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Derivations of Planck Constant and De Broglie Matter Waves from Yangton and Yington Theory

Edward T. H. Wu

Abstract: *Spinning particles are simulated by a whirlpool model. Because the momentum P of the spinning particle is proportional to the mass m and the spin frequency ν of the particle, therefore* $P = Km\nu = KmC/\lambda = mh_0/\lambda$ *(where* h_0 *is named General Planck Constant), De Broglie Wavelength* $\lambda = mh_0/P$*, and Planck constant* $h = m_{yy}h_0$ *(where* m_{yy} *is the mass of a photon or a Wu's Pair). Furthermore, De Broglie wavelength, momentum and energy of the electron in Bohr Model are calculated. As a result, all Planck constant h in the old formula are replaced by* $(m_e/m_{yy})h$ *such that in the new version, De Broglie wavelength* $\lambda = (m_e/m_{yy})h/P$*, momentum* $P = m_e(KZe^2)/(n\hbar)(m_e/m_{yy})$ *and energy* $E = -\frac{1}{2}m_e(KZe^2)^2/(n^2\hbar^2)(m_e/m_{yy})^2$*.*

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I. Planck Constant

At the end of the 19th century, light was thought to consist of waves of electromagnetic fields which propagated according to Maxwell's equations [1], while matter was thought to consist of localized particles. In 1900, this division was exposed to doubt, when, investigating the theory of black-body radiation [2], Max Planck proposed that light is emitted in discrete quanta of energy (photon). Studied with the photoelectric effect [3] in 1905, Albert Einstein proposed that light is also propagated and absorbed by photons. These photons would have an energy given by the Planck–Einstein relation:

$$E = h\nu$$

and a momentum

$$P = E/C = h/\lambda$$

Where ν and λ are the frequency and wavelength of the light, c is the speed of light, and h is the Planck constant [4].

II. De Broglie Matter Waves

De Broglie, in his 1924 PhD thesis, proposed that just as light has both wave-like and particle-like properties, electrons also have wave-like properties. By rearranging the momentum equation stated in the above section, we can find a relationship between the wavelength λ of an electron and its momentum p, through the Planck constant h:

$\lambda = h/P = h/mV$

All matter can exhibit wave-like behavior. It is referred as the de Broglie hypothesis [5] and Matter waves as the de Broglie waves. This is also called Wave Particle Duality. It is a central part of the theory of quantum mechanics.

Wave-like behavior of matter was first experimentally demonstrated by George Paget Thomson's thin metal diffraction experiment [6] and independently in the Davisson–Germer experiment [7] both using electrons, and it has also been confirmed for other elementary particles, neutral atoms and even molecules.

III. Wave Particle Duality of Spinning Particles

According to Yangton and Yington Theory [8], it is believed that only spinning particles such as photon and electron can have Wave Particle Duality. Since graviton doesn't spin, there is no Wave Particle Duality can be found in graviton.

A spinning particle, like a whirlpool, has a momentum that is proportional to the mass and the spin frequency:

$$P = Km\nu$$

$$P = KmC/\lambda$$

Where K is a constant.

Therefore, the energy and momentum of a spinning particle can be calculated as follows:

Because

$\Delta E = P\ \Delta V$
Assuming the final speed of the particle is Absolute Light Speed C, then
$E = PC = Km\nu C$
Given
$h_0 = KC$
Therefore,

$$E = mh_0\nu$$
$$P = mh_0/\lambda$$

And the wavelength of the spinning particle is

$$\lambda = mh_0/P$$

Where m is the mass, E is the energy and P is the momentum of the spinning particle. h_0 is the General Planck Constant and λ is the wavelength of De Broglie Matter Wave of the particle.

IV. Wu's Pair – A circulating Yangton and Yington Pair

Yangton and Yington Theory [8] is a hypothetical theory based on a pair of super fine Antimatter Particles named "Yangton and Yington" with a build-in inter-attractive force named "Force of Creation" forming a permanent circulating particle pair named "Wu's Pair" (Fig. 1). Wu's Pairs is proposed as the fundamental building blocks of the universe. Yangton and Yington Theory explains the formation of all subatomic particles and the correlations between space, time, energy and matter.

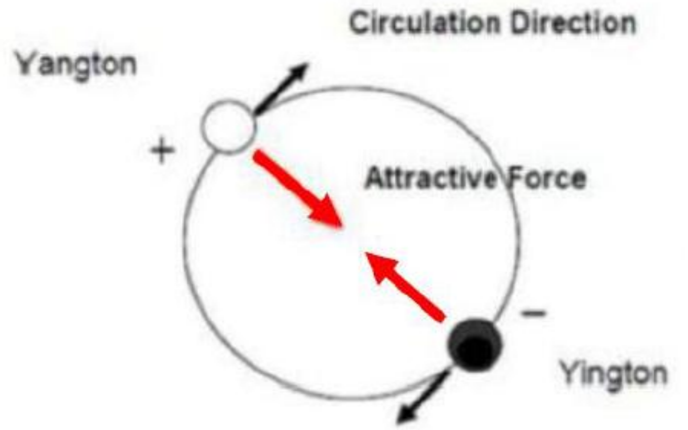

Fig. 1 Wu's Pair - a Yangton and Yington circulating pair.

V. Photon – A Free Wu's Pair

A photon is a free Wu's Pair, a super fine Yangton and Yington circulating pair, traveling at light speed in space. According to Yangton and Yington Theory, the mass of a photon is the same as that of a Wu's Pair. It is a pair of Yangton and Yington particles.

It is proposed that photon is emitted from an object through a two stage process: separation stage and ejection stage (Fig. 2) [9].

A. Separation Stage

To unlock a photon from the surface of an object, it requires thermal energy to overcome the string force between the photon and the Wu's Pair on the surface of the object.

B. Ejection Stage

After the separation stage, photon is ejected by the repulsive forces between the Yangton particles and the Yington particles between the photon and the Wu's Pair on the surface of the object.

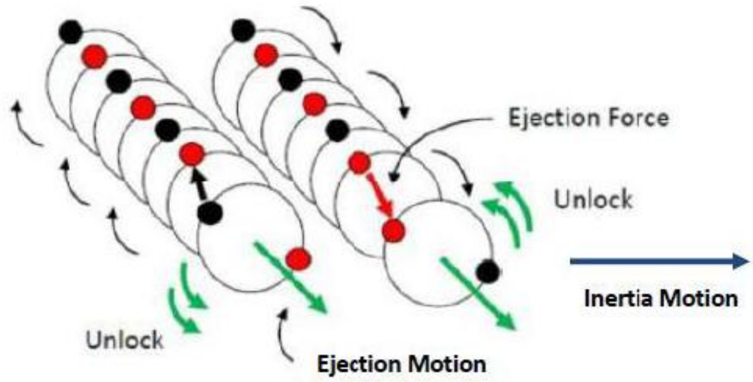

Fig. 2 A photon is formed in a two stage separation and ejection process by releasing Wu's Pair from its parent substance.

VI. Absolute Light Speed

Because of the constant ejection force in the photon emission process, regardless to the frequency, a photon escaped from its parent object should always have a constant speed 3 x 10^8 m/s known as "Absolute Light Speed" [9] in the ejection direction observed at the parent object (light source).

VII. Photon Inertia Transformation

Photon emitted from an object carries the inertia of the object (light source). In other words, photon travels not only at an Absolute Light Speed (3 x 10^8 m/s) in the trajectory direction from the light source, but also with a speed and direction as that of the light source from the observer. This phenomenon is named "Photon Inertia Transformation" [10].

VIII. Momentum and Energy of Photons

Unlike Wu's Pairs having a momentum and energy as a portion of the substance, the momentum and energy of a free photon is generated during the two stage photon separation and ejection process from the light source.
The momentum of the photon, similar to a whirlpool, is proportional to the frequency (ν) of the circulation of the Yangton and Yington particles in the Wu's Pair. Therefore,
$P = Km_{yy}\,\nu$
Where K is a constant and m_{yy} is the mass of a photon, a single Wu's Pair.
Since energy is the amount of the interaction applied on an object caused by the resistance of the action and the response of the action, therefore, the energy difference (ΔE) between a Wu's Pair and a photon can be represented by the multiplication of the momentum (P) and the change of velocity (ΔV) as follows:

$$\Delta E = P\Delta V$$

Because,
$\Delta E = E$
Also,
$\Delta V = C$
Therefore,

$$E = PC$$

Where E is the kinetic energy, P is the momentum of a photon and C is the light speed in space.
Because,
$P = Km_{yy}\nu$
$h_0 = KC$
Therefore,
$E = Km_{yy}\nu C = (m_{yy}KC)\nu = m_{yy}h_0\nu$
Given
$h = m_{yy}h_0$
Therefore,

$$E = h\nu$$

Where h is Planck constant 6.626 × 10^{-34} m^2 kg/s.
Because,

$P = E/C = (h\nu/C) = h/(C/\nu)$
$C/\nu = \lambda$
Therefore,

$$P = h/\lambda$$

And

$$\lambda = h/P$$

Where λ is the wavelength of a photon.
It is believed that during the photon separation process, the string energy [8] associated with the string force between two Wu's Pairs on the surface of the substance is converted to the kinetic energy of the photon.

IX. Electron and Bohr Model

For an electron circulating around the atomic nucleus, the wavelength of the electron can be represented as:

$$\lambda = m_e h_0/P$$

Where m_e is the mass of an electron and h_0 is the General Planck Constant.
According to Bohr model,

$2\pi R = n\lambda = nm_e h_0/P$

$m_e(V^2/R) = KZ(e^2/R^2)$

$E = -\frac{1}{2} m_e V^2$

Also,

$P = m_e V$

$h = m_{yy}h_0$

$\hbar = h/2\pi$

Therefore,

$$\lambda = (m_e/m_{yy})h/P$$

$$V = (KZe^2/m_eR)^{1/2}$$

$$R = (n^2 \hbar^2/m_eKZe^2)(m_e/m_{yy})^2$$

$$P = m_e(KZe^2)/(n\hbar)(m_e/m_{yy})$$

$$E = -\frac{1}{2} m_e(KZe^2)^2/(n^2\hbar^2)(m_e/m_{yy})^2$$

Since m_e/m_{yy} is the amount of Wu's Pairs in an electron, it is a constant and so is $(m_e/m_{yy})^2$.

X. Conclusion

Spinning particles are simulated by a whirlpool model. Because the momentum P of the spinning particle is proportional to the mass m and the spin frequency ν of the particle, therefore $P = Km\nu = KmC/\lambda = mh_0/\lambda$ (where h_0 is named General Planck Constant), De Broglie Wavelength $\lambda = mh_0/P$, and Planck constant $h= m_{yy}h_0$ (where m_{yy} is the mass of a photon or a Wu's Pair). Furthermore, De Broglie wavelength, momentum and energy of the electron in Bohr Model are calculated. As a result, all Planck constant h in the old formula are replaced by $(m_e/m_{yy})h$ such that in the new version, De Broglie wavelength $\lambda = (m_e/m_{yy})h/P$, momentum $P = m_e(KZe^2)/(n\hbar)(m_e/m_{yy})$ and energy $E = -\frac{1}{2}m_e(KZe^2)^2/(n^2\hbar^2)\ (m_e/m_{yy})^2$.

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