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Research Article

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The Crucial Concept of Resonance for Ground-Breaking Perspective on Light Wave

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Abstract

This paper discusses the crucial concept of resonance between potential and kinetic energy as the fundamental mechanism responsible for generating all types of waves, including light waves. The paper introduces a groundbreaking perspective on light waves by drawing comparisons with mechanical waves and suggesting a connection between potential energy (pressure) and kinetic energy (density). Furthermore, the paper delves into the idea of particles reaching velocities beyond the speed of light by √3 within an ideal gas medium, supported by rigorous logical reasoning. It also advocates for the existence of an unseen, widespread space medium, which challenges established principles in physics. This fresh perspective revolutionizes our comprehension of light waves and calls for a profound revaluation of fundamental properties within the universe.

Keywords: Resonance, Light Waves, Mechanical Waves, Pressure, Density, Particle Velocity, Speed of Light.

1. Introduction

Light waves have captivated the scientific community for centuries, serving as a cornerstone of modern physics. However, the underlying mechanisms governing the generation and propagation of these waves have remained a subject of continuous inquiry and exploration. Central to this understanding is the concept of resonance between potential and kinetic energy, a fundamental mechanism that extends beyond the realm of mechanical waves, and which is crucial in elucidating the intricate nature of light waves.

This paper embarks on an ambitious journey to shed new light on the nature of light waves, aiming to draw connections between the well-established principles governing mechanical waves and the enigmatic world of electromagnetic radiation. It posits that the resonance between potential energy, often described as pressure in mechanical systems, and kinetic energy, represented by density, is the driving force behind the creation and perpetuation of all waves, including light waves.

The concept of resonance in wave systems has been the subject of extensive research. Resonance arises when potential energy is converted into kinetic energy cyclically, a phenomenon that has been pivotal in understanding the behavior of waves [1]. Light waves are fundamentally explained by James Clerk Maxwell's equations, which describe the behavior of electric and magnetic fields [2]. The specific resonance link between potential and kinetic energy in light waves is an area of ongoing exploration. The dual nature of light, exhibiting both wave and particle-like behavior, has been a central theme in quantum mechanics [3]. Understanding the interplay between potential and kinetic energy in this context is vital.

The idea of particle velocity exceeding the speed of light, particularly within specific mediums, has intrigued physicists [4]. This concept challenges conventional notions and pushes the boundaries of our understanding of light waves. Historical debates on the existence of luminiferous ether, a hypothetical medium thought to carry light waves, have been influential [5]. Contemporary discussions on the existence of an invisible, all-pervasive space medium continue to shape our understanding of the universe. The study of wave-particle interactions in plasma environments is relevant to understanding the dynamics of light waves in space and astrophysical contexts [6].

The propagation of light waves in optical fibers, essential for modern telecommunications, involves complex interactions between potential and kinetic energy [7]. Understanding the resonance between potential and kinetic energy is critical in engineering applications, including the study of wave-induced vibrations in structures [8]. Resonance between potential and kinetic energy plays a role in various biological processes, such as hearing, where sound waves are transduced into neural signals [9]. Quantum field theory explores the generation of virtual particles from vacuum fluctuations, shedding light on the dynamic nature of energy and waves [10]. Resonance is

fundamental in the design of wave energy converters, devices that harness the energy of ocean waves [11]. The study of seismic waves relies on understanding resonance between potential and kinetic energy in Earth's subsurface [12].

Plasma physics research examines the interaction between waves and charged particles, a phenomenon central to the behavior of light waves in astrophysical plasmas [13]. Astrophysical phenomena, such as the propagation of light waves through the interstellar medium, involve complex interactions between potential and kinetic energy [14]. The concept of entanglement in quantum physics reveals the interconnectedness of particles and their information transfer, which has implications for our understanding of wave behavior [15]. This paper presents innovative ideas linking various fields, explores particle velocity in ideal gas, argues for invisible space medium, and could transform our understanding of light waves and fundamental universe properties.

2. The fundamentals

The natural explanation for the velocity for any type of wave is that its velocity results from the **resonance condition of potential energy and kinetic energy,** which results from the interaction of pressure and density. This resonance condition (root of the ratio of pressure to density) is applicable to any type of wave, whether it is a sound wave in air, a water wave on a lake, or a wave in a solid.

$$C_{liquid,gas} = \sqrt{\frac{K}{\rho}}$$

$$C_{solid,transversal} = \sqrt{\frac{G}{\rho}}$$

Where:

- $C_{liquid,gas}$ is the velocity of waves in the liquid or gas.
- $C_{solid,transsversal}$ is the velocity of transversal waves in the solid.
- K, G are constants with units of pressure (Pa).
- ρ is the density of the medium.

3. Logical derivation

Both the constant "K" in the formula for the velocity of waves in liquids and the constant "G" in the formula for the velocity of waves in solids have the unit of pressure (Pa). The light wave must also consist of a resonance phenomenon between potential and kinetic energy (pressure and density). The mathematical expression for the velocity of the light wave (resonance condition) is $C_{cal\_\varepsilon\mu}$ and $C_{cal\_Permit\_Permea}$.

$$c_{cal\_\varepsilon\mu} = \sqrt{\frac{\frac{1}{\varepsilon_0}}{\mu_0}}\, 2.998 \times 10^8 \frac{m}{s}$$

$$c_{cal\_Permit\_Permea} = \sqrt{\frac{\frac{1}{Permittivity}}{Permeability}}\, 2.998 \times 10^8 \frac{m}{s}$$

By this analogy, we can assume with high probability that behind the reciprocal of the permittivity, there is a pressure P_0, and behind the permeability, there is a density ρ_0.

3.1. Solution approach

It is necessary to find a definition of the current and the field constants permittivity and permeability, which is independent of the abstract unit ampere. To achieve this goal, a new "ampere-free" **universal** space constant is formed. **URKμ** arises from the permeability μ_0, the unit A and the elementary charge e_e.

$$URK_\mu = \frac{\mu_0 . A^4}{e\_e^2} = 4.895 \times 10^{31} \frac{m.kg}{s^4}$$

This constant contains the basic information about electricity and the field constants (encoded), without amperes appearing as a unit of measurement. The goal is now to decode this constant, created by multiplication and division, and break it down into its real and natural components. Mathematically, it is not possible to divide the result of a multiplication or division into its components. However, the goal can be achieved through creative thinking, logic, and understanding of relationships and probabilities.

3.2. Derivation of pressure, density, and impedance of space via permeability μ_0

The permeability [16] with the conventional definition is.

$$\mu_0 = 1.257 \times 10^{-6} \frac{m.kg}{s^2 . A^2}$$

The constant URK_μ is defined above.

$$URK_\mu = \frac{\mu_0 . A^4}{e\_e^2} = 4.895 \times 10^{31} \frac{m.kg}{s^4}$$

URK_μ is composed of density and velocity.

$$\left(\frac{kg}{m^3}\right) . \left(\frac{m}{S}\right)^4 = 1 \frac{m.kg}{s^4}$$

The speed must be the speed of light c; any other speed is unimaginable in this context.

$$c = \sqrt{\frac{1}{\varepsilon_0 . \mu_0}}\, 2.998 \times 10^8 \frac{m}{s}$$

Via URK_μ and c^2, the reciprocal of the permittivity ε_{0_m2} results in the pressure of the space P_0

$$P_0 = \frac{URK_\mu}{c^2} = 5.447 \times 10^{14} Pa$$

Via URK_μ and c4, the permeability μ_{0_m2} results in the density of the space ρ_0.

$$\rho_0 = \frac{URK_\mu}{c^4} = 6.06 \times 10^{-3} \frac{kg}{m^3}$$

Via URK_μ and c^3, we obtain the impedance of space Z_{0_em2}:

$$Z_{0\_em2} = \frac{URK_\mu}{c^3} = 1.817 \times 10^6 \frac{kg}{S.\ m^2}$$

The verification by the calculation of the speed of light c_{m2} and the confirmation by the formula for the impedance Z_{0_em2} show that the searched natural reciprocal values of the permittivity in the form of a pressure $\mathbf{P_0}$ and the value of the permeability in the form of a density $\boldsymbol{\rho_0}$ were found. This confirms the originally assumed hypothesis that the light wave also works by resonance between potential and kinetic energy and by resonance between pressure and density.

$$c_{m2} = \sqrt{\frac{1}{\frac{\varepsilon_{0\_m2}}{\mu_{0\_m2}}}}\, 2.998 \times 10^8 \frac{m}{s}$$

$$c_{m2} = \sqrt{\frac{P_0}{\rho_0}}\, 2.998 \times 10^8 \frac{m}{s}$$

$$Z_{0\_em2} = \sqrt{\frac{\mu_{0\_m2}}{\varepsilon_{0\_m2}}} = 1.817 \times 10^6 \frac{kg}{S.\ m^2}$$

4. Derivation of the properties of the medium

Assuming that it is a ubiquitous ideal gas, the further properties of the all-penetrating permeability and the permittivity could be derived from the pressure $\mathbf{P_0}$ and the density $\boldsymbol{\rho_0}$ according to kinetic gas theory [17]. The solution for shows a value larger than the speed of light by the square root of three ($\sqrt{3} = 1.732$)! The value corresponds to the kinetic gas theory because in every medium, the particle velocity must be larger than the linear energy transfer velocity.

$$P_0.Vol = \frac{1}{3}.N.m_0\, v_{m0}{}^2$$

$$v_{m0} = \sqrt{\frac{3P_0}{\rho_0}}\, 5.193 \times 10^8 \frac{m}{s}$$

$$\frac{v_{m0}}{c} = 1.732$$

The mass $\mathbf{m_0}$ of the smallest particle can also be determined from the temperature of the space $\mathbf{T_{Space}}$ using the formula of the kinetic theory of gases.

$$\frac{1}{3}.N.m_0\, v_{m0}{}^2 = N.k_B.\, T_{Space}$$

$$T_{Space} = 2.2732\ K$$

$$m_0 = \frac{3k_B.T_{Space}}{v_{m0}{}^2} = 4.197 \times 10^{-40} kg$$

Where:
- $\mathbf{P_0}$ is the pressure of the gas.
- **Vol** is the volume of the gas.
- N is the number of gas particles.
- $\mathbf{m_0}$ is the mass of the smallest particle (assumed to be constant for this ideal gas).

These properties mean that the space is not empty but filled with an all-pervading "ether". These properties provide all real and natural arguments that are needed to explain all at present only abstractly defined quantities (space curvature) naturally and vividly [18]. This also results in the basis for the TOE (Theory of Everything).

5. Circumstantial evidence, and confirmation

Confirmation by the property of the mass: At a closer look, the familiar properties of the mass in connection with the recognized deeper details offer an extremely clear hint that the space cannot be empty. **The behavior of the masses is only logical, plausible, and explainable by the presence of an invisible, omnipresent, and extremely potent partner.**

Argumentation: The mass consists of electrons, protons and neutrons that have immensely large distances among themselves (relatively seen) and fill the space only by a factor of approximately $\mathbf{10^{18}}$. For this specific comparison, for the whole volume of the earth $\mathbf{V_{Earth}}$, the effective space occupation by the compressed matter amounts to $\mathbf{V_{comp}}$, which results in a cube of the edge length of $\mathbf{L_{Side}}$. This points out that the mass of the earth represents exactly seen altogether less than a breath within the claimed volume.

$$V_{Earth} = \frac{4\pi}{3}.\ r_{Earth}{}^3 = 1.086 \times 10^{21}\ m^3$$

$$V_{comp} = \frac{V_{Earth}}{10^{18}} = 1.086 \times 10^3\ m^3$$

$$L_{Side} = \sqrt[3]{V_{comp}} = 10.278\ m$$

Where:
- $\mathbf{V_{m0}}$ is the mean particle velocity.
- $\mathbf{k_B}$ is Boltzmann's constant.
- $\mathbf{T_{Space}}$ is the temperature of space.
- $\mathbf{V_{Earth}}$ is the volume of the Earth.
- $\mathbf{V_{comp}}$ is the volume occupied by matter within the Earth

It is philosophically, technically, physically, and naturally impossible that this nothing in space alone can possess these immense and manifold properties of mass. There must be an invisible but incredibly powerful partner in the form of a potent medium. **Only by the presence of a strong environment with large pressure properties and density is explicable why the mass (a breath of nothing in the space) can have so many visible and strong properties.**

6. Conclusion

In conclusion, the resonance between potential and kinetic energy is a fundamental mechanism that governs the creation and propagation of waves, including light waves. The acknowledgment of an all-pervading medium, as recognized by historical figures like Einstein and Newton, has shaped our understanding of wave phenomena. This paper proposes a novel perspective on light waves by drawing parallels with mechanical waves. It introduces the idea that a resonance concept between potential energy (pressure) and kinetic energy (density) applies not only to mechanical waves but also to light waves. It suggests that behind the reciprocal of permittivity ($\boldsymbol{\varepsilon}$) lies a pressure ($\mathbf{P_0}$), and behind permeability ($\boldsymbol{\mu}$) lies a density ($\boldsymbol{\rho_0}$). These relationships, along with the connections between URKμ, c, and the derived properties ($\mathbf{P_0}$, $\boldsymbol{\rho_0}$, and $\mathbf{Z_{0\_em2}}$), support the hypothesis

that light waves operate through resonance between pressure and density. Additionally, the study proposes that particle velocity (v_{m0}) in an ideal gas medium could exceed the speed of light (c) by $\sqrt{3}$, and it argues for the existence of an invisible, pervasive medium in space through rigorous logical derivation.

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