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Research Article

Random forces in quant (photon) formation

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Abstract

In this paper equations for quant energy formation were derived. Quant and photon energy were studied. Random forces effect in quant formation was taking into account. Different between photon and quant was discussed. A photon is a tiny particle of light. But, it is the tiniest particle of light possible in Nature and type of quantum, that is, a tiny particle. Particles differ from waves in that they are localized, that is, they have a small and definite position.

Keywords: *electromagnetic wave, quant, photon, tiniest particle, quantum level.*

INTRODUCTION

The electromagnetic (EM) spectrum is the range of all types of EM radiation. Radiation is energy that travels and spreads out as it goes – the visible light that comes from a lamp in the house and the radio waves that come from a radio station. In physics, electromagnetic radiation *(*EM radiation or EMR) refers to the waves (or their quanta, photons) of the electromagnetic field, propagating (radiating) are two types of electromagnetic radiation.

6G-sixth-generation wireless is the successor to 5G cellular technology. 6G networks will be able to use higher frequencies than 5G networks and provide substantially higher capacity and much lower latency. One of the goals of the 6G Internet will be to support one micro-second latency communications, representing 1,000 times faster or 1/1000th the latency than one millisecond throughput (Parcel and Morin, 2013; Cloude, 1995; Savkovic Stevanovic, 2019a; 2019b).

The 6G technology market is expected to facilitate large improvements in the areas of imaging, presence technology and location awareness. Working in conjunction with artificial intelligence, the computational infrastructure of 6G will be able to autonomously determine the best location for computing to occur; this includes decisions about data storage, processing and sharing. 5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices. Some 5G pundits contend that the new network generates radiofrequency radiation that can damage DNA and lead to cancer; cause oxidative damage that can cause premature aging; disrupt cell metabolism; and potentially lead to other diseases through the generation of stress proteins.

At low frequencies, external electric and magnetic fields induce small circulating currents within the body. The main effect of radiofrequency electromagnetic fields is heating of body tissues. There is no doubt that short-term exposure to very high levels of electromagnetic fields can be harmful to health (Savkovic Stevanovic, 2020; Bartlett et. al., 2021).

To protect against 6G and 5G and other electromagnetic fields in your home, the electromagnetic field home adaptor is recommended. The home adaptor will correct the 6G or 5G or 4G signal going to devices like a tablet in our home. It will not fully protect against fields originating out of your home (such as the neighboring routers and cell towers).

Some studies have found a link between electromagnetic field exposure and a higher risk of childhood leukemia, but other studies have not. Other studies have not found proof that electromagnetic field exposure causes other childhood cancers. Studies in adults did not prove that electromagnetic field exposure causes cancer.

This paper revisits the quantum mechanics for one photon from the modern viewpoint and by the geometrical method. Especially, besides the ordinary (rectangular) momentum representation, we provide an explicit derivation for the other two important representations, called the cylindrically symmetrical representation and the spherically symmetrical representation, respectively. These other two representations are relevant to some current photon experiments in quantum optics. In addition, the latter is useful for us to extract the information on the quantized black holes. The framework and approach presented here are also applicable to other particles with arbitrary mass and spin, such as the particle with spin 1/2 ring final disposal. In this work quant, photon formation and electromagnetic waves were examined.

DIFFERENT BETWEEN QUANT AND PHOTON

A photon is a tiny particle of light. It is the tiniest particle of light possible in nature. A photon can also be described as a type of quantum, that is, a tiny particle. Some other types of quanta (plural) are electrons, neutrinos, and the Higgs boson. A quantum is the tiniest particle possible of a particular substance. For example, in the case of an electron, it's the tiniest particle possible of negatively-charged matter, just as a photon is the tiniest particle possible of light.

Carbon molecules emitting a photon (in green). Yes, the photon looks like it's moving towards the molecules—no accounting for the whims of artists (Ambrosiano, 2017).

This description is saying something interesting that nature does not allow us to cut matter and energy into smaller pieces indefinitely. Let's say that we could cut a rock down into tiny grains of sand, but there were some natural law that a grain of sand is as small as can get. If this were true, a grain of sand would be a quantum of rock. But, of course, can cut a grain of sand into ever smaller grains. Only when we get down to the level of electrons and other subatomic particles, does Nature call a halt to the cutting. That's when we hit the quantum level.

A single photon of light is too dim for a human being to see. It takes a few photons for us to detect light. Frogs, however, are able to see a single photon.

In summary, a photon is the tiniest possible particle of light, a quantum of light. A quantum, on the other hand, is the tiniest possible particle of any substance at the subatomic level and includes, for example, electrons and neutrinos (Savkovic Stevanovic. 2023; 2022).

To see how light can be divided into photons, it's necessary to understand a bit more about light. Light travels as a wave. Specifically, it travels as an electromagnetic wave. An electromagnetic wave is an electrical wave and a magnetic wave traveling together and interacting.

Physicists call all electromagnetic waves "light." This includes visible light, the kind that see with our eyes, but also X-rays, ultraviolet rays, infrared, microwaves, radio waves (which carry TV and radio signals), and others. The difference between the various types of electromagnetic waves is their wavelength.

Electromagnetic waves of various types are light. So, the term "photon" can mean a particle of visible light but also a particle associated with X-rays, microwaves, or any other part of the electromagnetic spectrum.

LIGHT IS A WAVE AND ALSO A PARTICLE

When light, that is, an electromagnetic wave, strikes an object, it immediately collapses into tiny bits or particles of energy. Please don't take this literally; it's meant only metaphorically. Each of these particles is a photon. It's as if an ocean wave hits a rock and shatters into a gazillion tiny droplets. Each "droplet" of the light wave is a photon, and each carries a bit of energy. If a wave of visible light were to strike a piece of photographic film, we would be able to see the traces of all the photons which struck it. Each photon creates a tiny dot, a bit of the photo, usually a small fraction of a pixel. Together, the photons form the image.

Waves, including light waves, are spread out in space (Savkovic Stevanovic, 2024 a; 2024 b). When it strikes the film, the light is no longer acting as a wave; it's acting as a particle. Particles differ from waves in that they are localized, that is, they have a small and definite position.

In summary, light acts as both a wave and a particle. When traveling, it's an electromagnetic wave (Savkovic Stevanovic, 2024 c). But upon striking objects, it acts as a particle. While "photon" is the name given to light only when it acts as a particle, people may neglect the distinction. They often use the term "photon" for light at all times, whether it's in wave form or particle form.

As a note, the term "photon" comes from the ancient Greek *photos*, which means "light" and the ending *-on*, which means "a particle." "Photon" means literally "light particle."

WHAT IS QUANTUM

The general term for all types of subatomic particles which are of the smallest possible size allowed by Nature is "quanta." "Quanta" is the plural; "quantum" is the singular. The term "quantum" comes from the Latin *quantus* which means "how much." In its original meaning, a "quantum" is the tiniest particle of a substance that Nature allows. However, often people call any tiny particle that follows the laws of quantum physics a "quantum" even when it's not the smallest allowed by Nature.

Light waves don't physically shatter when they hit objects. They interact with the objects and due to the laws of quantum physics, the waves transform into tiny energy-bearing particles, that is, photons.

The physical nature of waves at the subatomic level is difficult to describe. It's still under debate due, in part, to the odd ways in which these waves behave in experiments. One view, for example, is that they are no more than mathematical expressions in the form of a wave equation which somehow create physical.

HOW QUANT IS FORMED

Electromagnetic waves emitted in the form of quant, with total emitted energy $E = nhf$ to the final product. When these quant energies are high density then becomes substance. Thus, substance is high density energy.

Energy quant can form on the probabilistic manner. The quant energy term can be derived according to following equation:

$$\Delta p \Delta q = \varepsilon \Delta t \qquad (1)$$

where p probability of position, q is probability of time, ε is quant energy and t is time. This formula includes no determine principle. Vibration change can be defined as:

$$\Delta f = \frac{\varepsilon}{h} \qquad (2)$$

where f frequency.

where $h = 6.62\ \ 10^{-34}\ Js$ universal Plank's constant, f frequency and λ wave length of electromagnetic waves which emitted.

Like other waves, electromagnetic waves have properties of speed, wavelength, and frequency.
To set the start frequency is very important. The maximum stop frequency can measure by the measurement hardware.

FORCES AFFECTED IN QUANT ENERGY FORMATION

Forces which can influence to energy of quant are nonrandom forces and random forces. Nonrandom forces are gravity force, electromagnetic force, friction force and pressure. Random forces can be some interaction, collision, black hole, electricity or some obstacle.

$$m\frac{dv}{dt} - G - F - P - R = 0 \qquad (3)$$

where v particle velocity moving, m - particle mass, G - gravity force, F -friction force, P - pressure force, and R - random force and t - time.

$$G = ma_g, N$$

$$F = ma_f, N$$

$$P = ma_P, N$$

$$R = pma_R, N$$

where a -acceleration, p - probability of occur.

DISCUSSION

The equation for quant formation has derived, first time in literature.
Random forces and nonrandom forces were defined.
Light different length waves were identified.

Each particle of light is a photon, that is tiniest particle of light.
Different between quant and photon was defined. A quantum is the tiniest particle possible of a particular substance. A photon is the tiniest particle possible of light.

CONCLUSION

In this paper equation for quantum energy formation was defined. The effect nonrandom and random forces were included.

Electrons are the quanta associated with electron waves; neutrinos are the quanta associated with neutrino waves; etc. Just like photons, electrons cannot be further divided into something smaller, nor can neutrinos.

The physical nature of waves at the subatomic level is somewhat mysterious. Photon can also be described as a type of quantum.

NOTATION

a - acceleration, m/s^2

g - gravity acceleration, m/s^2

F - friction force, N

f - frequency, s

$h = 6.62 \ \ 10^{-34}$ Js -universal Plank's constant

m - particle mass, kg

p - probability of position

q - probability of time

t - time, s

v - particle velocity moving, m/s

Greek symbols

ε - quant energy, J

λ - wave length, m

Index

g - gravity

f - friction

P - pressure

R - random

Abbreviation

DNA - deoxyribonucleic acid
EM - electromagnetic waves
EMR - electromagnetic radiation

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