Review of: "Some Considerations on the Speed of Light"

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Potential competing interests: No potential competing interests to declare.

I have accepted the invitation to review the paper, even though my specialty is inorganic chemistry. When reviewing a manuscript that challenges mainstream theory, it is important to comment on the arguments presented in the manuscript rather than insisting on evidence for the mainstream theory to deny its publication.

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However, this paper falls within the framework of accepted theory with innovative ideas proposed.

A. Comments Concerning the Suitability for Publication

The criteria for the publication of manuscripts are three: (1) Is it new? (2) Is it surprising? (3) Is it correct?

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The least important criterion is (3) (Is it correct) when this cannot be determined at the present time. Journals serve as forums where different ideas confront and inspire innovations. In history, research results based on erroneous theories were published during periods when the inaccuracies of the theories had not yet been realized. Failed experiments are allowed to be published to present full perspectives for consideration. Innovative ideas, even those at risk of future failure, may hold value in inspiring the progress of science.

This paper is one of the rare inspiring papers deserving publication. It provides a serious endeavor to explain experimental results related to the measurement of the speed of electromagnetic waves. Therefore, I recommend its publication.

B. Background Information

In established theory (Maxwell's equations in college physics), the speeds of all electromagnetic waves with different frequencies are the same in a vacuum, denoted as "*c*." This consistency applies to the speed of photons and the speed of wave propagation.

When electromagnetic waves enter a different medium, their frequency remains unaffected, though the energy of the waves can be further absorbed. However, the speeds of wave propagation can vary in different media due to differences in permittivity and permeability between materials. Nevertheless, the speed of wave propagation for different waves in the same medium remains constant, resulting in different wavelengths for different frequencies. The speed of photon and the

speed of its wave propagation are identical in the same medium.

The arguments presented in this paper align with these fundamental concepts taught in college-level physics. These principles substantiate the credibility of the arguments and should not be dismissed solely because the underlying principles are straightforward.

C. Language

The sentence "As follows from (4), the speed of a single photon is a function of two physical quantities characterizing the corpuscular-wave nature of this object of matter - the wavelength λ nd the repetition rate (frequency) of the photon-particle ν, the product of which is a constant value" should be revised as:

"As follows from (4), the speed of a single photon is a function of two physical quantities characterizing the corpuscular-wave nature of this object of matter - the wavelength λ and the repetition rate (frequency) of the photon-particle ν, the product of which is a constant value."

“As seen from Table 1, the frequencies of ‘orange-yellow’ photons exceed the frequencies of ‘red’ photons from 1.187 to 1.357 times” should be write as "As seen from Table 1, the frequencies of 'orange-yellow' photons exceed the frequencies of 'red' photons (760 nm) from 1.187 to 1.357 times" for clarity.

In Table 1, 3.95 ÷ 4.69 should be 3.95 - 4.69.

The sentence "at the same time the difference between the ‘wavelengthcjmponent’ and ‘frequency component’ of the speed of single photons within the light spectrum is noticeable " should be revised as:

"at the same time, the difference between the 'wavelengthcomponent' and 'frequency component' of the speed of single photons within the light spectrum is noticeable."

D. Comments on the Arguments

The paper argues that the speed of a photon or the propagation of a wave is a function of frequency and wavelength, which is acceptable. However, the mathematical expression

$$C = V_{single\ ph.}(\lambda) + V_{single\ ph.}(\nu)$$

is not appropriate. The correct expression should be:

$$dV_{single\ ph.}(\lambda, \nu) = \left[\frac{\partial V_{single\ ph.}(\lambda, \nu)}{\partial \lambda}\right]_{\nu} d\lambda + \left[\frac{\partial V_{single\ ph.}(\lambda, \nu)}{\partial \nu}\right]_{\lambda} d\nu$$

In the same medium

$$V_{single\ ph.}(\lambda, \nu) = \nu\lambda = constant$$

Thus,

$$(\frac{\partial \lambda}{\partial \nu})_V = -\frac{\lambda}{\nu}$$

which leads to

$$\left[\frac{\partial V_{single\ ph.}(\lambda, \nu)}{\partial \lambda}\right]_\nu \left(\frac{\partial \lambda}{\partial \nu}\right)_V + \left[\frac{\partial V_{single\ ph.}(\lambda, \nu)}{\partial \nu}\right]_\lambda = 0$$

However, the above correction does not affect the paper's arguments. The key point is that the speed of light results from the combined effects of frequency and wavelength.

The most innovative part of the paper lies in using the concept developed from the above argument to explain the results of experiments on the speed of light. It argues that some measurements only yield results from the contribution of the frequency effect. These arguments should be published to allow further accumulation of evidence and continued development.