Review Article

Piercing the veil of modern physics: part 1 & basics

Abstract

This article is part 1 in the "Piercing the Veil of Modern Physics", which is to lay the foundation for the full text. First, it should be clearly pointed out that a particle moving at the value c of the light speed in vacuum, its static mass can only be equal to 0, but doesn't exist in reality. Therefore, it is vital that how can we correctly make a distinction between the speed of light in vacuum and that in reality. Then, by the aid of the law of conservation of mass–energy, we know that the energy convergence phenomena of high– speed electrons are the result of the binding energy inside them to be lost gradually in the form of electromagnetic radiation. So, according to the related electromagnetic theories and the kinetics formulas of the special relativity theory, the study concluded that the charge of a moving electron will follow along with its static mass to be lost synchronously, and its charge–mass ratio whose value remains unchanged. Since an electron can be further broken down, then there should be a kind of more fundamental particles, the electro–ultimate particles, which can compose electrons and whose charge– mass ratio should be equal to the electronic physical constant. Besides, if nature's background (ether) is also composed of the electro–ultimate particles, Maxwell's electromagnetic theory should be true. A corollary is that all photons radiating from the electrons in a storage ring are composed of the electro– ultimate particles. Then, combining with de Broglie's matter wave formula, it is pointed out that the energy convergence phenomena of high–speed particles are the primary factor causing the spectrum redshift. And through this formula, the average force suffered by a high–speed particle moving along the direction of its wavelength can be obtained. Thus, according to Newton's third law to make a judgment, the ether must exist. Finally, point out the essence of so–called wave–particle duality: No matter where, as long as there is energy, there must be mass. And vice versa. The two as a unity of opposites present in front of us in the form of wave. They must exist at the same time, carry each other, be short of one cannot. In reality, both values can be close to zero, but never equal to zero.

Keywords: special relativity, energy convergence, spectral redshift, electro–ultimate particles, charge– mass ratio

Jian D,[1] Xiuqin HU,[2]
[1]Department of Meta–physics and Physics, Integrated Electronic Systems Lab Co. Ltd., China
[2]Department of Computer Science, Qilu Normal University, China

Correspondence: Ding Jian, Department of Meta–physics and Physics, Integrated Electronic Systems Lab Co. Ltd., Jinan–250100, China, Email jiandus@163.com

Introduction

So–called the static mass of a photon being zero but it had energy in reality,[1] which went against the kinetics formulas of Einstein's special relativity.[2] This is purely a confusion on the concept of definition domain, must be clarified. A photon whose static mass is equal to zero, does not exist in reality, and would nothave energy; but because it has energy in reality, so the static mass must be greater than zero. The main purpose of this study was starting from a new perspective to reveal the veil of modern physics gradually, which was by means of the energy convergence phenomena of high–speed electrons, taken an electron storage ring widely in use as an example, based on the law of conservation of mass–energy and de Broglie's matter wave equation.[3]

Special relativity can be used to explain jihao's experimental data

Since 2006, Mr. Jihao has published three papers in "Engineering Science", "China Science and Technology Achievements" and "China Science & Technology", to introduce three experiments he completed. Based on the experimental data[4–6] submitted by Jihao, we have got two tables after collating as follows:

In Table 1, it can be seen that the six kinds of energy electrons along the direction perpendicular to the magnetic field lines did uniform circular motion, and each of the actual "measured radius" values from the trajectories all were $R = 18(\text{cm})$, which moving in a same uniform magnetic field, the magnetic induction intensity,

$B = 0.121(\text{T})$. And in Table 2, the actual "temperature–rising" values were measured with the calorimetry directly out of the electrons' energy, and the experimental results showed that the values all were 1.03°C in the same lead target generated, which were provided from four kinds of energy electrons, 8 to 15 (*Mev*). Each kind of the electron beams was used in both experiments all from the same U.S. Varian 2300C/D linear accelerator. As a control, the current prevailing theoretical values were listed in Table 1 & Table 2.

This seemed to imply when an electron moving close to the speed of light in vacuum, its mass didn't change so much like the relativity predicted. Accordingly, Mr. Jihao laid claim to question[4,6,7] the mass–speed formula.[2]

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

Einstein's theory of special relativity. The formula 1 and the subsequent 2 and 3 are known as the kinetics formulas of Einstein's special relativity. In these formulas, the concept of mass[8] has been divided into two: m is the dynamic mass when an electron's moving speed is equal to v, or called the relativistic mass, which is to represent the mass of inertia; and m_0 is the static mass of the electron, also known as the rest mass, which represents the mass of the quantity of matter. In this paper, considering the effects of electromagnetic radiation, m_0 will no longer be a constant. Its conversion relationship with the relativistic mass should be following formula 1. And the constant c is

the value of the speed of light in vacuum, which is the limiting speed in the universe. We can't get its exact value through the experimental means in reality, which can only be approached as far as possible.

It should be noted that each electron has been acquiesced to be an elementary particle which was not able to be further decomposed, and put the m_0 as a constant, this was the main basis questioned by Mr. Jihao. It was this main basis, which went against the experimental data submitted by Jihao. Because the experimental data suggested that the static mass of an accelerated electron would gradually be lost in the form of electromagnetic radiation. Once we realize this, the kinetics formulas of Einstein's special relativity will be fit together with the experimental data. Of course, we can visually see the energy convergence phenomena of high–speed electrons to discuss, and this is precisely a valuable point of the experimental data submitted by Jihao.

Table 1 The relation between electron energy and measured radius values, B=0.121(T)

Electron energy *E/Mev*	20	16	12	9	6	4
Relative speed β=v/c	0.9997	0.9995	0.9992	0.9986	0.9969	0.9908
Theoretical radius *R*/cm	55	44	33	25	17	11
Measured radius *R*/cm	18	18	18	18	18	18

Table 2 About the energy and temperature values comparing between the theoretical and measured

Electron energy *E/Mev*	15	12	10	8	6	1.6
Relative speed β=v/c	0.9995	0.9992	0.999	0.998	0.997	0.99
Theoretical temperature /°C	6.29	5.03	4.2	3.36	2.52	0.67
Measured temperature–raising /°C	1.03	1.03	1.03	1.03	1	0.97

Qualitative analysis of the energy convergence phenomena

For the above–mentioned experimental data submitted by Jihao, through the kinetic energy formula[2]

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

Einstein's special relativity, only need to qualitative analysis, it can be seen when the speed *v* of an electron is very close to the *c*, its static mass m_0 only can be close to zero little by little, because of the energy presenting convergence phenomena and being a finite value, but never equal to zero. In formula 2, $E_0 = mc^2$ is the static energy, and *E* the (total) energy, both belong to one and the same moving electron. Here $\gamma = E / E_0$ is the expansion factor, equivalent to $\gamma = 1 / \sqrt{1 - v^2 / c^2}$.

$$E = mc^2 \text{ or } \Delta E = \Delta mc^2 \qquad (3)$$

That is the famous mass–energy formula[2] in Einstein's special relativity. The implication is if a moving electron (or body) to release energy *E* in the form of radiation, its mass will reduce the E / c^2. This means that according to formula 1 and 3, the static mass of the electron (or body) will gradually be lost along with the energy radiated. So the radiated $\Delta E = \Delta mc^2$ is not only energy, but also contains the static mass of representing the quantity of matter, collectively known as the mass–energy.

In view of this, It is necessary to point out that the relationship in reality between energy and (static) mass is a unity of oppositeness, which must exist at the same time, carry each other, be short of one cannot. Only in this premise, the *E* in above formulas can be called the (total) energy.

The above–mentioned three kinetics formulas of special relativity are the formula 2 as the main body, both of the formula 1 and 3 are derived from it. Because an absolute state of rest ($|v| \equiv 0$) does not exist in the universe, so their domain of definition is $0 < |v| < c$.

In terms of the above–mentioned three kinetics formulas, by studying their essence, Einstein has wisely pointed out that "The most important upshot of the special theory of relativity concerned the inertia masses ofcorporeal system. It turned out that the inertia of a system necessarily depend on its energy–content, and this led straight to the notion that inertial mass is simply latent energy. The principle of conservation of mass lost its independence and became fused with that of the conservation of energy".

That is to say, the original laws of conservation of mass and energy in classical mechanics, which were independent of each other, have formed a unified "the law of conservation of mass–energy" by Einstein's three kinetics formulas. It can be expressed as follows: In an isolated system, the sum of the kinetic and static energy from all of the ponderable bodies, which remains unchanged in the processes of interactions.

Strictly speaking, there was nothing wrong with such an expression. But according to formula 2, onlywhen the moving speed *v* of each ponderable body is extremely close to the *c*, it can conform to such a description that the sum of the kinetic and static energy is conserved in an isolated system. Due to the domain of the kinetics formulas is $0 < |v| < c$, in most cases, for those particles which have the characteristics of high density, such as protons, neutrons, electrons and photons between their internal more fundamental particles, where have stored a lot of internal binding energy in the form of the binding force, and presented in front of us in the form of electromagnetic radiation from time to time. In modern physics, the binding force is called strong interaction, or referred to as strong force. By the way, the contents associated with electromagnetic radiation will be the focus throughout the full text.

In order to emphasize a lot of binding energy to have been stored inside the high density particles, the law of conservation of mass–energy can also be more clearly expressed as follows: In an isolated system, the kinetic and static energy as well as internal binding energy, which are all from the ponderable bodies, the sum of them has remained unchanged in the processes of interactions. As to an electron in the process of acceleration, it will release energy in the form of radiation, now has been widely used.[9] This means that according to the kinetics formulas of Einstein's special relativity, with the increase of an electron's speed, its static mass will gradually be lost in the form of radiation. That is to say, for the electrons to present the energy convergence phenomena, which should be taken into consideration together with the internal binding energy released by electromagnetic radiation.

Check whether the charge–mass ratio has varied with accelerated electrons

In reality, the above–mentioned three kinetics formulas are applicable for all of the ponderable bodies (including all kinds of high–speed particles). Among them, the mass–speed formula 1 is the most striking. It reveals that with the increase of the speed of a ponderable body, the original concept of mass in classical mechanics is divided into two which represent the static mass of the quantity of matter and the dynamic mass of the inertia, respectively. In specific applications, must pay attention to the conceptual distinctions between the two. Such as the charge–mass ratio, which is the ratio of the quantity of charge to that of matter, it should be e / m_0. By the way, the word "charge" in the full text is usually represented as a negative charge, unless specifically specified as positive charge.

Once it is identified that the static mass m_0 of an accelerated electron will gradually be lost in the form of radiation, then we have to observe and study whether its charge–mass ratio is equal to that $e_0 / M_0 = -1.175882 \times 10^{11} (\text{C}/\text{kg})$ of the constant of physics. Among them, $e_0 = -1.602 \times 10^{-19} (\text{C})$ and $M_0 = 9.109 \times 10^{-31} (kg)$ are the elementary charge and the rest mass respectively, both of them are the constants of physics. The answer is yes. Now by the electron storage rings[9] widely in use are taken as an example to demonstrate, as follows:

By the electromagnetic theory knowable, when an electron is moving in the uniform magnetic field, perpendicular to magnetic field lines, it will continue to do uniform circular motion with radius R. In fact, it is a kind of accelerated motion. Electron storage rings were based on this principle to build the large–scale scientific facilities. In the storage ring, an electron momentum.[1,10]

$$p = m\mathbf{v} = e\mathbf{B}R \qquad (4)$$

It can be obtained directly from the equation of centripetal force mv^2 / R and that of Lorentz force eBv. Among formula 4, e is the charge of an electron, $\mathbf{B}$ the magnetic induction intensity. For high–speed electrons, relativistic effects should be considered. By formula 1 & 4.

$$\beta = \frac{v}{c} = \sqrt{\frac{(\frac{e}{m_0})^2}{(\frac{e}{m_0})^2 + (\frac{c}{BR})^2}} \qquad (5)$$

The relative speed of an electron can be deduced. Because the magnetic induction intensity B and the curvature radius R both are designed as calibration values in the storage ring, by formula 5, it can be seen that the electron moving speed v depends on the charge–mass ratio e / m_0. Let us suppose that the charge–mass ratio is changed, and then the electron's speed should be changed along with it. Well, that is the case only, the curvature radius R should be changed, and electron beams will strike the inner wall of the tubular vacuum chamber, because the direction and intensity B of the magnetic field of bending magnets in the storage ring have not changed at all. If so, it should never escape easily under the gaze of physicists. However, the above phenomenon has not happened in high–energy electron storage rings all over the world. It has also been proved that the charge–mass ratio e / m_0 of the accelerated electrons in these storage rings, whose value must remain unchanged. So there are only two possibilities that the static mass m_0 has not been changed, or the charge e has been lost along with it synchronously. Only choose the latter, we can reasonably explain the experimental data submitted by Jihao. So, there is the following formula to be true.

$$\frac{e}{m_0} = \frac{\Delta e}{\Delta m_0} = \frac{e_0}{m_0} \qquad (6)$$

Up to this point, it has been proved that the charge of accelerating electrons in storage rings will follow along with their static mass to be lost synchronously, but their charge–mass ratio and moving speed all are determined values. So, it can be predicted that electrons are made up of more fundamental particles.

Quantitative calculation of jihao's experimental data

Substituting both of $B = 0.121 (\text{T})$ and $R = 18 (\text{cm})$ in Table 1 into formula 5, then merging with formula 6, $\beta = v / c \approx 0.99695c$ can be calculated. Because the electron beams used in both experiments were all from the same U.S. Varian 2300C/D linear accelerator, well then, four kinds of energy electrons from 8 to 15 (*Mev*) in Table 2, which should be also the same speed. That is to say, both of different experiments have shown that the value of each electronic kinetic energy was no longer to continue to increase and tended to convergence, and formed an inflexion point near $v=0.99695c$.

In allusion to the data in Table 2, Mr. Jihao wrote in the experiment reports[6]: "A total number of electrons were received the lead target was used for the experiments and weighed 70 grams. The temperature was increased by 1°C, the energy required $0.31 \times 70 \times 4.18 = 9.0 \ joules$."

From this knowable, 2.36×10^{13} electrons made the lead target temperature to increase 1.03°C and should pay a total of their kinetic energy $w_k = 9.0 \times 1.03 = 9.27 (\text{J})$. So, near the energy inflexion point, here $v = 0.99695c$, each electronic kinetic energy was

$$E_k = \frac{w_k}{2.36 \times 1013} \approx 3.928 \times 10^{-13} (\text{J}),$$

and able to be converted into $E_k = 2.452 (\text{Mev})$. According to formula 2, there was the following formula to be true

$$3.928 \times 10^{-13} = m_0 c^2 (\frac{1}{\sqrt{1 - 0.99695^2}} - 1)$$

The static mass $m_0 = 3.69846 \times 10^{-31} (\text{kg})$ was able to be calculated. In view of the charge–mass ratio whose value remains

unchanged, the charge $e = 6.504929 \times 10^{-20}$ (C) can also be calculated according to the formula 6.

Figure 1 showed the internal changing laws of the high–speed electron's energy convergence phenomena. Its meaning was that along with an electron accelerating continually, on the one hand, the expansion factor was γ for and the mass $m = \gamma m_0$ according to formula 1, but on the other hand, the electromagnetic radiation caused the static mass m_0 to decrease to $\gamma_0 m_0$ gradually according to formula 3. Among them, the attenuation factor $1 > \gamma_0 > 0$. As a result, an energy inflexion point had been formed near $v = 0.99659c$. That was to say, in this energy inflexion point near, the expansion factor was, the attenuation factor of the static mass $\gamma_0 = 1 / \gamma$, so the result of the two together caused the energy $E = mv^2$ to present a maximum value. After that, the expansion factor was still γ, but the attenuation factor of the static mass has been accelerating to reduce $\gamma_0 < 1 / \gamma$. From this moment on, the energy $E = mv^2$ of the electron has presented convergence phenomena. For the experimental data submitted by Jihao, the so–called electron's mass didn't change so much like the theory of relativity predicted, this was the internal mechanism.
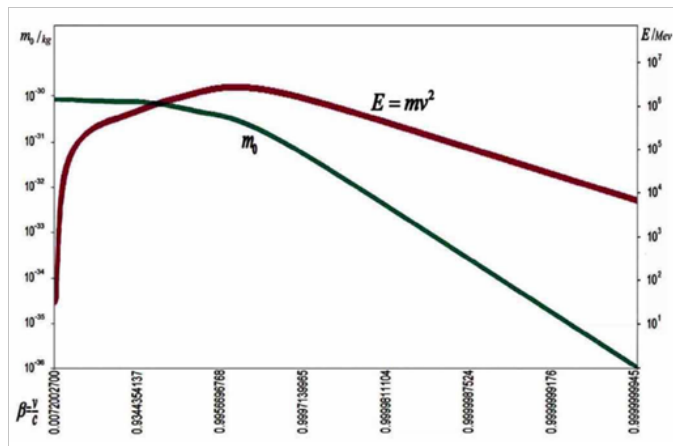
Figure 1 The varying laws of static mass and energy of electron following its relative speed.

As for a total number of 2.36×10^{13} electrons were received in the experiment reports, was calculated based on the current value of the lower speed electrons. At this time, the static mass of each electron should beslightly smaller than its physical constant value due to the impact of electromagnetic radiation. As a result, the total number of electrons received should be slightly larger than 2.36×10^{13} according to the same current value. That was to say, the static mass $m_0 = 3.69846 \times 10^{-31}$ (kg) and kinetic energy $E_k = 2.452$ (Mev) of an electron at the above inflection point should be the upper limit value. All in all, the static masses and charges of electrons in the energy inflection point near had been synchronously fallen to original 40% about. After that, along with the electrons accelerating continually, the energies have taken on a convergence state. Only such electrons were able to make the experimental data submitted by Jihao and the kinetics formulas of Einstein's special relativity to fit together well.

Generally, the charges gathered on the lead target cannot cause temperature rise, which will be consumed by the parts of higher resistance value in the loop circuit if you use wires to release. It is a pity that in the experiment reports submitted by Jihao, lacked the

discharge data of charges on the lead target. Of course, if you want to get a more complete experimental data, should also measure the wavelength values of electrons.

De Broglie's matter wave and the essence of wave–particle duality

As early as the 1920 s, the famous de Broglie's matter wave equation[3,11] has shown us that a high–speed particle (electron or photon), its momentum

$$p = mv = \frac{h}{\lambda} \qquad (7)$$

and energy

$$E = mv^2 = \frac{hv}{\lambda} = hf \qquad (8)$$

Were not able to grow without limits, and must be restricted by the Planck's constant h. According to formulas 7 & 8, a high–speed particle is moving along the direction of the wavelength λ, whose average velocity $v = \lambda f$ .If you confirm that the frequency f is stable, this is the speed v what we have measured through experiments and applied to the above kinetics formulas. For high–speed moving particles, should merge the formula 1 to consider the relativistic effects. We should also be aware that when a photon moving from the optically thinner medium into denser one, along with the increase of frequency f, its energy E remains unchanged; while it passing through the optically denser medium back again to the original thinner one, has once again restored to its original frequency f and the energy E not changed. This means that in the optically denser medium, photons still follow the laws determined by the formulas 7 & 8.

According to formula 5, when the magnetic induction intensity B and the curvature radius R are designed as a calibration value, an electron moving speed v in the storage ring should be a determinate value. Due to the electromagnetic radiation, after its static mass m_0 is reduced to a certain extent, the value of the momentum p and energy E will also reduce along with it, which is the root of energy convergence phenomena. The energy convergence phenomena to be presented in front of us are the increase of wavelength and the decrease of frequency accordingly, which are usually referred to as spectral redshift.[12,13] Therefore, energy convergence phenomena and spectral redshift, whose essence should be to explain the same physical effect, just like two blind men to touch an elephant from different angles.

However, due to the interference of the Uncertainty principle, the energy convergence effects of high– speed electrons (or photons) have not caused enough attention. A minimal deviation may result in wide divergence, now this first factor in causing spectrum redshift has been replaced by the Doppler Effect, and transformed into that celestial bodies are moving away from us.

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, also associated with wave, also complied with the general concept of wave mechanics, diffraction phenomenon was also able to occur." This argument further elaborated the scope of application of formula 7, which was also able to be applied to other particles with high–density characteristics in addition to electrons. For the term photon, the above has been mentioned several times, which should be a kind of high–speed particles to have been radiated from high–density particles such as electrons, protons or nuclei and so on.

Einstein defined it as the quantum of light, later has been called as the photon for short. According to the kinetics formulas of Einstein's special relativity, the word "quantum" contains indivisibility between matter and energy, while the word "light" is focused on radiation. That is to say, all high–speed particles radiated from high–density particles should be assigned to the category of photons.

De Broglie's matter wave relationship, which is formula 7, can be called the cornerstone of wave mechanics. The several formulas discussed by us before, all can be organically combined together through it. Thereupon, the essence of so–called wave–particle duality can be got, as follows: No matter where, as long as there is energy, there must be (static) mass. And vice versa. The two as a unity of opposites present in front of us in the form of wave. They must exist at the same time, carry each other, be short of one cannot. In reality, both values can close to zero, but never equal to zero.

Analyzing the force suffered by a high–speed particle

Since the formula 7 has been validated by many quantitative experiments, we can be based on the definition of force in Newton's second law, to obtain the average force

$$F = \frac{dp}{dt} = (\frac{h}{\lambda})' = -\frac{h}{\lambda^2}\frac{d\lambda}{dt} = -\frac{hv}{\lambda^2} \qquad (9)$$

Suffered by a high–speed particle which is moving with a constant frequency f and along the wavelength direction. In formula 9, make $d\lambda = dt = v$ in the process of derivation. That is the average velocity $v = \lambda / t_\lambda = \lambda f$ of the high–speed particle moving along the wavelength direction within a fluctuating cycle $t_\lambda = 1 / f$. Generally speaking, since the frequency f is stable, this is the speed v what we measured through experiments and applied to the above mentioned kinetics formulas. In addition, the negative sign in formula 9 indicates that the direction of the average force F suffered by the particle is contrary to that of the average speed v which moving along the wavelength.

According to Newton's third law, action and reaction are a pair of equal–sized forces to exert simultaneously on the different objects and in the opposite directions. As such, formula 9 means that there must be the existence of a medium which should be also subjected to an equally sized reaction force simultaneously from the high–speed particle. This medium is absolutely essential existence in reality. It is nature's background–ether.

Due to the frequency $f = v / \lambda$ according to the formula 8 and 9,

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

The energy of a high–speed particle is matter to present in front of us in the form of wave, which is proportional to the frequency, while the wavelength inversely. Among them, $F\lambda$ is the work done by the high–speed particle on the ether. Formula 10 illustrates that a high–speed particle moving in the ether, its energy is conserved. And the size of the energy is equal to the work done by the force on the ether in a complete wave cycle.

According to the formula 2 can also be seen that as a kind of ideal state, a particle moving at the c, its static mass can only be equal to zero. Of course, its energy must also be equal to zero. This kind of particle whose static mass and energy all are beyond the domain of formula 2, does not exist in reality. Similarly, a particle whose static

mass is equal to zero and has energy also does not exist. This means that a particle can exist but doesn't exist in reality, which is purely conceptual confusion and cannot be used as an ideal state. Therefore, correctly understand and legitimately differentiate the relationship between the light speed in vacuum and that in reality, which is a matter of critical importance.

Here the so–called reality, mainly aims at the ether. As the background of nature, ether is the most fundamental medium to carry all of the ponderable bodies moving. Nevertheless, the ideal vacuum means that a pure void has nothing at all, which does not exist in reality. This means that a particle or object moving in the ideal state, which is neither following the kinetics formulas of Einstein's special relativity, nor following de Broglie's matter wave relationship, but following Newton's first law of motion. So we can merge the principle of constant light speed in vacuum and Newton's first law of motion together, and express as: In the ideal vacuum, the photon's mass is equal to zero, and always do uniform motion at a constant speed c along a straight line.

Ether is composed of the electro–ultimate particles

The charge of a moving electron follows along with its static mass to be lost synchronously, which seems to have cheated physicists. This is not the electron deceiving, but there is a kind of traditional inertial thinking that each electron has been acquiesced to an elementary particle which cannot be further decomposed. So that put the static mass in formula 1 or 2 as a constant, and believing the electron to radiate out energy is only a part of its kinetic energy, which seems to have originated from this tiny omission.

After the static mass of an electron in a storage ring to be reduced in the form of radiation, in view of its charge–mass ratio whose value has remained unchanged, this means that the value of the debris which has been radiated from the electron also has not changed. According to formula 6, the charge–mass ratio of the debris should be equal to that of electrons. Additionally due to these debris of electrons are the photons whose mass spectra are differ from one another and have continuity, so they corresponding to the spectral ranges are extremely wide, from X–ray extends to the far–infrared, there are still enough strengths. So, there must be a kind of more fundamental particles, which should be called the electro–ultimate particles whose charge–mass ratio is equal to that of electronic physical constant. We can believe that all photons radiating from the electrons in a storage ring are composed of the electro–ultimate particles, and whose charge–mass ratio is equal to that of electrons. So, the moving photons must also follow the formula 4, and continue to do uniform circular motion with radius R in the uniform magnetic field perpendicular to magnetic field lines. The phenomena of light refraction, whose essence is when photons moving through a strong magnetic field between atoms, the deflections have been occurred. Furthermore, based on the theory of electron–positron colliding and some experimental facts[14] which have been shown, a corollary is electro–ultimate particles can constitute a variety of elementary particles with different natures which depends on the binding force inside.

We can also believe the ether as a medium is made up of the electro–ultimate particles. As the background of nature, their moving speed should be the highest in reality and second only to the c. Therefore, there is no possibility to be accelerated further. That is

to say, the radiation effect has disappeared. At this time, based on the previous discussion, you don't have to consider the internal binding energy again in the application of the law of conservation of mass–energy. Positrons are antiparticles of electrons, in addition to the positively charged, other properties are roughly the same as electrons. The annihilation lifetime of a positron in the ether (i.e. the vacuum chamber) is about 10–10 (s) order of magnitudes. Just think, if a positron is soaked in an ocean of the debris of electrons, it should be annihilated off soon. In the electron–positron collider, due to the vacuum chamber is almost unstoppable the ether to flow freely, can only rely on increasing the beam intensity to extend the annihilation lifetime, which can change the concentration of positrons in the local space. Or change to a way of thinking, the positrons have been found nearly a century and now widely used in many fields, but why have we never seen a storage ring of positrons? The reason is whose annihilation lifetime is too short, never unexpectedly, but impracticality. From the opposite angle, it can also prove the ether is composed of the electro–ultimate particles.

The so–called annihilation which is the moving speed of a ponderable body upon reaching only second to the c, the internal binding energy has been lost gradually in the form of radiation, while transforming into the background of nature – ether. So, electron and positron can be annihilated in collision, with which, all of the internal binding energy will be almost released out in the form of kinetic energy. And we have observed only two or three gamma photons which can only represent a part of the mass–energy. As for those almost omnipresent very minimal particles which cannot be stopped by the vacuum chamber, they are just under our noses carrying mass–energy to escape from that. To sum up, we can believe that Maxwell's electromagnetic theory should be established if the ether is composed of the electro–ultimate particles. It seems to imply that the concept of field has been returned again to the classical mechanics, there must be a carrier of mechanics – static ether. But the only difference is so–called "static" whose moving speed is almost equal to the constant c which is an absolute reference point.

Conclusion

In this paper, the main research background was so–called photon's static mass being zero but it had energy in reality. This is purely a confusion on the concept of definition domain, must be clarified. As the fundamental part of full text of "Piercing the Veil of Modern Physics", starting with a new perspective which was the energy convergence phenomena of high–speed electrons, aimed at sorting out and screening some of existing ideas, and laid a way for subsequent several parts of contents. Now sum up as follows:

a) A particle moving at the c, its static mass can only be equal to zero, but doesn't exist in reality. Therefore, correctly understand and legitimately differentiate the relationship between the light speed in vacuum and that in reality, which is a matter of critical importance. Here the so–called "reality" is mainly aimed at the ether. As the background of nature, ether is the most fundamental medium to carry all of moving ponderable bodies.

b) We were able to visually see the energy convergence phenomena of high–speed electrons through the experimental data submitted by Jihao. With the aid of the law of conservation of mass–energy, we known that the intrinsic cause was the binding energy inside moving electron to be lost gradually in the form of electromagnetic

radiation. So, according to the related electromagnetic theories and the kinetics formulas of the special relativity theory, the experimental data has been analyzed and studied from the qualitative and quantitative two different perspectives. And then to take an electron storage ring now widely in use as an example, inspected the charge–mass ratio whether it had varied with the electrons to be accelerated. The conclusion is that the amount of charge of the moving electron will follow along with its static mass to be lost synchronously, and its charge–mass ratio whose value remains unchanged.

c) According to the experimental data submitted by Jihao, we calculated that the static mass and charge of an electron had been synchronously fallen to original 40% about near the energy inflection point. Only such electrons, which can make the experimental data submitted by Jihao and the kinetics formulas of Einstein's special relativity to fit together.

d) Since an electron can be further broken down, then there should be a kind of more fundamental particles, the electro–ultimate particles, which can compose electrons. And their charge–mass ratio should be equal to that of electronic physical constant. Therefore, the electro–ultimate particles can constitute a variety of fundamental particles with different natures, which depend on the binding force inside. Further deduction is that Maxwell's electromagnetic theory should be established if the nature's background (ether) is also composed of electro–ultimate particles. It seems to imply that the concept of field has returned again to the classical mechanics, which must have a carrier of mechanics–static ether. But the only difference is that so–called "static" whose moving speed is almost equal to the c, while the constant c is an absolute reference point.

e) De Broglie's matter wave equation has long shown us that the momentum and energy of high–speed particles cannot grow without limits, which must be restricted by Planck's constant h. Therefore, the energy convergence phenomena of high–speed particles are the primary factor causing the spectrum redshift. Both are in explaining the same physical effect, which is the loss of mass–energy of high–speed particles to be caused by electromagnetic radiation. But now, the cosmological redshift has been judged as a correct theory, while to think carefully, a little worry involuntarily.

According to de Broglie's matter wave equation, the average force F of a high–speed particle moving along its wavelength direction can be obtained. And then, according to Newton's third law to make a judgment, the ether must exist, which should be also subjected to an equally sized reaction force simultaneously from the high–speed particle. So, $F\lambda$ is the work done by the high–speed particle moving along the direction of its wavelength on the ether.

The original laws of conservation of mass and energy in classical mechanics, which were independent of each other, have been formed a unified "the law of conservation of mass–energy" by the kinetics formulas of Einstein's special relativity. And combining with de Broglie's matter wave relationship, the essence of so–called "wave–particle duality" can be got. As follows: No matter where, as long as there is energy, there must be (static) mass. And vice versa. The two as a unity of opposites present in front of us in the form of wave. They must exist at the same time, carry each other, be short of one cannot. In reality, both values can close to zero, but never equal to zero.

The ideal vacuum means that a pure void has nothing at all, which does not exist in reality. This means that a particle or object moving in the ideal state, which is neither following the kinetics formulas of Einstein's special relativity, nor following de Broglie's matter wave relationship, but following Newton's first law of motion. So we can merge the principle of constant light speed in vacuum and Newton's first law of motion together, and express as: In the ideal vacuum, the photon's mass is equal to zero, and always do uniform motion at a constant speed c along a straight line.

In order to verify whether the above arguments are true, put forward a kind of the simple and effective identification method which is to measure the wavelength value of electrons in a storage ring.

Acknowledgements

None.

Conflict of inertest

Authors declare there is no conflict of interest.

References

1. Zhang YZ. Experimental Foundations of Special Relativity. China: Science Press; 1982.

2. John S. The Collected Papers of Albert Einstein. In: Fan DN, editor. China: Hunan Science & Technology Press; 2002.

3. Broglie LD. Physics and Microphysics.In: Zhu JD, editor. China: The Commercial Press; 1992.

4. Fan LZ. Would the mass of microscopic particles moving at high speed really be unlimited increase? *Frontier Science.* 2009;3(12):84–87.

5. Ji H. Experiments on the law of motion of electrons with different energies in a uniform magnetic field. *China Science & Technology Panorama Magazine.* 2009;(6):162–162.

6. Ji H. Experiment of measuring electronic energy with calorimetry method. *China Science and Technology Achievements.* 2009;(1):34–35.

7. Okun LB. The concept of mass. *Physics Today.* 1989;42(6):31–36.

8. Einstein A. Out of My Late Years. In: Fang ZQ, Han WB, He WG, editors. China: Hainan Press; 2001.

9. Jin YM. Electron Storage Ring Physics. China: USTC Press; 2001.

10. Ma LD, Yang FJ. Synchronized Radiation Application Introduction. China: Fudan University Press; 2002.

11. Ni GJ, Li HF. Modern Physics. China: Shanghai science and Technology Press; 1979.

12. Chen SG. Who Exploded the Cosmos (Origin of Gravitation and Gravitational Redshift). China: Sichuan science and Technology Press; 2004.

13. Hawking SW. A Brief History of Time. In: Xu MX, Wu ZC, editors. China: Hunan Science & Technology Press; 1996.

14. Tang XW. Electron Positron Physics. China: Science Press; 1995.