon constants are the main components for them.

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