

Making progress by thinking about light differently

Georgina P. Woodward November 2023

Abstract

A brief history of theories of light is given. New terminology that will be useful in the discussion of matters to do with light or its precursor is given, and how it is to be applied is discussed.

Thinking about concealed possibilities comes next, considering the material reality that is concealed and what superposition actually represents. A Model with a pre-light binary with divisible photon carrier wave is presented, accounting for the outcomes of double slit apparatus experiments and experiments involving beam splitting and recombination, with an objective material solution.

Reason for the speed of 'light' being unaffected by speed of source and recipient explained by using transmission as a pre-light binary model

Making progress by thinking about light differently

Georgina P. Woodward November 2023

Light, how is it different from other commonplace things that exist and we know about? And why is the physics that applies to it different from most everyday things. Classical mechanics of things sets out that, to work out the relative velocity of something if it is carried, the velocity of the carrier should be added or subtracted from the velocity of the subject of interest, depending on direction. Either adding to or subtracting from the velocity of the subject.

Issac Newton thought the phenomenon of light could be explained by corpuscles of light[1], Christiaan Huygens had a wave theory of light[2]. Albert Einstein proposed discreet energy packets of light called photons[3] . De Broglie and Bohm suggested photon paths are directed by the 'wave function', acting as a pilot wave. "Bohm hypothesized that each particle has a "complex and subtle inner structure" [4]"That provides the capacity to react to the information provided from within the Schrödinger equation, being guided by it, which is the quantum potential" Wikipedia[.].

Selecting appropriate terminology

This is a different approach to the questions still remaining about light.

To be clear we need to differentiate the seen light phenomena and unseen physics happening prior to involvement of human senses or cameras, leading to the phenomenon of light. Seen light can be a beam of light having an intensity, maybe a direction or general illumination of an area, having a color or ambient 'warmth' depending on mix of frequencies. Seen light is called light. The unseen physics happening prior to involvement of human senses or cameras, leading to the phenomenon of light is best not also called 'light', as that is ambiguous. Having differentiated them, the light clock thought experiment merits reconsideration. Discussed elsewhere.

We will discuss why just referring to pre-light as electromagnetic radiation is insufficient to account fully for behaviors needing explanation.

It would be more helpful to have a different name for the observer independent happening. Pre-light binary, seems appropriate (occurring before the phenomenon of light and a combination of two parts.) It is not just electromagnetic radiation alone. It is not photon particle alone. A combination that demonstrates wave behaviour and indivisible particle behaviour. Detectable as a particle by it's effect on chemical photo receptors. Inference strongly suggests that it is happening within the observation independent, external environment as wave interference affecting the location of the photo-detectable particle. Young's double slit experiment [6], provides evidence that there is a 'medium', substance of some-kind, that supports waves within it and is involved in the transmission of light photons (seemingly, indivisible particles). The complete ensemble only exists when in the external, observation independent, environment. The divisibility of waves but not photon particle provides an alternative explanation for quantum behaviour at double slits and beam splitters to be provided, without need for abstract superposition.

Thinking about concealed possibilities;

Possibility, defined by Oxford languages 1. "noun a thing that may happen or be the case."

(About time and Schrödinger cat type thought experiment : As there is no outside observer subjective, generated, relative viewpoint of the contents of the box emergent variable and persistent time does not apply. There is still foundational, sequential, passage of time -the sequential change of the pattern of all that is existing.)

The Schrödinger cat thought experiment illustrates a scenario where a possibility may have been extinguished but this is not known by an excluded outside observer. So the now impossible is retained as a possibility, though this is incorrect. Smelling poison fumes escaping the closed box could be used as an indication that the live possibility has been extinguished.

A different situation is when viewpoint or measurement protocol, i.e. the context, 'seen this way' is yet to be established. The possibilities remain 'vital', only being extinguished when a relative viewpoint or measurement protocol is used to give a new singular observation or measurement outcome.

For a macroscopic object subsequent observation or measurement is still possible, depending on how the experiment is conducted. So to say that other possible outcomes have been extinguished is not necessarily true. It is true where only one outcome can be obtained. Such as in subatomic scale experiments or a destructive measurement protocol. At any scale is used. Application of different viewpoints or different measurements can give different outcomes.

This is relativity, an extraction from the absolute, existing, material template that embodies many possibilities. The 'many worlds' of possibility are not in the limited relative outcomes, but preceding them as a material. observation independent, Object reality.

Summary

Two different situations both represented by a wave function.

1. Includes an outcome, still considered possible from outside that has been superseded eg, live cat dies, so only dead cat is possible outcome.

2. All outcomes are still possible but no 'seen this way', relative context for production of singular outcome has been chosen.

In both cases the observer has not made a limited 'seen his way' observation or measurement product informing what is concealed, or for other reasons, not visible. Instead of what's there pre-observation / measurement being represented, the superposition represents possible outcomes, as far as the excluded observer is aware.

Observation independent material reality is what exists regardless of the excluded observer. (Object permanence and deception by illusion are evidence)

The pre-light binary model

The pre-light binary is divided by such obstacles into a wave alone and a wave carrying a photon particle. (This is modeled by macroscopic hydrodynamic bouncing droplet on oil bath models. Waves in the oil are divisible but the droplet always passes through one or the other slits intact. [6]) The divided wave recombines after passing through the slits, producing an interference pattern, affecting the eventual location of the carried photon particle when it is detected.

Isn't quantum superposition needed to explain the outcome of various experiments, such as Young's double slit [7] variants and experiments involving beam splitters? No, they can all be explained by a wave carrier of a photon being divisible into wave and photon and separated wave. Undivided carrier wave and carried particle is the normal structure of pre-light. This helps explain the double slit experiment and also why in classical physics, speed of source or recipient does not affect speed of light transmission. The divided wave without detectable photon particle can not be detected itself but its material presence, which can materially interact, inferred instead of effect due to a part of the superposition of a wave function. An example of use of the divided input model to explain an experiment involving beam splitting[8] [9]

Reason for the speed of 'light' being unaffected by speed of source and recipient

Einstein, using his intuition, proposed a constant speed of light in a vacuum. Why is a question needing a proper answer. That the constant speed of 'light' in a vacuum is needed by special relativity doesn't 'cut the mustard'. He does not explain what physically is happening to make that so.

In a 'vacuum' is specified. The substance passed through can be thought of as providing additional resistance to transmittance. The material properties of the substance passed through effects the ease of transmittance through it and so does affect speed overall. The speed will be unchanged if the substance and its properties, or a vacuum, remain constant.

The Pre-Light binary (transmitted by electromagnetism) is only an existing/happening thing when it is formed within the environment, being in part a particular environmental disturbance. It is not a transmissible composite without it.

Without a means of transmission the particle component does not move to the receiver and cause the chemical changes allowing a seen product to be formed. For comparison, the electrons of a magnet are not themselves the magnetic field. The (as it seems) indivisible particles emitted and associated with seen light are not themselves alone the Pre-light binary necessary for the wave behaviour inferred from interference patterns observed in the outcomes of various experiments. The photon particles initiate the pre-light transmission process, and enable detection of it but are not sufficient themselves for 'light' transmission through the, Object reality, the observation independent environment .The Pre-light binary exists until it is absorbed by a receiving material or object, when it ceases to be existing and happening.

The motion of the source, prior to formation of the pre-light binary, does not determine the speed of the Pre-light binary (speed of light) when it is in the environment. Likewise the speed of the receiver plays no part in the speed of the Pre-light' binary after receipt as the Pre-light binary no longer exists. Only the

travel in the environment between source material and sink material corresponds to existing of the Pre-light binary. The composition, constituents and concentration, of the environment determines the speed when not in a vacuum. When in a vacuum the speed is constant.

A material object, such as a ball, exists before it is released, and after catching. Taking on the speed of the carrying objects, which will be added or subtracted (depending on same or opposite direction of motion, from the speed of the ball would have if the carriers were stationary relative to the observer. It can be appreciated that from emission to receipt pre-light is a 3 stage processes involving an environmental influence and discreet unitary entity not a material existing thing, with atomic structure. Why is the physics that applies to precursor of the seen light phenomenon different from most everyday things? From release to receipt, the composition and happening of pre-seen-light quanta is very different from the existing and happening of material, pre-seen objects.

References

[1] Newton's particle theory of light

<https://galileo.phys.virginia.edu/classes/609.ral5q.fall04/LecturePDF/L20-LIGHTII.pdf>

[2] Herivel, John. "Christiaan Huygens" *Encyclopedia Britannica*, 22 Oct. 2023, <https://www.britannica.com/biography/Christiaan-Huygens>. Accessed 18 November 2023.

[3] Britannica, The Editors of Encyclopaedia. "photon". *Encyclopedia Britannica*, 16 Nov. 2023, <https://www.britannica.com/science/photon>. Accessed 18 November 2023.

[4] Goldstein, Sheldon, "Bohmian Mechanics", *The Stanford Encyclopedia of Philosophy* (Fall 2021 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/fall2021/entries/qm-bohm/>

[5] Wikipedia, De Broglie–Bohm theory,, https://en.wikipedia.org/wiki/De_Broglie-Bohm_theory, retrieved 20th Nov 2023

[6] Boling Guo (Institute of Applied Physics and Computational Mathematics, China) Quantum Hydrodynamic Equation and Its Mathematical Theory

<https://doi.org/10.1142/12978> July 2023

[7] Wikipedia Double-slit experiment , https://en.wikipedia.org/wiki/Double-slit_experiment, last revised 10 November 2023

[8] [Georgina Woodward viXra:2203.0020](#) [Georgina Woodward History and Philosophy of Physics](#) On Interaction Free Testing and Photon Divisibility 2022-03-03

[9] [Georgina Woodward viXra:2203.0095](#) [History and Philosophy of Physics](#) 2022-03-17 Revised Photon Partition Hypothesis: Interrogating Photons
Note: cut photon body is used to refer to the intact photon body, the carried measurable quantum. Cut from the the entire (pre-splitting) pre light binary combination including a carrier wave (not measurable and is divisible, but detectable via interference happening at recombination.)