Energy quantum, light wave, and de Broglie wave

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1. Overview

The energy quantum proposed by Planck is the basis of today's quantum mechanics. De Broglie also linked this energy quantum to the energy of matter and showed that matter is a wave.

In the energy body theory, I linked the energy quantum to the kinetic energy of an electron and discovered that kinetic energy is a photon. 1) The radiation interval of photons which are plane waves becomes the wavelength of light emission line spectrum, 2) When electrons and protons interact, distortion (negative energy) occurs in the foot of each rotating wave, which works a restoring force, 3) It also generates a wave (positive energy) in the corresponding space, 4) The electron (or proton) moves while being dragged by this kinetic energy, and 5) The Schrödinger equation defines the wave that combines the distortion of the foot of the electron and the wave generated in space.

It is also estimated that when an electron is on the orbit of an excited proton, the wavelengths of the de Broglie waves of the electron and the proton are the same length. Then, by dividing the distance at the speed of light (3 × 10 to the power of 8) by the wavelength, and multiplying the frequency by the Planck constant, we obtain the energy quantum. It has become clear that this relationship appears as the similarity of a triangle created by the distortion of the foot of a proton. $E = h\nu$

2. Energy quantum

De Broglie linked the energy quantum to the energy of matter, revealing that matter is a wave. But the energy body theory linked it to the kinetic energy of electrons, discovering that kinetic energy is a wave, and kinetic energy becomes a photon. The energy quantum is expressed by equation (1).

$$E = h\nu \qquad (1)$$

2.1 Energy and Bonding of Matter

When combined with the energy of the electron or proton itself,

$$h\nu = mc^2 \qquad (2)$$

we get de Broglie waves, which are matter waves.

$$\lambda = \frac{h}{p} \qquad (3)$$

If we apply the wave with this wavelength to the elementary particle model of energy body theory, it is the wave that the energy cell bodies are expanding and contracting being centered on one point of space while rotating in a disk shape with a phase shift.

The wavelength λ is the length from trough to trough (or crest to crest) of the wave rotating around its own axis. The wave number is the same from the center to the tip of the base. Therefore, the wavelength λ gets longer from the center to the outside.

Here, we substitute de Broglie's relation into Bohr's quantum condition, which states that the length of one orbit multiplied by the momentum of the electron is an integer multiple of the Planck constant h,

and rearrange it to obtain the following equation.

$$rmv = n\hbar \quad (4)$$

Substituting de Broglie's relation (3) to (4) and rearranging, we get the following equation.

$$2\pi r = n\lambda \quad (5)$$

This equation (5) means that the circumference of a stable circular orbit is an integer multiple of the wavelength of the de Broglie wave.

2.2. Kinetic energy and bonds

The transition energy of an electron is the same as its kinetic energy, so

$$h\nu = \frac{1}{2}mv^2 \quad (6)$$

the velocity of the electron's kinetic energy is obtained. This is the relationship I first discovered in the energy body theory, and it represents the "speed of a photon."

The "speed of a photon" is different from the speed of light.

$$v = \sqrt{2\frac{h\nu}{m}} \quad (7)$$

The speed of a photon is, naturally, the same as the speed of its kinetic energy.

When kinetic energy is separated from an electron, it becomes a photon, so kinetic energy and photons are the same thing. Also, since the electron is pulled along by the kinetic energy during the transition, the electron also travels at the same speed.

The wavelength is expressed by the following equation.

$$\lambda = \frac{2}{mv^2 \cdot hc} \quad (8)$$

The wave to which this wavelength belongs is a plane wave formed by the group of photons emitted the transition. Its wavelength λ is the length of the interval between the emission of photons, and the distance and time it takes for an electron to move from the ground state

orbit of a proton to the excited state orbit. The electron transition is instantaneous and can be ignored.

2.3 Elementary Particle Model

Here, we will briefly explain the elementary particle model of the energy body theory. The group of energy cell bodies that make up space rotate as waves by expanding and contracting around a single point in space, shifting their phase. It has the shape of a disk, with the center being a particle character and the spreading foot being character of a field. The interaction depends on the direction of the rotating wave. If the directions of the waves are the same, there is an attractive force, and if they are opposite, there is a repulsive force. When the interaction occurs, the spreading foot of the elementary particle is distorted vertically, and a restoring force h is generated. At the same time, a wave corresponding to the spreading of the foot is generated in space. This is kinetic energy. The amount that causes the distortion of the foot and the wave is the mass of the elementary particle. The electron moves in the direction of the axis of movement, dragged by the kinetic energy. The kinetic energy that left the electron becomes a photon. The side of the photon is observed as light, but due to the distortion, it reaches the observer with a delay from the radiation. The rate of this delay is the speed of light.

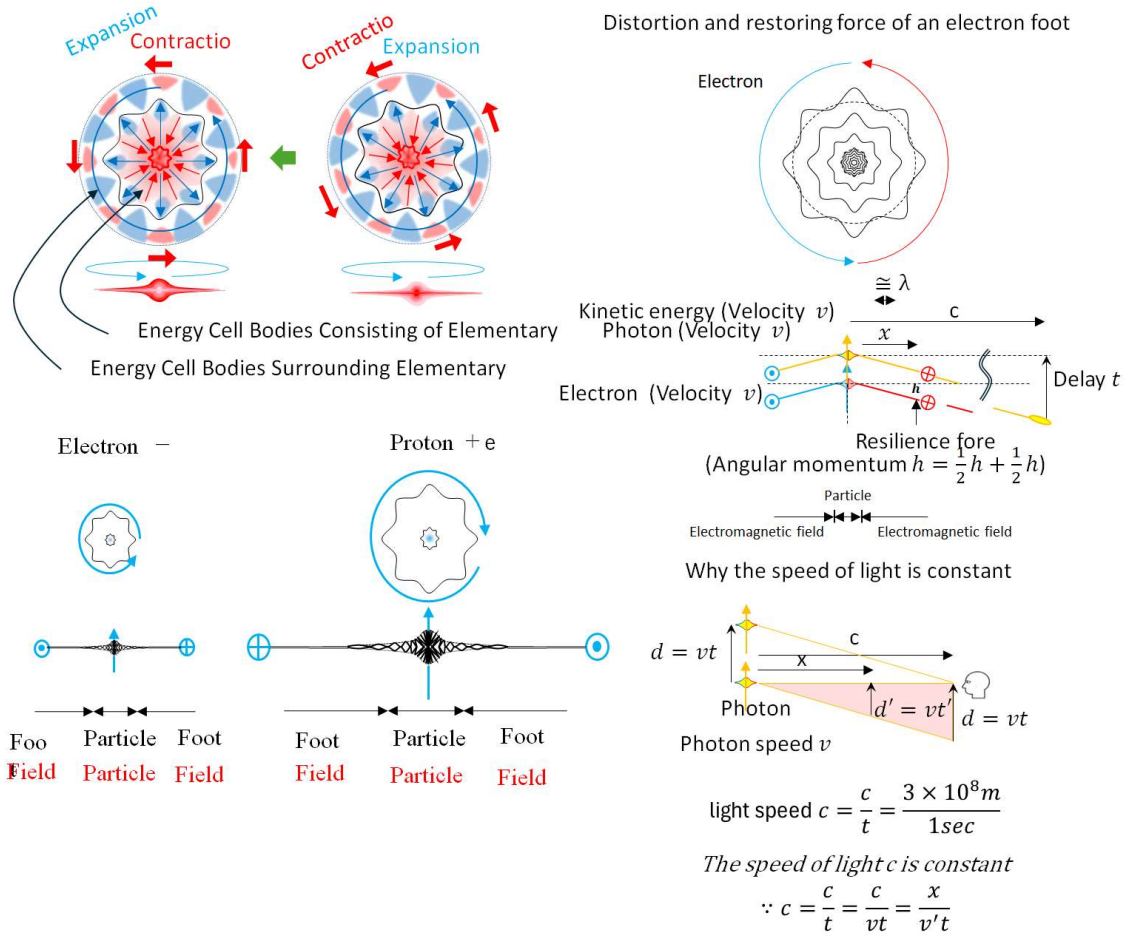


Fig1.

2.4. Photon

A photon is the kinetic energy of an electron that has been separated from the electron. When an atomic nucleus receives external energy and becomes excited, the electron on the proton's ground state orbit moves to the excited state orbit, and after that generates kinetic energy, and moves in one go back to the original ground state orbit. The speed is about 2,000 kilometers per second. It is an amazing speed that can be called instantaneous movement. The electron moves while being dragged by the kinetic energy, which is a wave, but when the electron stops, the kinetic energy is separated, and it becomes a photon.

When the energy that excites the atomic nucleus is supplied steadily, such as heat from combustion, the emission frequency of photons is constant, and the wavelength λ is a constant emission line spectrum.

When the energy that excites the atomic nucleus is supplied in a wavy manner, such as alternating current, the emission frequency of photons is wavy, and the wavelength changes to λ_1, λ_2 and λ_3 as shown in the figure. In addition to this wavelength, there is a wave λ_4 created by multiple photons that corresponds to the change in the supplied energy. When light passes through a prism, various wavelengths appear because wavelength λ_4 is separated into λ_1, λ_2, and λ_3.

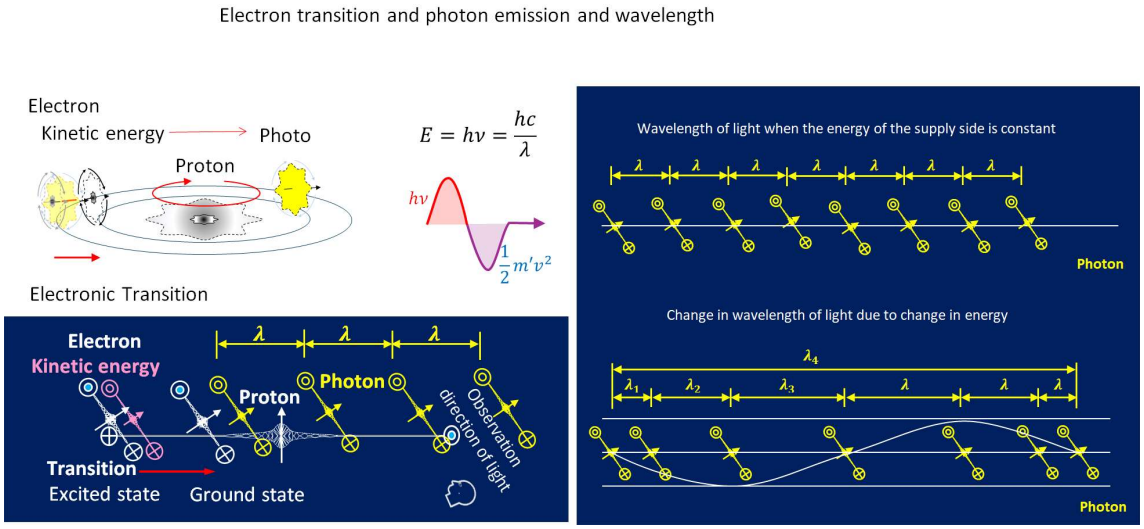


Fig2.

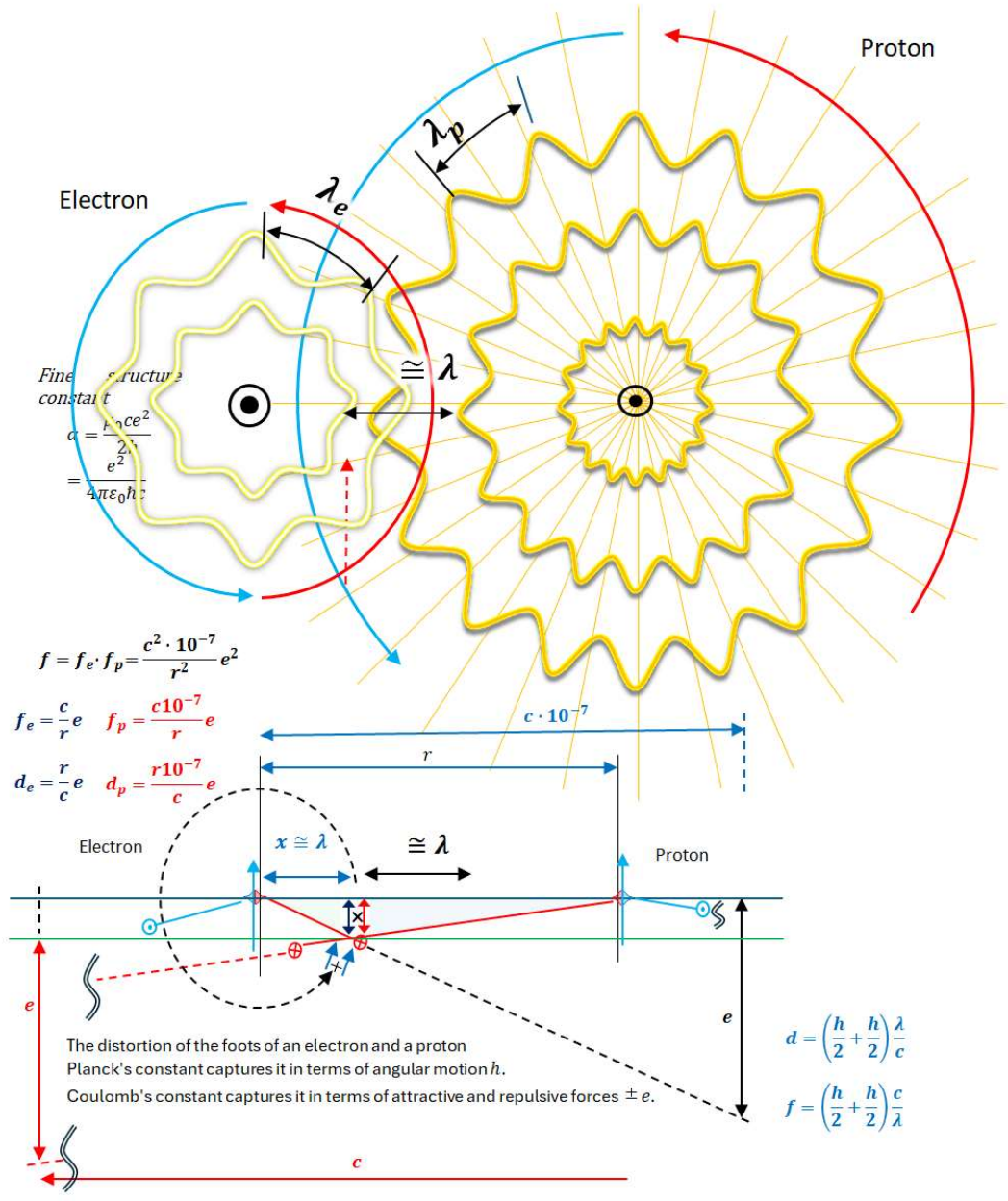
3. De Broglie waves and emission line spectrum

De Broglie wave spread from the center of an elementary particle to its foot. The wave number does not change, but instead the wavelength increases as it moves away from the center. It is derived from Bohr's quantum condition and de Broglie's equation that the number obtained by dividing the circumference of the orbit by the wavelength of a de Broglie wave is an integer.

Bohr's quanta condition $rp = n\frac{h}{2\pi}$ de Broglie's equation $\lambda = \frac{h}{p}$ $\rightarrow$ $2\pi r = n\lambda$

The wave number of the de Broglie wave of a proton is greater than the wave number of the de Broglie wave of an electron. And the wavelength of the de Broglie wave of an electron at the position where the electron is bonded to a proton is the same as the wavelength of the de Broglie wave of the proton at that position. It is also expected that the wavelength of the emission line spectrum emitted by the electron transition will be the same length. This is because the wavelengths of these three are derived using the same energy quantum.

de Broglie wavelength of an electron orbiting a proton and wavelengths of emission lines



λ_e :Electron de Broglie wave length

λ_p :Proton de Broglie wave length

λ : Wavelength of light (distance between photons) Electron transition distance

$$\lambda_e = \lambda_p = \lambda \ ?$$

Fig3.

4. Energy quantum and the speed of light

The energy quantum is the Planck constant h multiplied by the photon frequency ν .Since a photon is emitted each time an electron transition, it can be predicted that the energy quantum is linked to the frequency of light. The higher the frequency, the more photons there are per unit time, and therefore the greater the energy of the light.

$$E = h\nu = h\frac{c}{\lambda}$$

What mechanism of an electron and a proton produces this energy quantum? It comes from the restoring force of the foots of the rotating waves of an electron and a proton in the energy body theory. The triangle formed by the distorted foot of the electron and the other triangle formed by the distorted foot of the proton are similar shapes. Planck's constant h is the sum of the restoring forces of the foots of the electron and proton.

If the triangle formed by the distance and width of the distorted foot of the proton that moves due to the electron transition (the triangle painted light blue in the figure) is put at the center of the proton, it becomes similar to the triangle formed by ch. From this trigonometric ratio, the following equation is obtained.

$$\frac{c}{\lambda} = \frac{h}{d} \qquad \therefore d = h\frac{\lambda}{c}$$

The recovery energy is inversely proportional to the strain width, so the formula is as follows:

$$E = h\frac{c}{\lambda}$$

Relationship between distortion of an electron and a proton foots, and energy quantum

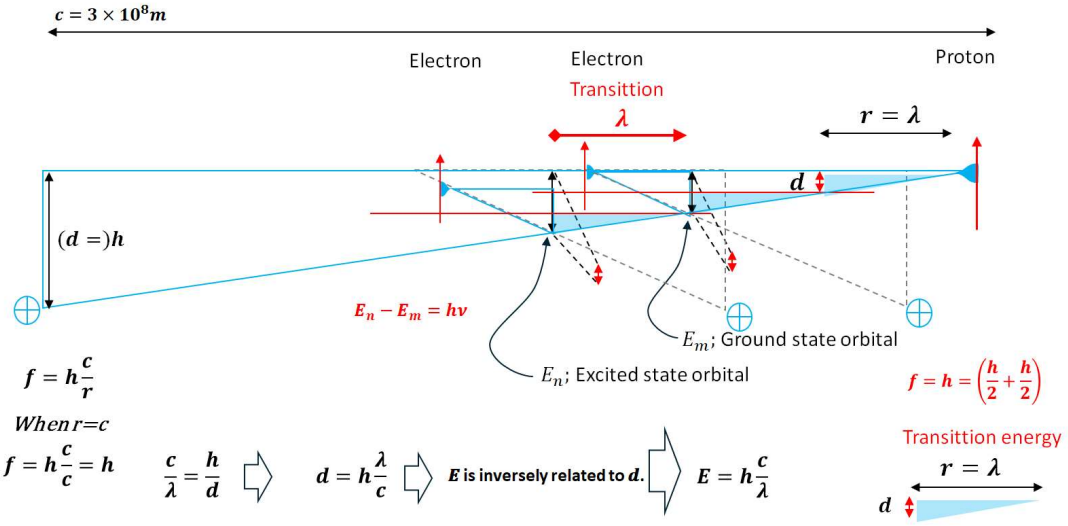


Fig4.

5. Schrödinger Equation

Fig. 5 is a flow chart showing the structure of the Schrödinger equation. As can be seen from the diagram, the Schrödinger equation is an equation that combines the de Broglie wave and the kinetic energy of electrons.

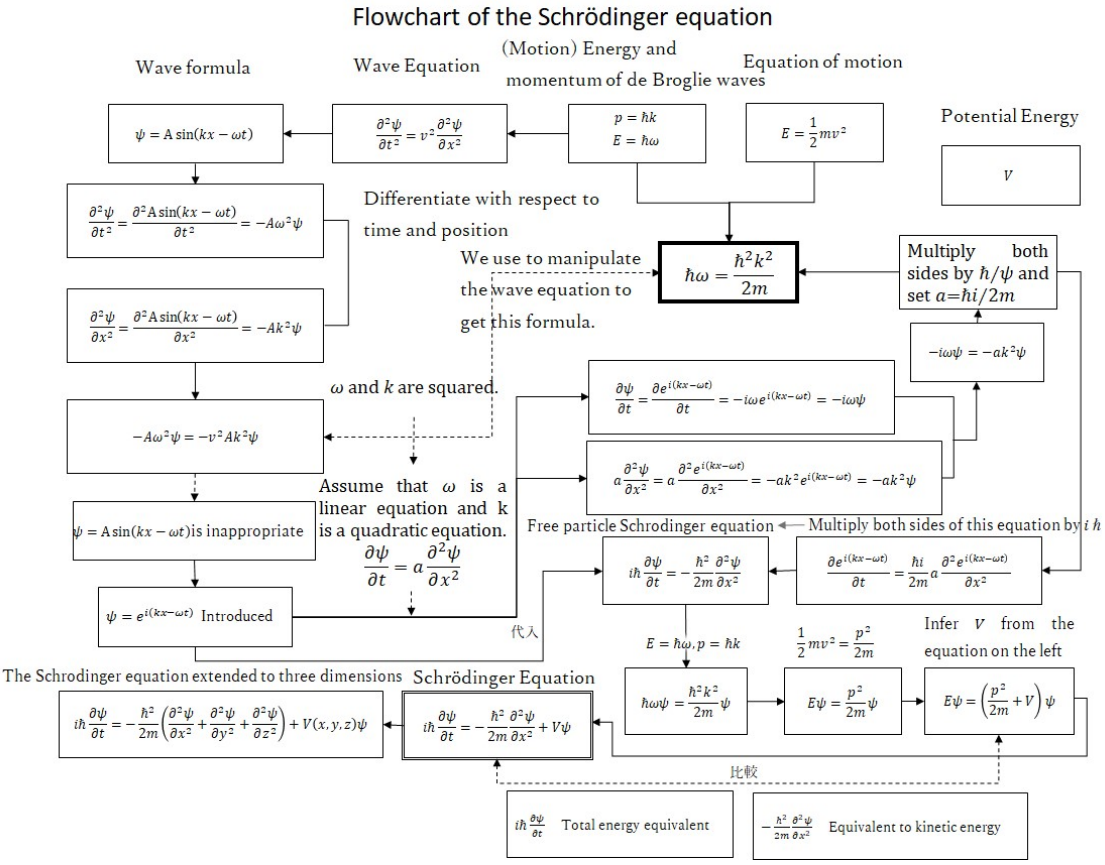
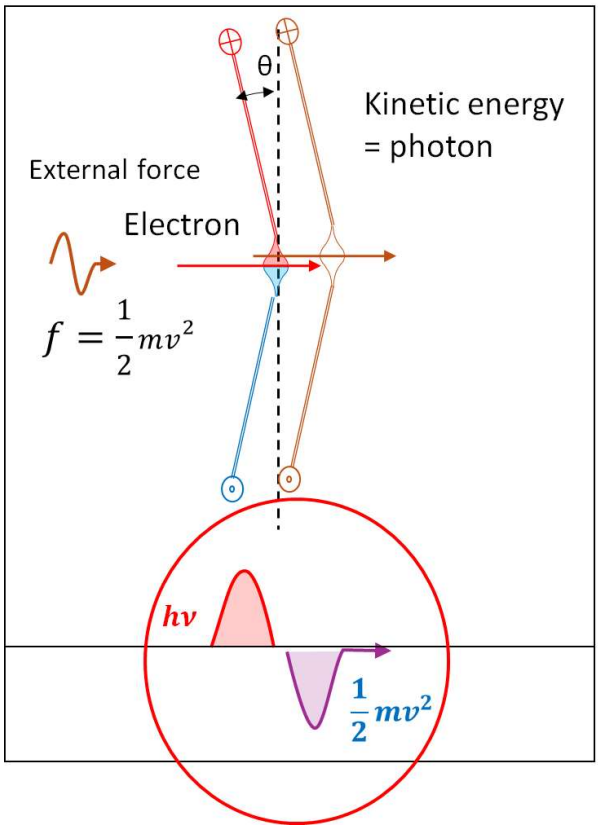


Fig5

The Schrödinger equation ultimately represents the distortion of the tail of the rotating electron wave, which is also explained in the mechanism of electrical energy propagation, and the kinetic energy wave generated in space (Fig. 6).

The shape of electrons and protons and the distortion and restoring force of the spreading of rotating waves



E_s: Static energy

$$E_s = mc^2 \quad (1)$$

E_k: Kinetic energy

$$E_k = \frac{1}{2}mv^2 \quad (2)$$

E_d: $Distortion\ Energy$

$$E_d = h\nu\left(=\frac{1}{2}mv^2\right) \quad (3)$$

Energy of an electron

$$E = E_s + E_k$$

$$= mc^2 + h\nu\left(=\frac{1}{2}mv^2\right) \quad (4)$$

Fig6.

5. Conclusion

By linking energy quanta with the kinetic energy of electrons, I found that the kinetic energy is a photon. Photon models emitted reflecting expansive disklike-shaped electrons in energy body theory form plane wave of light. The radiation interval of photons is the wavelength of the light emission spectrum. Also, because the emission spectrum is observed, we can know that we observe the thin side of the photon as light. In other words, the observer observes the side of the photon that is perpendicular to the direction of the photon's travel. Also, when electrons and protons interact, distortion (negative energy) occurs in the foot of each rotating wave, which becomes a restoring force, and generates a wave (positive energy) in the corresponding space. We found that the Schrödinger equation defines the wave that combines the distortion of the foot of the electron and the wave generated in space. Furthermore, an electron (or a proton) moves by being dragged by this wave, which is kinetic energy. This is in accordance with Einstein's famous words, "Inertial motion is the drag of space. “In addition, when an electron is in an excited state on the orbit of a proton, it is assumed that the wavelengths of the de Broglie waves of the electron and

the proton are the same. The energy quantum is obtained by dividing the distance at the speed of light (3×10 to the power of 8) by the wavelength and multiplying it by the Planck constant. It has become clear that this relationship appears as the similarity of a triangle created by the distortion of the foot of the proton.