Ether-medium and a new constant on photons radiated

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Abstract

According to the definition of force in Newton's second law, through the force analysis on a high speed particle, we have proved that the existence of the ether-medium is absolutely essential, and the speed of light in vacuum is the limiting value of the moving object in that. And put forward that as the cosmic background, the ether-medium is composed of the electro-ultimate particles which are moving at the highest speed close to the speed of light in vacuum. In addition, the average force suffered on static mass per unit of the electro-ultimate particle is a constant which implication is the upper limit on photons radiated. For any photon of known wavelength, the moving speed can be directly calculated through this constant. After that, the average force suffered and the static mass, when the photon moving along the wavelength direction, can be calculated. On the basis above, it also reveals that the mechanism behind the spectral redshift, the dynamic mass (or called relativistic mass) of ponderable bodies and the law of universal gravitation.

1. Introduction

In the previous thesis [1] I have written that according to the related experiments, the high-speed electronic energy convergence phenomena were discussed in detail. The reason was that its static mass had gradually been lost in the form of radiation. If you have questions or do not recognize, please read this article in full patiently and will certainly obtain some new insights. In recognition of an electron which can be further broken down as prerequisite, the high-speed electronic energy convergence phenomena, it can be explained by Einstein's special relativity. Thus, the Kinetic energy formula of Einstein's special relativity,

$$E_k = E - E_0 = m_0 c^2 \left(\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} - 1 \right)$$

(1) ,

and its derived mass-energy formula,

$$E = mc^2 \quad \text{or} \quad \Delta E = \Delta mc^2$$

(2) ,

mass-speed formula,

$$m = \frac{m_0}{\sqrt{1-\dfrac{v^2}{c^2}}}$$ (3),

should be to obtain a more adequate experimental support. In the above formulas, m is the dynamic mass when an electron speed is equal to v, or called relativistic mass; m_0 is the static mass, also known as the rest mass, in view of the electron which can be broken down, it is no longer a constant; c is the value of the speed of light in vacuum; $E_0 = m_0c^2$ is the static energy; E is the total energy. They are all against one and the same moving electron. Moreover, if no special instructions, the definition domain of the formulas in this article is $0 < |v| < c$.

Under the premise of the above formulas which have obtained experiment supports, we can according to related theory carry out to demonstrate the basic points at the beginning of Einstein's special relativity, which are assuming the c and the ether-medium to be put on hold, as well as try to give supplementary explanation.

2. The existence of the ether-medium is absolutely essential

In 1924, de Broglie proposed his theory of matter waves, and pointed out that between a particle's momentum p and the wavelength λ had the following relationship:

$$p = mv = \frac{h}{\lambda}$$ (4).

Afterwards, by the Davisson-Germer Experiment, found diffraction occurring when electrons pass through a crystal, and many other experimental quantitative validation, which gave this as the cornerstone of wave mechanics concept with forceful and complete proof.

Because of this contribution, de Broglie won the Nobel Prize in Physics 1929 year. At that time, according to the formula (4), it could be understood that the momentum and energy of high-speed particles can't increase unlimited, and are restricted by the Planck's constant h. But for which had implied the high-speed electronic energy convergence phenomena, the reason that its static mass m_0 gradually to be lost in the form of radiation, failed to attract enough attention.

In 1945, after many years of thinking and observation, at the meeting of "Surface state research" held in Paris, de Broglie pointed out: The later some experiments showed that the other matter particles such as protons, nuclei, and so on, are also associated with wave, also comply with the general concept of wave mechanics, diffraction phenomenon can also occur. [2] This means that formula (4) is also applicable to other particles in addition to electrons.

Since the formula (4) has been validated by many quantitative experiments, we can be based on the definition of force in Newton's second law [3], to obtain the average force,

$$F = \frac{dp}{dt} = (\frac{h}{\lambda})' = -\frac{h}{\lambda^2}\frac{d\lambda}{dt} = -\frac{hv}{\lambda^2}$$ (5),

suffered by a high-speed particle, which is moving with a constant frequency f and along the wavelength λ direction. In the formula (5), make $d\lambda / dt = v$ in the process of derivation. That is the

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average velocity, $v = \lambda / t_\lambda = \lambda f$, of the high-speed particle moving along the wavelength λ direction, within a fluctuating cycle, $t_\lambda = 1/f$, and can be understood as the phase velocity. Since the frequency f is stable, generally speaking, this is the speed rate v what we have measured through experiments and applied to the formula (1). In addition, the negative sign in the formula (5) indicates the direction of the average force F suffered by the particle, which is contrary to of the average speed v along the wavelength λ.

According to Newton's third law, action and reaction are a pair equal-sized forces to exert simultaneously on the different objects and with the opposite direction. As such, the formula (5) means there must be the existence of a medium, and it is also simultaneously subject to an equally sized reaction force from the high-speed particle. This medium presence is absolutely essential. It is nature's background -- the ether-medium.

To this, in 1920 Einstein had pointed out: "according to the general theory of relativity, space without ether is unthinkable..." This shows that during the initial creation of special relativity, Einstein did not abandon the ether-medium, only temporarily shelved. [4]

3. The force analysis on a high-speed particle

In view of the high-speed particle's energy convergence effect, the essence is its static mass m_0 which is gradually losing in the form of radiation. In order to eliminate the interference caused thereby, after substituting the formula (4) and (3) in proper order into the formula (5), in particular, the form of expression is converted to the average force suffered on the static mass per unit,

$$\frac{F}{m_0} = \frac{v^2}{\lambda\sqrt{1 - \frac{v^2}{c^2}}} \tag{6}.$$

It should be noted that in the concept of acceleration of Newton's second law, the mass is m in the formula (3), which focuses more on the characterization of the inertia of the high-speed particle, while the static mass m_0 is mainly for the amount of substance.

The meaning of the formula (6) is that in the ether-medium, when a high-speed particle's velocity is gradually close to the c, the F/m_0 will tend to infinity. In this process, the original binding force inside the particle will become difficult to maintain, causing its static mass m_0 to be lost in the form of radiation, and gradually close to zero.

In order to illustrate more clearly the above point of view, again substituting the formula (4) and (3) into the formula (6), to rid the item on wavelength λ, we get the formula,

$$\frac{\sqrt{F}}{m_0} = \sqrt{\frac{v^3}{h(1 - \frac{v^2}{c^2})}} \tag{7}.$$

The formula (7) shows that in terms of a high-speed particle, although $F < \sqrt{F}$, but it does not affect the above conclusion that the F/m_0 will tend to infinity.

This proves that the c is a limiting value when ponderable bodies moving in the ether-medium. Any objects in the universe, attempting to equal or exceed the c, are impossible. When their speeds are Infinitely close to the c, the F/m_0 will tend to infinity. As such, they will be pressed into very fine-powders, while the static mass in the form of radiation to lose everything, just like an avalanche. This process is called the annihilation. According to the Law of Conservation of Mass, its essence is to transform the ponderable bodies into the background of nature -- the ether-medium.

In other words, the ultimate high-speed particles are objectively existent (in this paper which has been suggested as the electro-ultimate particles), which can be integrated into the ether-medium and become a part of that. As nature's background, the ultimate particles could not be further accelerated, of course not be broken down again. At the same time, we can further appreciate why the definition domain is $0 < |v| < c$, which has limited the static mass m_0 of high-speed particles must be greater than zero.

4. The limiting constant of photon radiation

The radiation effects disappear, at this moment, the F/m_0 will present out a limit value. This limiting value is a constant like the c, the implication is the upper limit of photon radiation. It can be called "limiting constant of light", in this paper by a_p to represent.

For the high-speed particle as debris which had been radiating out and with energy, Einstein defined it as the quantum of light. Later, generally referred to simply as the photon. Among them, the word "quantum" implies the indivisibility between matter and energy, while the word "light" is characterized by radiation. That is to say, all the particles generated in the form of radiation, can be classified to the scope of photons. Any objects in the universe, in the process that the F/m_0 are Infinitely tending to the constant a_p, will be pressed into very fine-powders, and in the form of radiation become the ultimate particles to integrate into the ether-medium. Any ponderable body is transformed into nature's background -- the ether-medium, the process is so-called "annihilation". As such, the a_p can also be called the constant of annihilating photons.

In the previous article [1], we had used HLS (Hefei Light Source) 800MeV electron storage ring for example, in allusion to the radiated photon whose characteristic wavelength was $\lambda = 2.427 \times 10^{-9}$ (nm), estimated out that its energy increased to 2.9642×10^9 times than before. Thus calculated the values of the other parameters of the photon, see Table 1 as following:

Table 1. *The estimated values of photon of characteristic wavelength,* $\lambda = 2.427 \times 10^{-9}$ *(m).*

Wavelength λ/m	2.427×10^{-9}	Static Mass $\mathbf{m_0}$/kg	1.9639×10^{-46}
Moving Speed $\mathbf{v}$/ms^{-1}	$(1-2.3252 \times 10^{-26})\mathbf{c}$	Energy increased /times	2.9642×10^9

The radiation to occur was along the tangential direction of electrons moving in the ring. According to the formula (1), the kinetic energy to increase substantially, is due to the photon's speed has been improved, while these depend on the binding force inside the electron. According to the formula (6), $F/m_0 = 1.717229 \times 10^{38}$ (N / kg). Before we haven't got a more accurate numerical value, temporarily take which act as the limiting constant of light, that is $a_p = 1.717229 \times 10^{38}$ (N / kg).

5. The parent photons to again radiate are the original cause of spectral redshift

The limiting constant of light which has been found, will bring us great convenience to explore the microcosmos. Generally speaking, its scope almost can cover all the high-speed particles generated by the radiation. According to the formula (6), we can see that for any known wavelength photon, its moving speed v can directly be calculated by the constant a_p. Then, the force F can be calculated by the formula (5). And then, substituting it into the formula (6), the static mass m_0 can be calculated. With these parameter, other values of the photon are also obtained extremely easy. Partial photons' moving speeds and static masses in visible wavelengths are listed in Table 2.

Table 2. Partial photons' moving speeds and static masses in visible wavelengths

Wavelength λ/nm	Moving Speed $\mathbf{v}$/ms^{-1}	Static Mass $\mathbf{m_0}$/kg
435.5176107	$(1-7.22079437781230174 \times 10^{-31})\mathbf{c}$	$6.098696402 \times 10^{-51}$
532.2450361	$(1-4.83474063106035814 \times 10^{-31})\mathbf{c}$	$4.083430956 \times 10^{-51}$
657.4594393	$(1-3.16853486279254031 \times 10^{-31})\mathbf{c}$	$2.676150456 \times 10^{-51}$

As for the aforementioned photon of characteristic wavelength $\lambda = 2.427 \times 10^{-9}$ (m), later in motion, we will find the spectral redshift to have occurred. The reason is that it is as the parent photon to further radiate the debris along its moving direction. While the radiation occurs, because the moving speed of debris is very close to the c, as such we can convert the formula (7) to

$$m_0 = \frac{Fh}{m_0 v^3}(1 - \frac{v^2}{c^2}) \approx \frac{a_p h}{c^3}(1 - \frac{v^2}{c^2}) = 4.223 \times 10^{-21}(1 - \frac{v^2}{c^2})$$

(8).

The formula (8) shows that the static mass m_0 of the debris to decay at top speed, which is proportional to the $(1 - v^2/c^2)$, and the moving speed is the more close to the c, its m_0 will become smaller. That is to say, the high-speed particle generated by the radiation, whose F/m_0 is infinitely tending to a_p, in this process, the wonder will happen like an avalanche. We have observed the phenomenon of annihilation when positrons encounter electrons, which is the most typical example. [5]

Throughout the process of radiation, the momentum is conserved. The radiation not only makes the static mass of the parent photon decreasing, but also causes its moving speed to be correspondingly reduced.

Substituting the formula (3) into (4), after tidying, we get the formula,

$$\lambda = \frac{h\sqrt{1 - \frac{v^2}{c^2}}}{m_0 v}$$

(9).

Through the formula (9), it can be seen that the wavelength of the parent photon is bound to increase accordingly. This is so-called spectral redshift. Again combining with the formula (6) can be seen that in this process along with the spectrum redshift and moving speed to be reduced, the F/m_0 of the parent photon also to be declined accordingly, the more the difference between it and the a_p is, the less

the proportion of radiated debris will become. When this proportion is tend to zero, the parent photon is called as dark matter. In a further step, when this kind of dark matter gathers together into a whole, in which the static mass is large enough and the density high, a black hole is formed.

6. Electro-ultimate debris will be integrated into the ether-medium

On the other hand, the static mass of debris is much less than its parent photon. Through the formula (9), it can be seen that between the wavelength λ and the static mass m_0 has an inverse relationship. So, the wavelength of the debris is bound to be greatly increased. Meanwhile, the debris also has a higher moving speed v, and the F/m_0 is more closer to the a_p, and as the next generation of parent photons, such stepwise radiation will continue... so it goes. Finally, it has a small static mass m_0 can not be small. As a ultimate particle, it has transformed into a part of the ether-medium.

After the static mass m_0 of electron to be reduced in the form of radiation, in view of its charge-mass ratio, e/m_0, whose value remains unchanged, this means that the value of the debris which has been radiated from the electron in a storage ring, also has not changed. [1] Additionally due to the static mass of debris is diverse from each other, corresponding to photons at different wavelengths, it can be inferred that the above-mentioned ultimate debris which has transformed into a part of the ether-medium, and its charge-mass ratio, e/m_0, is the same as of electron. In other words, it can be thought of as the ether-medium to be composed of the electro-ultimate particles, which are moving at the highest speed close to the c in reality.

You can imagine, when an electron moving along a circular, the electro-ultimate particles which compose the ether-medium among this circle, will surely fly away similar to magnetic field lines. At this moment, if there is a closed conductor in the distance, will produce induced current in which. In other words, if the ether-medium is composed of the electro-ultimate particles, Maxwell's theory of electromagnetism can be established.

Furthermore, positron is the antiparticle of electron, in addition to the positively charged, others are the same as the electron. Just think, If a positron is soaked in an ocean of electronic debris, it will be bound to annihilate off soon. The so-called annihilation, that is the ponderable bodies to be transformed into the background of nature. As a result, the positron is unstable particles in reality, and usually is not easily observed. And furthermore, positron and electron could annihilate in collision, which has been observed only two or three gamma photons to be released. However, those minimal particles of almost omnipresent, whether are they under our noses and carrying energy to escape from the vacuum chamber?

It seems to mean that the concept of field has returned again to the classical mechanics, that must have a mechanical carrier -- static ether-medium. But the only difference is that the so-called "static" whose moving speed is relative to the value c which is an absolute reference point.

7. Exploring the characteristics of the ether-medium and the origin of universal gravitation

"What the highest perfect is like water", this sentence was from the book of "Lao-tzu" of the Chinese Warring States era (480-220 B.C.). It used the figurative language to clarify the omnipresent characteristics of the ether-medium, and reached a perfect level. And the next one, "Water benefits all things without profit for oneself", also could be vividly likened to the laws of the conservation of energy and momentum. That is small enough to electrons, protons, neutrons and other microscopic particles, big to celestial bodies, constellation, when moving in the ether-medium, either low-speed or high-speed, the laws of the conservation of energy and momentum are universally applicable. For example, the formula (5) can also be converted to the form of energy of high-speed particles, as follows:

$$F\lambda = \frac{hv}{\lambda} = hf = mv^2$$ (10).

Among them, $F\lambda$ is the work done by a high-speed particle to the ether-medium, the average force F is the resistance which has been suffered. Because it still continues to move forward along the original direction at the same speed v, according to Newton's first law of motion, this shows that it also should suffer a thrust F' which is opposite to the direction of the resistance F, and the both forces are the same size to act on it, so the net external force is equal to zero. That is to say, the resistance that the high-speed particle has suffered opposite to the direction of movement, is doing work on the ether-medium, while being the thrust is that the ether-medium again sends all obtained energy back to it, the energy throughout the process is conserved.

Substituting the formula (4) into (6), to rid the item on wavelength λ, the form of expression is converted to

$$m = \frac{h\sqrt{1-\frac{v^2}{c^2}}}{v^3} \bullet \frac{F}{m_0}$$ (11).

The formula (11) shows that the high-speed particle moving in the ether-medium, the changes of F/m_0 are always faster than of its dynamic mass (or called relativistic mass) m. This is also the reason why the dynamic mass m of a ponderable body goes up along with its moving speed increase in the formula (3). According to Newton's third law as well as the relationship between resistance F and thrust F', it can be known that the dynamic mass m of any ponderable body is relevant to its internal F/m_0.

For the particles, bodies and even celestial bodies in the usual sense, the ether-medium can easily enter into their interiors, almost omnipresent. As such, their internal binding forces which may be understood as the internal stresses, are also relevant to the ether-medium which has entered into their interiors. In this regard, after changing the internal stress of objects, two experimental physicist of China's Sichuan province had conducted a series of experiments to result in different weighing, which were before and after about capacitors charged, ferromagnetic objects magnetized, springs elongated or compressed, metal materials' temperature rising and falling, as well as gyros stopping and rotating. According to the formula (11), the reason is because the internal F/m_0 of these objects had been

changed.

Only for those most elementary particles which compose the ether-medium, also are the electro-ultimate particles, the pressures suffered can only be considered all together at their surfaces. By the formula (6) and the foregoing discussion, their F/m_0 are the maximum in reality, and can be expressed by the a_p. But in those places where ponderable bodies are with higher densities, subject to the binding forces between the internal particles, the moving speeds and the wavelengths are correspondingly reduced. So, the F/m_0 will also be much smaller, which lead to the so-called field non-uniformity. In other words, this uneven matter field presents us a characteristic that between the particles, bodies and even celestial bodies, there are pulling forces by ether-medium. This is so-called universal gravitation,

$$\boldsymbol{F}_g = G\frac{m_1 m_2}{r^2} \tag{12}.$$

In the formula (12), the gravitational constant $G = 6.67428\times10^{-11} N \bullet m^2/kg^2$, m_1 and m_2 respectively are the masses of ponderable bodies, r is the distance between m_1 and m_2.

8. Conclusion

In this paper, the main research background is aiming at two basic points as well as the ether-medium to be put on hold, when the beginning of Einstein's special relativity, and through the force analysis on a high speed particle, try to give supplementary explanation. While the limiting constant of light has been found to bring great convenience, it allows us to directly explore the ultimate particles. As a conclusion, can be listed as follows:

1) According to Newton's laws, through the force analysis on a high speed particle, we have proved that the existence of the ether-medium is absolutely essential, and the speed of light in vacuum is a limiting value c of the moving bodies therein.

2) Any object in the universe, attempting to equal or exceed the c are impossible. When their speeds are Infinitely close to the c, will be pressed into very fine-powders, while the static mass in the form of radiation to lose everything. In terms of high-speed particles, will present to us the energy convergence phenomena and spectral redshift.

3) The ultimate high-speed particles, in this paper which have been suggested as the electro-ultimate particles, will be integrated into the ether-medium and become a part of that. Because the ultimate particles can not be further accelerated, of course not be broken down again. At this moment, the F/m_0 will present out a limit value. it is a constant, tentatively to be named "limiting constant of light", and can also be called the constant of annihilating photons.

4) We point out that the ether-medium is composed of the electro-ultimate particles which are moving at the highest speed close to the c. In such a cosmic background, the Positron will be naturally annihilated off, Maxwell's electromagnetic theory should also be established. The concept of field seems to return again to the classical mechanics, which must have a mechanical carrier -- static ether-medium. But the only difference is that the so-called "static" whose moving speed is relative to the value c which is an absolute reference point.

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5) Our universe itself is a uneven matter field. The ether-medium as cosmic background, the density of ponderable bodies is minimum and the F / m_0 maximum in reality. But in those places where ponderable bodies are with higher densities, the F / m_0 is relatively smaller. Such a kind of uneven matter field to present us a characteristic is that between the particles, objects and even celestial bodies, there are pulling forces by ether-medium. This is so-called universal gravitation.

In addition, the article also reveals the mechanism behind the mass-speed formula of Einstein's special relativity. In other words, the dynamic mass m of any ponderable body is relevant to its internal F / m_0.

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