Photons and independent E/M waves

Michael Tzoumpas
Mechanical and Electrical Engineer
National Technical University of Athens
Irinis 2, 15234 Athens, Greece

E-mail: m.tzoumpas@gmail.com

June 2019

Abstract. The independent E/M waves are created as another form of E/M waves, during the electron oscillations at an emission antenna. These waves do not compose the constant photon length, in contradiction to the fundamental E/M waves of photon. Additionally, the Compton phenomenon is interpreted, while the atomic orbitals are standing waves the self-superposition of the motion wave of electrons.

Keywords: E/M waves.

PACS numbers: 03.50.Kk, 12.10.-g

1. The E/M waves as photons

By the unified theory of dynamic space,[1,2] the constant length[3,4]

$$L = 3000m \Rightarrow L = 10^{58} L_0 \tag{1}$$

of the photon and the constant length of photon helix[3,4]

$$\pi L = \pi 3000m \Rightarrow \pi L = \pi L_0 10^{58} \tag{2}$$

are determined, where

$$L_0 \approx 10^{-54} m \tag{3}$$

the quantum length[5] of the electric dipole. In the photon helix (Eq. 2), one or more forces talantonion[6]

$$f_\tau \approx 10^{26} N \tag{4}$$

are accumulated. The forces talantonion f_τ, which are accumulated in the constant length of photon helix, determines the wavelength, the number of the fundamental E/M waves and the frequency of the photon.[4] Therefore, all fundamental E/M waves, which are derived from the motion meridians[7] of the electron and have a constant photon length L, are the autonomous motion of E/M waves, the photons.

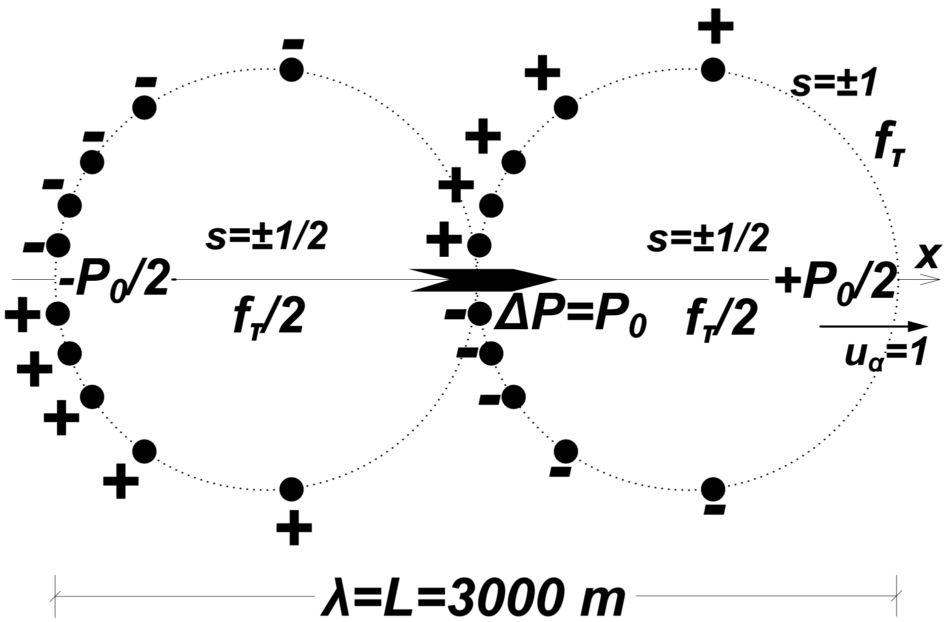

Figure 1. The two E/M formations compose the fundamental E/M wave[4] with a spin $s = +1/2 + 1/2 = +1$ or $s = -1/2 - 1/2 = -1$ and an accumulated force of one talantonion ($f_\tau = f_\tau/2 + f_\tau/2$) and a wavelength $\lambda = L = 3000$m

The fundamental E/M waves[4] (Fig. 1), which constitute the photon, have interchangeable spin (+1, −1). So, depending on the number of the fundamental E/M waves (even or odd), the photon spin becomes $s = 0$, or $s = \pm 1$.

2. Emission of independent E/M waves

The independent E/M waves are created as another form of E/M waves, during the electron oscillations at an emission antenna. These waves do not compose the constant photon length $L = 3000$m, in contradiction to the fundamental E/M waves of photon.

At the upper end of the emission antenna (Fig. 2), where the electron, while executing linear oscillations, has zero linear speed, a maximum downwards linear acceleration γ is created and some forces talantonion[6] appear on the pairs of motion meridians.[7] This change of the electron kinetics affects the pressure difference ΔP of the electron spin[8] and therefore the spin oscillations of the electron begins and at the same time the electron spin tends to zero (from $s = +1/2$ to $s = 0$) at the middle of the antenna, under the influence of the angular deceleration a. So, due to the negative charges of the electron, the inductive forces[9] F_{G+} and F_{G-} are developed (inductive phenomenon), which compress the grouping units[9] to the left (Fig. 2) of the motion meridian that is vertical to the electron spin.

Subsequently, at the middle of the antenna, the electron acquires its maximum speed u and the spin becomes $s = 0$. Lower to the medium of the antenna, the electron is decelerated reducing the accumulation of forces talantonion on motion meridians.

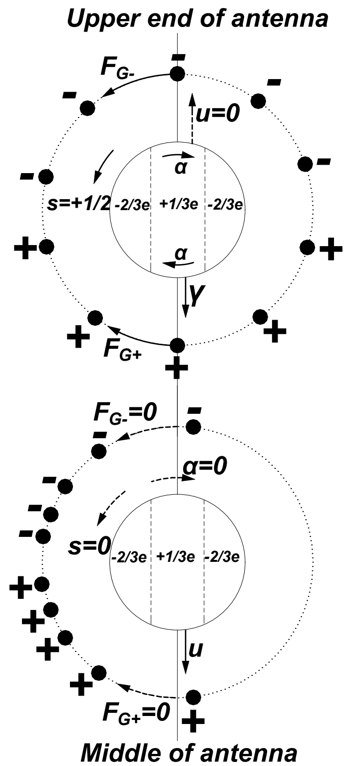

Figure 2. The electron spin $s = +1/2$ tends to zero ($s = 0$) from the upper end to the middle of the emission antenna with result an accumulation of grouping units to the left

Finally, at the lower end of the antenna, the linear speed of the electron becomes zero under the influence of the maximum linear deceleration γ. The continuing spin oscillations of the electron alters the electron spin from $s = 0$ at the middle of the antenna to $s = -1/2$ at its lower end, resulting the further compression of the grouping units to the left (Fig. 3) under the influence of the forces F_{G+} and F_{G-} (inductive phenomenon) due to the angular acceleration a.

The E/M formation, now, has developed the whole pressure difference

$$\Delta P = P_0, \tag{5}$$

vertical to the direction of oscillation and, due to zero speed of the electron at the lower end, the exit of the first E/M formation begins to the direction of motion arrow ΔP.

The opposite happens during the upwards motion of the electron, from the lower to the upper end of the antenna, since, by the spin oscillations, the spin becomes from $s = -1/2$ first $s = 0$ and then $s = +1/2$. Subsequently, the forces F_{G+} and F_{G-} (inductive phenomenon) compress the grouping units of the motion meridian that is vertical to the electron spin to the left, creating the second E/M formation with opposite, to the first E/M formation, charges (indicatively see Figs 2 and 3).

So, with the exit of the second E/M formation, vertical to the direction of oscillation, the E/M wave of two spindles with alternating charges of units is completed (Fig. 4).

Of course, from the number of motion meridians, only those who are close to the vertical level to the electron spin are formed by the forces F_{G+} and F_{G-} (inductive phenomenon). After the exit of these motion meridians as E/M formations, more meridians follow, which occupy the positions close to the vertical level of the electron spin.

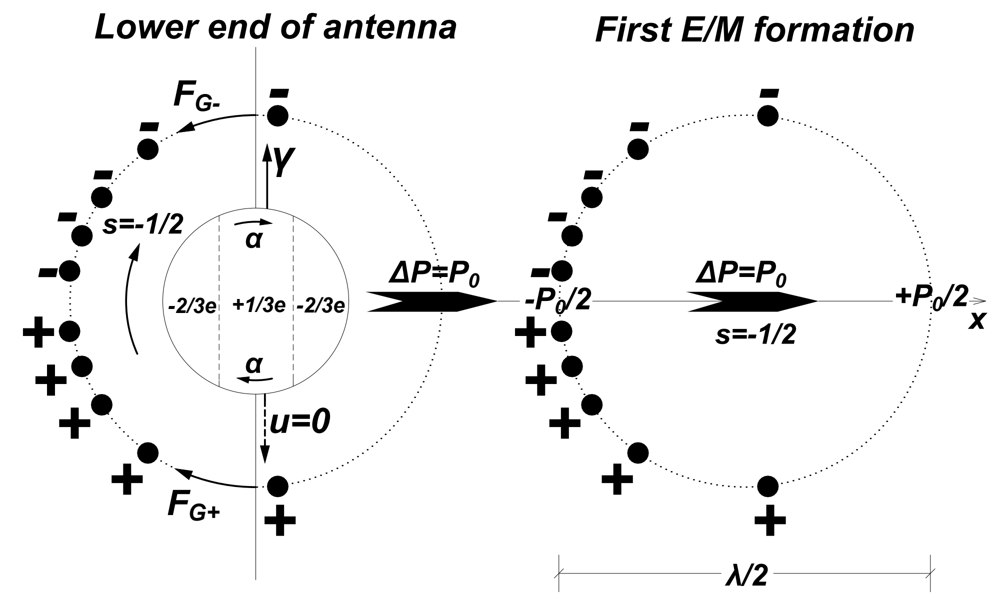

Figure 3. Reversion of the electron spin ($s = -1/2$), further accumulation of grouping units to the left, creation of a motion arrow ΔP and exit of the motion meridian as a first E/M formation

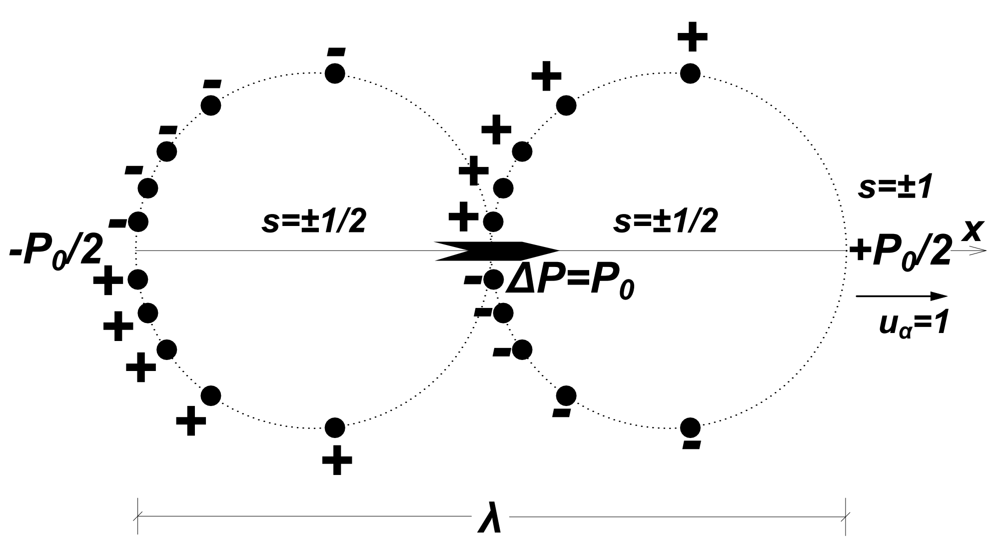

Figure 4. The first (Fig. 3) and the second (as is described) E/M formation completes the E/M wave vertical to the emission antenna with a spin $s = +1/2 + 1/2 = +1$ or $s = -1/2 - 1/2 = -1$

Therefore, the number of motion meridians that are formed as E/M formations, is very small, depending on the accumulated force. Hence, in every electron oscillation the radiation energy is very small, while the remaining energy returns to the field caused by the electron oscillation, in-phase with every electron deceleration.

These independent E/M waves may be continuous or non continuous with empty intervals that are multiples of wavelength λ (Fig. 4), which are in-phase with the electron oscillation. Therefore, the electron oscillation creates independent E/M waves with a wavelength corresponding to the oscillation frequency of the electron.

This radiation form of independent E/M waves, with in-phase allocation along the space, as a result of the electron oscillations, differs from the photonic form (section 1) of the accelerated or decelerated linear motion of the electron.

3. Absorption of independent E/M waves

The absorption of the independent E/M waves takes place reversely to their creation. When an electron of the receiver antenna is found in the first E/M formation (Fig. 5) of the E/M wave, the pressure difference ΔP of the electron spin $s = +1/2$ is affected by the motion arrow $\Delta P = P_0$ of E/M formation and is altered, thus reversing the electron spin to $s = -1/2$.

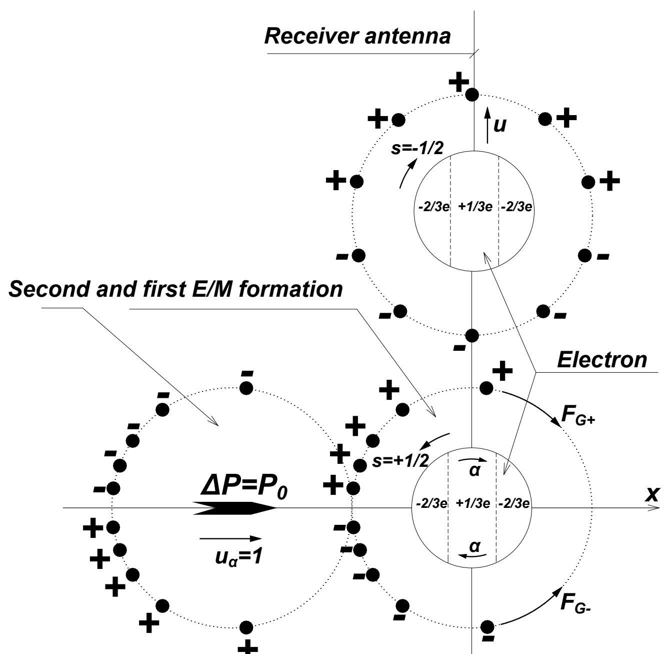

Figure 5. Absorption of the first E/M formation by the electron with creation of its motion meridian

This reversion of the electron spin decelerates initially and then accelerates the negative charges of the electron (with angular deceleration or acceleration a), resulting to the creation (Fig. 5) of the forces F_{G+} and F_{G-} (inductive phenomenon). The result is the conversion of the E/M formation into a motion meridian[7] of the electron, with an arrow of motion upwards in Fig. 5, i.e. towards the positive grouping units.[9] The motion of electron to the upper end of the receiver antenna creates there a negative charge, which reduces the electron speed to zero and the electron is repelled towards the lower end, while it is forced to oscillate at a frequency equal to that of the absorbed independent E/M waves.

The opposite happen now, when an electron is found with opposite spin ($s = -1/2$) in the second E/M formation with opposite allocation of its grouping units (Fig. 5), in which case the reversal of the electron spin creates a motion meridian of the electron downwards. So, the second E/M formation of E/M wave is absorbed.

The electron motion to the lower end of the receiver antenna creates there a negative charge, which reduces the electron speed to zero and the electron is repelled upwards to the upper end, while it is forced to oscillate at a frequency equal to that of the absorbed independent E/M waves.

However, if an electron ($s = -1/2$) is found in the first E/M formation (indicatively see Fig. 5), then the reversal of its spin at $s = +1/2$ further compresses the already compressed grouping units of E/M formation and is not converted into a motion meridian of the electron. The same happens with the second E/M formation that follows, so a motion meridian is not created again and the E/M wave passes without interacting with this electron (with a spin $s = +1/2$).

4. Interpretation of Compton scattering

The unified theory of dynamic space[1,2] does not accept the paradox of the wave-particle duality. For the photon-electron interaction, at the emission of photons[4] or independent E/M waves, see section 1, while for their absorption by the electrons (Fig. 5), see section 2. So, the above theory interprets the Compton scattering as follows:

The accumulated force of the photon is

$$F_s = n f_\tau, \tag{6}$$

where f_τ the force talantonion,[6]

$$n = \frac{\nu_n}{\nu_\tau} \tag{7}$$

the number of the fundamental E/M waves-forces talantonion, ν_n the frequency of the photon and

$$\nu_\tau = 10^5 Hz \tag{8}$$

the frequency of the fundamental E/M wave or of the weaker radiation that the dynamic space can give.[4] Therefore, the photon of high frequency has a great accumulated force (into a small wavelength λ), which, in front of and behind the photon, installs a motion arrow $\Delta P = P_0$ (Eq. 5). This great pressure difference $\Delta P = P_0$ creates high thickening of electric units in a small wavelength

$$\lambda = 0,071 nm \tag{9}$$

and blocks the entrance of the electron in E/M formations of the photon as a compact wall, while the same pressure difference $\Delta P = P_0$ with low thickening of electric units in longer wavelength λ can be allowed the entrance (Fig. 5) of the electron in the E/M formation. At Compton scattering, therefore, the electron impinges against the wall of the high thickening of electric units of the high frequency photon, because of which it is scattered.

How, now, does the electron come out (Fig. 3) from the E/M formation of high frequency, during its creation? As known, the breakage of a potential concave surface is easier than the breakage of a potential convex surface of the E/M formation and, therefore, the emission of high frequency photons from the electrons is possible.

Consequently, the photon of Compton phenomenon behaves as a “particle” with momentum

$$p = \frac{h}{\lambda} \tag{10}$$

in modern Physics, or

$$p = \frac{F_s L_0}{C_0} \tag{11}$$

in unified theory of dynamic space,[1,2] as an autonomous compact motion formation, where $L_0 \approx 10^{-54}$m (Eq. 3) the quantum length of the electric dipole,[5] F_s the accumulated force[6] in the formation of the photon and C_0 the speed of light.[10]

5. The photons at the atomic orbitals

The atomic orbitals are created, due to the motion wave of the electrons[11] as a cause of the self-superposition (standing waves). However, on atomic orbitals there is only the centripetal acceleration, causing the change of the electron direction that maintains it on circular orbit. Linear acceleration (or deceleration) occurs in elliptical orbits, wherein the created photon is absorbed instantaneously by the same electron (see section 3).

So, the emission of the photons[4] is described as a consequence of linear acceleration of the electron. Therefore, a photon emission happens only during the falling of an electron at a lower energy atomic orbital, which happens by linear acceleration.[4] In order to jump at a higher orbital (with higher n), the electron needs energy to overcome the attractive force of the nucleus. As it is known, a photon gives this energy, which is absorbed and converted to pairs of motion meridians,[7] whose the mechanism is described in section 3.

6. References

[1] N.I.Gosdas, *The Unified Theory of Dynamic Space*, Greek Edition (Trohalia, Athens, 1999).

[2] M.Tzoumpas, *Hubble's Law and antigravity - Higgs boson and gravity*, http://viXra.org/abs/1710.0082 [Quantum Gravity and String Theory].

[3] M.Tzoumpas, *What is de Broglie's wave-particle?*, http://viXra.org/abs/1806.0248 (section 2) [Quantum Gravity and String Theory].

[4] M.Tzoumpas, *Unified E/M waves theory*, http://viXra.org/abs/1905.0079 (section 1) [Quantum Gravity and String Theory].

[5] M.Tzoumpas, *Hubble's Law and antigravity - Higgs boson and gravity*, http://viXra.org/abs/1710.0082 (subsection 3.2) [Quantum Gravity and String Theory].

[6] M.Tzoumpas, *Time as motion phenomenon - Physics Laws do not apply to inertial systems*, http://viXra.org/abs/1802.0372 (section 3) [Relativity and Cosmology].

[7] M.Tzoumpas, *Unified E/M waves theory*, http://viXra.org/abs/1905.0079 (section 2) [Quantum Gravity and String Theory].

[8] M.Tzoumpas, *What is the spin of the particles?*, http://viXra.org/abs/1810.0281 [High Energy Particle Physics].

[9] M.Tzoumpas, *What is de Broglie's wave-particle?*, http://viXra.org/abs/1806.0248 (section 1) [Quantum Gravity and String Theory].

[10] M.Tzoumpas, *Hubble's Law and antigravity - Higgs boson and gravity*, http://viXra.org/abs/1710.0082 (subsection 2.5) [Quantum Gravity and String Theory].

[11] M.Tzoumpas, *Explanation of double-slit experiment*, http://viXra.org/abs/1807.0450 (sections 2 and 3) [Quantum Gravity and String Theory].