

Dual Natures of Light and Electromagnetic Fields

Henok Tadesse, Electrical Engineer, BSc.
Ethiopia, Debrezeit, P.O Box 412

Mobile: +251 910 751339; +251 912 228639 email entkidmt@yahoo.com or wchmar@gmail.com
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Abstract

The wave-particle dual nature of light was discovered from experimental observations and from theoretical works of Max Planck and Albert Einstein during the beginning of the twentieth century. This paper reveals that wave-particle duality is just one aspect of the *all dual* nature of light (electromagnetic waves) and electromagnetic fields and that light and electromagnetic fields manifest dual natures in other ways also. For example, light is not only a local phenomenon as conventionally viewed, but also a non-local phenomenon. Light behaves both according to classical ether theory and emission theory. Light acts as if it travels both in a straight line and in curved path, at the same time! Electrostatic lines of force behave as if they are both straight and curved lines. Electrostatic fields behave as if they ‘propagate’ both at the speed of light and with infinite speed, at the same time! This paper is a summary of the findings reported in previous papers published by this author. An extensive theoretical research carried out by this author in an attempt to explain the Michelson-Morley experiment, the Sagnac effect and other light speed experiments led to uncovering of the broader and more fundamental nature of duality in electromagnetism.

Introduction

The observed nature of light and electromagnetic fields remains to be one of the most confusing and formidable problems in science, much of which this author claims to have solved in paper[1]. The problem of the nature of light manifests itself in two seemingly unrelated areas: quantum mechanics and the problem of the speed of light. The wave-particle dual nature of light was discovered from experimental observations and from theoretical works of Max Planck and Albert Einstein during the beginning of the twentieth century. The problem of quantum mechanics (wave-particle duality) was observed in double-slit experiments and the problem of the speed of light was observed in the Michelson-Morley and other light speed experiments. Physicists generally presume (implicitly) that these two problems are unrelated and some physicists who ever ask if there is any connection between the two face a formidable theoretical gap. For example, some authors commented that Einstein’s Special Relativity theory is not compatible with his work on photo-electric effect. Einstein did not try to connect (or was unable to connect) the photon concept with the problem of the speed of light.

I carried out an extensive theoretical research on the speed of light[1], which was aimed at solving the puzzle of the Michelson-Morley experiment, the Sagnac effect and other light speed experiments. After years of work, I was able to formulate a successful theoretical model, which I called Apparent Source Theory, that explains the Michelson-Morley experiment, the Sagnac effect and many other light speed experiments. The research not only resulted in a successful theoretical model of the speed of light, it also revealed a fundamental nature of light and

electrostatic fields: duality. So far only one aspect of this dual nature of light is known to physicists: wave-particle duality. This paper summarizes the findings in my previous papers[1] about other aspects of duality in electromagnetism. Next we will briefly introduce aspects of dual natures of light and electromagnetic/electrostatic fields.

Dual natures of light and electromagnetic fields

Wave-particle nature of light

As observed in double slit experiments, light behaves as if it is a wave and as if it behaves as a particle.

Local and non-local nature of light and electromagnetism

Light acts as if it is both a local phenomenon and a non-local phenomenon

Finite and infinite 'speed' of electrostatic fields

Electrostatic fields behave as if they are transmitted both at the speed of light and at infinite speed

Straight line and curved path of light and electrostatic fields

Light behaves as if it travels both in a straight line and in curved path

Electrostatic lines of force behave as if they are both straight and curved

Emission theory and ether theory of light

Light behaves both according to ether theory and according to emission theory[1]

For an (absolutely) co-moving light source and observer, light travels from the apparent source[1] to the observer in a straight line, but travels from the real source to the observer in curved path.

For an absolutely co-moving electric charge and observer, the electric line of force comes in a straight line from the apparent charge, but in a curved path from the real charge.

If absolutely co-moving charge and observer suddenly accelerated, the apparent position of the charge will change instantaneously, but the apparent position of the charge changes as if light speed transmission.

Thanks to God and the Mother of God, Our Lady Saint Virgin Mary

References

1. Absolute Motion, the Speed of Light, Electromagnetism, Inertia and Universal Speed Limit c – Apparent Change of Source Position Relative to Co-moving Observer, Vixra, by Henok Tadesse