Introducing Photon as the Basis and Foundation of Quantum Energy

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If we look at the world around us, the first thing we see is the Earth, turning around its axis at about $1{,}600\ ^{km}/_{h}$ and orbiting the Sun at about $110{,}000\ ^{km}/_{h}$. The speeds we don't even feel.

During the day, we see the beautiful, radiant Sun, which isn't visible at night, but the bright Moon is. At night, the sky has a beautiful illumination from the stars, which is made even more beautiful by the moonlight.

If we pay attention to the smallest particles around us, we first encounter water and air molecules. Smaller than these are atoms and subatomic particles like electrons, and much smaller than those are light, or the same photons, which are seen during the day and night.

If we want to consider the smallest particles in the universe, first there are molecules and atoms, and smaller than them are electrons, and smaller than those are "atom of electrons", or photons. Photons are the smallest independent particle in terms of mass, dimensions, and other physical properties.

If we want to define a basic unit for energy, we can consider photons, because, as shown and proven in previous discussions, photons have a constant speed, a specific mass, and unique properties.

In fact, photons are the tangible embodiment of the smallest packets of energy in the universe: independent, free, and always accessible. As the saying goes, sometimes the answer is right before our eyes; we just need to look more closely. Therefore, photons can be considered (given their specific conditions) the foundation of quantum energy.

Properties of the Photon:

* Constant mass ($m_p = 1.64 \times 10^{-36} kg$)

* Constant total speed ($V_T = 3.3\ C$)

If we consider the energy of a photon as the smallest unit of energy, we have:

$$E_q = E_p = \frac{1}{2} m_p {V_T}^2 = \frac{1}{2} m_p (3.3\ C)^2$$

$$E_q = S = 8 \times 10^{-19} J$$

According to the derived relationship, we can define a basic energy packet with a constant value,

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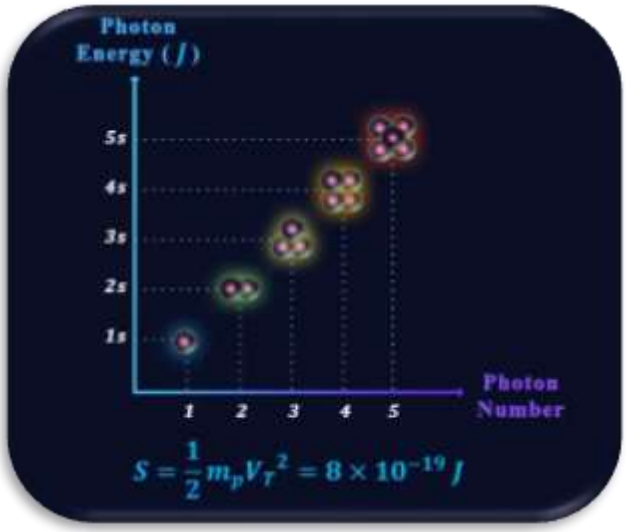
which aligns with the definition of a quanta of energy (the smallest discrete amount of energy).

Notice:

This characteristic is clearly seen in photons, consistent with the definition of quantum energy (the smallest packet of energy that increases discretely and its value increases by an integer multiple). This is because in a collection of photons, the total energy is equal to the sum of the energy of each photon.



By plotting a table where the horizontal axis represents the number of photons and the vertical axis represents their discrete energy value, it can easily be shown that the photon has the potential to be introduced as the quanta of energy.

Accordingly, the Saleh Theory Group proposes considering the photon as the quantum's nature and its kinetic energy as its quantity. Since this aligns with all laws (such as the Max Planck equation).

For instance, as we have proved before, for green spectrum ($f_G = 600\ THz$) we have:

$$\frac{E_T}{2} = E_L = E_r = hf_G = 4 \times 10^{-19} J$$

Given that the calculated basic energy value for green ($f_G = 600\ THz$) is equivalent to Planck's energy equation (which is the basis and foundation of electromagnetic energy value), therefore, the photon could be introduced as the basic unit (quanta) of energy, which is fully consistent with Planck's energy calculations.

In fact, based on the calculations and evidence presented, photons are the best option for defining the quanta of energy, and based on them, we can calculate the actual and real energy, and it is very suitable for measuring the unit and basic value of energy.

Result: If we want to provide a comprehensive definition for quanta of energy, photons, or electromagnetic waves, which are the smallest independent particles around us, have the merit

and capability for this.

In fact, it can be said that the best nature for quanta of energy and the equations governing it are photons and the energy presented for them in this article.

References:

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