Replaced Hypothesis of Light Quanta

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ABSTRACT

Einstein, in his later years, expressed deep dissatisfaction with the concept of 'light quanta', questioning whether the wave-particle duality, could be more fundamentally understood. In response to this fundamental legacy, we propose "*Einsmax Theory of Light Quanta and Massless Particles",* which treats light as comprising two separable, yet interdependent components each component fulfilling separate roles in physical interaction: a light wave is responsible for carrying energy, while massless glittering particles (corpuscles) responsible only for intensity of brightness. 'Einsmax theory 'retains all Maxwellian and quantum mechanical formalism. This theory adds an additional highlight to the amplitude of the light wave of the photon to be vested with the quantum levels as 1,2,3,4… n, acting as energy storage tanks for emission and absorption of light energy. The implications span quantum optics, photodetection and foundational interpretations of light matter interaction. We present, thought experiments and observational set ups, inspired by macroscopic imaging phenomena, such as long-distance photography in darkness (as well as 'Camera Obscura') to illustrate this conceptual separation. The clarity of images formed in dark regions, despite an apparent absence of visual corpuscular brightness, suggests the independent role of the wave component in transmission of the image to the camera, while the object being glittered by the corpuscular component, affirming the Truth: "The Light shines in the darkness and the darkness has never put it out".

INTRODUCTION

The nature of light has long inspired foundational debates in Physics. Classical Electrodynamics describes light as a transverse electromagnetic wave, while quantum mechanics introduces photons-quantized energy packets, that exhibit both wave-like and particle-like behaviour. Anyhow, the recent work on the separation of the light wave and the massless particles of a single photon[1,2] by Jia Kun Li and Ding et al, and the experiments conducted by Dimitrova[3] using 'Mach-Zehnder interferometer 'and by Ma Hai-Qiang[4] through the '50,150 beam splitter', demonstrated and confirmed the existence of the light wave and the light particles separately in two forms in the light. Einstein's explanation of the photoelectric effect provided compelling evidence for the quantum view, yet he remained dissatisfied with the ambiguity inherent in wave-particle duality. In a 1954 letter to Michael Besso[5], Einstein wrote:

"All these fifty years of conscious brooding, have brought me no nearer to the answer to the question, 'What are light quanta?' 'Normally, scientists do not look from the facts to the theory, but from the theory to the facts...! Would it not be possible to replace the hypothesis of 'light quanta' by another assumption, that would also fit the known phenomena? If it is necessary to modify the elements of the theory, would it not be possible to retain at least the equations for the propagation of radiation, and conceive only 'the elementary process of emission and absorption differently 'than they have been until now?"

Theoretical Concept

Inspired by this open question, we revisit the dual character of "Light Photon" and propose a framework, that offers a spatially and functionally distinct interpretation of its two components, 'Light Wave 'and 'Massless Particles', a novel conceptual model, that preserves the core equations of light propagation, but modifies the understanding of its emission and interaction processes. The electromagnetic radiation is the propagation of

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continuous chain of cycles, each cycle can be called a 'flexible container', υnumber of which in one second is called a 'photon', whose energy E is equal to hυ. The power or the rate of propagation of light energy is d(E)/dT. Glittering massless corpuscles, the entirely distinct component from light wave plays a critical role in contributing visible brightness to the target object: The intensity of brightness of the light is the rate of streaming of the glittering massless particles falling on the unit area of the target body. The massless particles take up the role, just as that of the photo flash of the flash photo camera, and also like the continuous stream of extra bright sparkle, that rush out from the LED lamp. The massless particles moving with a very high velocity of light, C, gain linear momentum as demanded in Compton effect[6-8] with the Einsmax energy quantum level 1

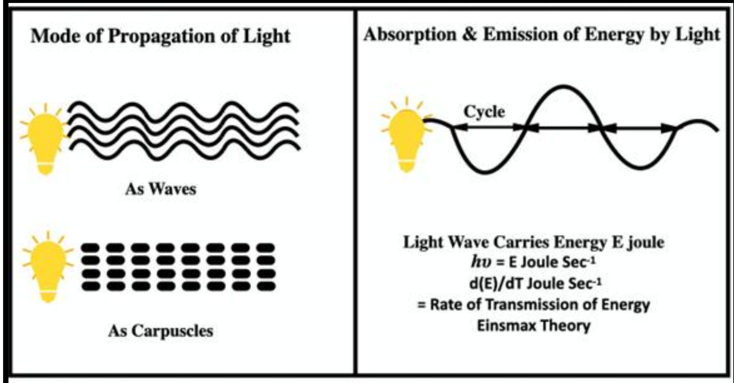

Figure1. Schematic diagram representing the law of emission of light and absorption of light energy.

Quantum Energy associated with the photon: In the following experiments of light, it is inferred that, while photons of fixed frequency absorb energy, the amplitude of the light waves of the photons is found to increase and also while photons of fixed frequency emit energy, the amplitude of the light waves of the photons alone is found to decrease. It is true that two light waves of equal frequency but of different amplitudes do not have the same energy. When the energy possessed by one photon is hυ Joule in its ground state, its Einsmax energy quantum level is 1. When another hυ joule is absorbed by the photon, the energy increase is bagged by the photon while its amplitude jumps to its higher 'Einsmax 'quantum level to 2. If the constructive interference is the result of the two light waves of the same frequency$\upsilon, eachwiththeEinsmaxenergyquantumlevel1$then the energy of each photon of the new light wave is 2 hυ joule in the bright fringe. This is very well supported by Kuhn's report[9] on Planck's third edition of the monograph of accepting theory that both emission and absorption of light are quantal.

I. The basic value of energy (Ground Einsmax quantum level, n= 1)

possessed by one photon of light wave = h$\upsilon joule$

II. Energy possessed by each photon of the electromagnetic radiation

when each photon is vested with double the basic value of the energy

at the first higher level of the Einsmax energy quantum level, n=2 = 2 hυ joule

III. Energy possessed by each photon of the electromagnetic radiation

when each photon is vested with triple the basic value of the energy, n=3 = 3 hυ joule

IV. Energy possessed by each photon of the electromagnetic radiation

When each photon is vested with n times the basic value of the energy

Where the Einsmax quantum level = n = n hυ joule

V. The basic value of energy transferred in one second duration by the

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electromagnetic radiation. (At the ground quantum level, n =1) = hυ joule

VI. When the energy is transferred from the cycle of the light wave

from state 4 (E = 4 hυ joule) to state 2 (E = 2 hυ joule), then the energy is

thrown out in two chunks or in two quanta i.e., in 2 seconds as under:

In the 1st second:

Each photon is moving from its energy state of 4 hυ to state 3 hυ

When one photon is moving (1^{st} second) (4 $h\upsilon$ - 3 $h\upsilon$) = hυ joule

During the 1^{st} second, the light energy transferred is only = hυ joule

In the 2nd second:

Each photon is moving from its energy state of 3 hυ to state 2 hυ

When one photon is moving (2^{nd} second) (3$h\upsilon$ - 2$h\upsilon$) = $h\upsilon$ joule

Similarly, the energy released in the 2^{nd} second is again the same = $h\upsilon$ joule

Thus, the energy released in 2 seconds = 2 $h\upsilon$ joule

Unlike traditional interpretations of duality, that suggests that ‘wave or particle behaviour arises conditionally upon observation’, the Einsmax theory asserts that light always coexists simultaneously as both a wave and a corpuscular stream and they do exist as separate entities, each component fulfilling separate roles in physical interaction, for they have been recently separated one from the other[1-2], as also predicted by the Einsmax theory.

Optical and quantum phenomena from the advanced processes like, spectroscopy, interference, circular dichroism, black body radiation, photoelectric and Compton effects, photosynthesis and photochemistry– down to the classical scattering, reflection and refraction are all found fitting with the ‘Einsmax theory ’illustrating how this separation of the light components resolves long standing interpretational challenges. Through all conceptual experiments, observational analysis and also reinterpretation of classical and quantum optical phenomena, we demonstrate that the Einsmax theory offers a consistent and extendable view of light’s dual nature in perfectly separate forms, each with its separate functions. This interpretation not only aligns with historical appeals by Einstein and Max Planck, but also compliments recent quantum optics findings on the spatial separation of quantum properties and hence designated ‘Einsmax ’theory.

Energy Quantum Level and Amplitude & the Role of Glittering Massless Particles

TABLE 1 : List of experiments to support quantum energy level and amplitude in the form os glittering massless particles.

S.No	Experiment	Light Phenomena	Einsmax Outcome
1	Light energy is absorbed by a Carbonyl group (Fig.2.)	Infrared Spectroscopy	Light energy absorbed is utilized to increase Amp. of the carbonyl group
2	Two light waves involved in constructive interference	Constructive Interference	a) Both the energy and the Amp. of the new light wave are doubled.

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	(Fig.2)		b) Intensity of the brightness of the bright fringe is doubled.
3	R-CPL & L-CPL of plane polarised light waves enter an optically active solution. (Fig.2)	Circular Dichroism	a) Energy of both waves are differently absorbed as a result their Amp. differently decreased. b) As path length increases, glittering massless particles are scattered more. So, intensity of transmitted light decreases.
4	Energy(E) is supplied to the waves during storm in the ocean.	Mechanical Waves in Ocean	Amp. of the waves is increased[10]. Energy of wave is proportional to Amp^2.
5	In Black body radiation, heat energy emitted at λ 510 to 1100 nm is n times more than the expected hυ [h c/λ]. Emits heat n times h c/λ instead of simply h c/λ. (Fig.3)	Black Body Radiation	Reason: The base width of the cycle or the wave length of the above given range provides stability for erection of wave of higher Amp. that is vested with higher quantum value. (Fig.3)
6	The current depends on the rate of impingement of the massless particles on unit area of the metal.	Photoelectric Effect & Compton Effect (Fig.4)	The massless particles gain momentum because they are carried along with a very high velocity, C of light
7	Plants kept both under the sun and under the shade receive the same light energy[20].	Photosynthesis (Fig.4)	Plants that need high kick start are kept under the sun while that opt low kick start are kept under the shade.

A 1) Infrared Spectroscopy: A particular carbonyl group absorbs the electromagnetic radiation at 1760 cm^{-1}. Absorption of energy continues as long as the frequency of both the carbonyl group and that of the electromagnetic wave continue to be equal. As the energy is being absorbed, the frequency of that carbonyl group is not increased, or not even changed, but it is only the amplitude of the carbonyl bond what is being increased and it is also quite convincing that, the energy absorbed by the bond is being utilised to increase the travel distance of the carbonyl bond. Also, the extent to which there is a decrease in amplitude of the energy donor, in every photon in turn every cycle of the light wave, is reflected exactly in an equal increase in the amplitude of the energy of the acceptor, the vibrating bond.

A 2) Constructive Interference: The principle of superposition of waves states that, when two or more propagating waves of the same type are incident on the same point, if a crest of a wave meets the crests of all other waves of the same frequency at the same point, then the resultant amplitude at that point is equal to the vector sum of the amplitudes of the individual waves[11]. If so, then why is it in constructive interference involving

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two waves, according to the law of conservation of energy, that the frequency is not doubled, if frequency alone be deciding the energy of light? Then, should the law of conservation of energy not come true? On the other hand, it is only the amplitude of every photon in turn the amplitude of every cycle of the light wave is only found doubled! The same is observed in the experiment conducted by Thomas Young in 1803, demonstrating interference from two closely spaced slits[12], and also in the more definitive studies and calculations made public in 1815[13] and 1818[14] by Augustin–Jean Fresnel, who gave great support to the wave theory of light, that had been advanced by Christian Huygens[15].

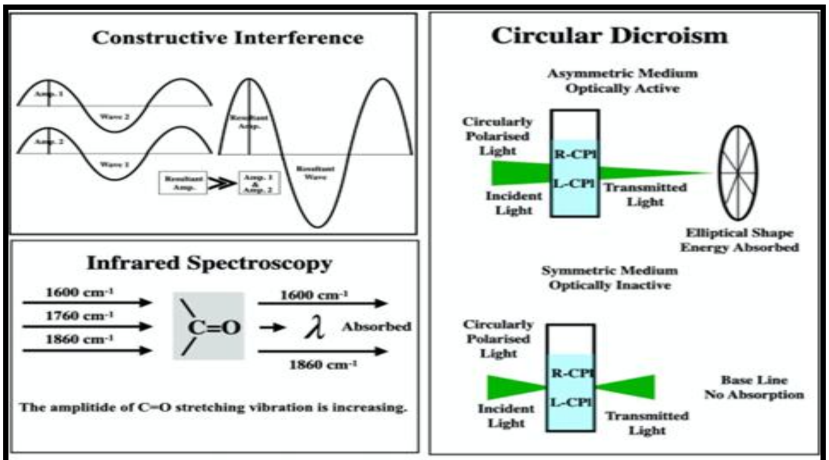

Figure 2. Schematic diagram representing Einsmax theory in Interference, Infrared Spectroscopy and Circular Dichroism experiments

In the constructive interference pattern, the bright fringe must be doubly flooded with the density of the glittering massless particles of light, compensating the absence of the massless particles of the light in the dark fringe. The (intensity of) massless particles of the light is just only the tool to identify and differentiate the dark and the bright fringes. The bright fringes can be identified by the eyes, only when the light wave scattered from the bright fringes (which is continuously being clothed by double the intensity of the glittering corpuscles) falls in the eyes.

A 3) Circular Dichroism: When a plane polarised light is allowed to pass through an optically active solution, the mere rotation of the plane of the plane polarised light clearly indicates that, energy from both the R-CPL (the right circularly polarised light wave) and the L-CPL (the left circularly polarised light wave) of the plane polarised light are unequally absorbed by both the solution, leading both R-CPL and L-CPL to be with two different energies, in turn into that of two different amplitudes. Hence the light comes out as elliptically polarised.

Also, as the light moves into the layer after the layer inside the solution, the massless particles get scattered by each layer, thus resulting in the steep falling off of the intensity of the transmitted light. Thus, the energy of the light wave gets reduced due to absorption while the density of the glittering massless particles of the transmitted light gets reduced due to scattering. Hence the intensity of brightness of the transmitted light is reduced.

A 4) Mechanical waves in ocean: While energy is supplied to the waves during storm in the ocean, the effect is felt at the amplitude of the wave, that is notably increased, but there is no effect on the frequency of the wave. Also, the energy (E) of the wave is proportional to the square of the amplitude (A) of the wave[10]. $E \propto A^2$ (proportionality symbol). Also, the energy and amplitude of every cycle are very much related and tied up together. Indeed, any two electromagnetic radiations of equal frequency but of different amplitudes cannot have the same energy.

A 5) Black Body Radiation: The experimental results of the black body radiation were the key to revolution. The first successful theoretical analysis of the data was made by Max Planck in 1900. He concentrated on modelling the oscillating charges, that must exist in the oven walls, radiating heat inwards and in thermodynamic equilibrium-themselves being driven by the radiation field. Referring to the Planck's constant h, Planck supposed that, in the several oscillators of each of the many finite characteristic frequencies, the total energy was

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distributed to each, in an integer multiple of, a definite physical unit of energy E (being equal to hυ) of the respective characteristic frequency[16]. [Fig.3]

Planck found that he could account for the observed black body radiation curve, if he required these oscillators not to radiate energy continuously as the classical theory would demand, but they could lose or gain energy in chunks, called quanta, of size hυ. [Fig.3]. Also in the black body radiation curve, there has been a strong fall off, of the radiation energy, when the wave length was shorter, than when the wavelength was longer, at which there was a peak value for the radiation [Fig.3].

Planck could just propose only hypothetical oscillators, purely imaginary, theoretical investigate. He said of them that such oscillators do not need to really exist somewhere in nature[17]. Planck did not attribute any physical significance to his hypothesis of resonant oscillators, but rather proposed it, as a mathematical device, that enabled him to derive a single expression for the black body spectrum, that matched the empirical data at all wavelengths[18]. Planck's original theoretical justification of the equation, for spectral energy density is rather abstract, because it involves arguments based on entropy, statistical mechanics and several theorems proved earlier by Planck, concerning matter and radiation in equilibrium[19].

Part of the problem was that, Planck's route to the formula was long, difficult and implausible. He even made contrary assumptions at different stages even though the result was correct as Einstein pointed out later. In the black body radiation curve, the radiation emitted at a particular wavelength, λ ’is not found to be equal to h c/ λ ’[υ' = c/ λ’; $h\upsilon'$ = h c/ λ’]. On the other hand, there may also be waves of varying energy quantum level (n', n'', n''', etc.) but of the same wavelength, λ ’of the corresponding energy values as follows: n' h c /λ’, n'' h c/ λ’, n''' h c/ λ ’etc., especially for the radiations having low wavelengths (of wave length ranger of 510 nm) [Fig.3] having cycles of very low base width.

When Planck was not able to give reason for this, Maxwellian theory supported Max Planck. According to Maxwellian theory, an oscillator of frequency υ', could have any energy value other than h c/ λ ’and could change its amplitude continuously as it is radiating any fraction of its energy. This Maxwellian theory, even though did not have any base, did help Planck to make his revolutionary proposal to be accepted hundred years before. But the very same Maxwellian theory, which alone helped the beautiful and precise experimental results of the black body radiation, only by adding a clause ‘the oscillator of frequency υ, could have any value of energy, other than even hυ, and could change its amplitude continuously as it radiated any fraction of its energy’, the concept which is very well supported and is provided with a strong ground by the 'Einsmax theory of the light photon and massless particles' as under:

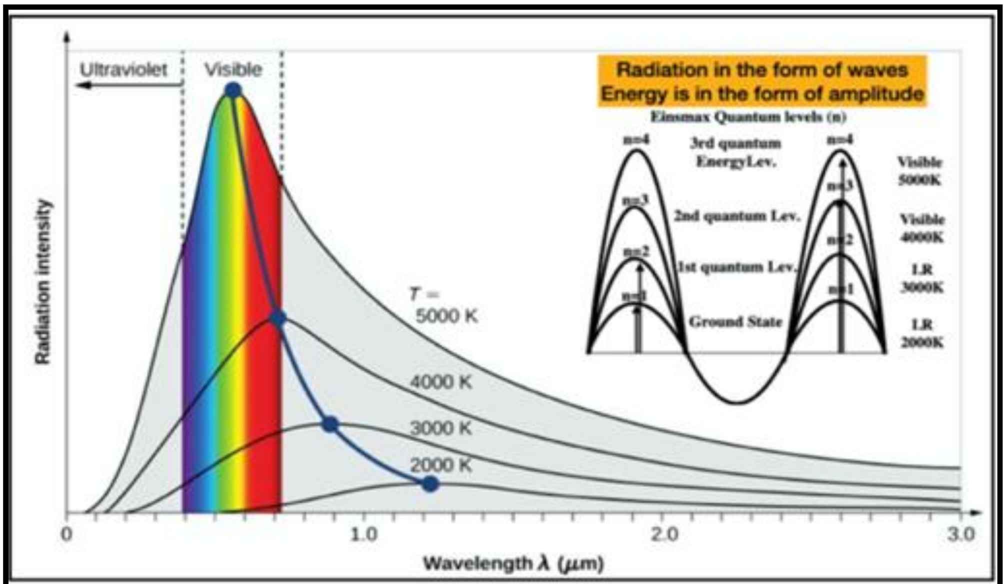

Figure 3. Schematic diagram supporting ensmax outcome related to blackbody radiation.

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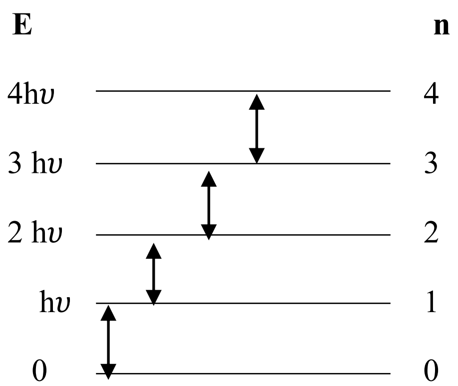
The width of the cycle of its light wave is its wave length, which is the base for its amplitude to stand on firmly with a high stability to be loaded with a high quantum level to bag high heat content. Radiations of higher energy like X-ray have very low λ,having very low base width, hence cannot have amplitude of high quantum level. The light waves, whose $wavelengths$ vary from 510 nm to 1100 nm gain stability, of which the nature helps that of around 510 nm to be loaded with maximum amount of heat at its high quantum values of the amplitude because of the base width being conducive to build higher quantum level at the amplitude. But, the range of λ, above and below may not be accommodating amplitude of high quantum level and so can bag only a low quantity of heat, as noted from the black radiation curves [Fig.3].

To secure agreement with experiment of the black body radiation, Planck had to assume that the total energy of a resonator with mathematical frequency υ, could be an integer multiple of hυ as theoretically arrived by Einsmax theory:

E resonator = n hυ joule Where n = 1,2,3…to n =∞



In addition, Planck concluded that emission of radiation of frequency, υ occurred when a resonator dropped to the next lower energy state. Thus the resonator can change its energy only by the difference ΔE, according to ΔE = hυ.

That is, it cannot lose any

hυ 1

amount of its total energy, but only a finite amount allowed energy levels according to hυ, the so called quantum of energy. The above Planck's original hypothesis, fornfigure shows the quantised energy levels and allowed an oscillator with frequency υ. transitions proposed by Planck Allowed transitions are indicated by double headed arrows.

A 6) Photoelectric Effect: According to the prediction of electromagnetism[20], the frequency (as well as the wavelength) is the property of the electromagnetic wave and hence cannot be altered by the change of direction implied by scattering. The light wave carries every second E joule of energy distributed among υ number of cycles and the rate of propagation of light energy or power is d(E)/dT, which alone helps to dislodge the electrons that are tied up to the metals, but is independent of the intensity of the incident light[21].

Though the light particles are only massless, they move with a very high velocity of light C. Hence, they do gain momentum in line with De Broglie, which is essential to provide a kick start to the metal electrons. The number of electrons in the metal, having received the momentum or the kick start is proportional to the rate of transmission of the massless particles impinging on unit area of the metal, what is known as the intensity of brightness. Hence it is only this intensity, that decides the number of electrons ejected per second (the current).

The energy of the photon is j. Part of the energy is used to redeem the electron from the metal, to meet the threshold energy Φ, while the rest contributes to electron's kinetic energy, E_k to be carried by the photoelectron[22]. $E_k = j - \Phi$. [Fig.4]

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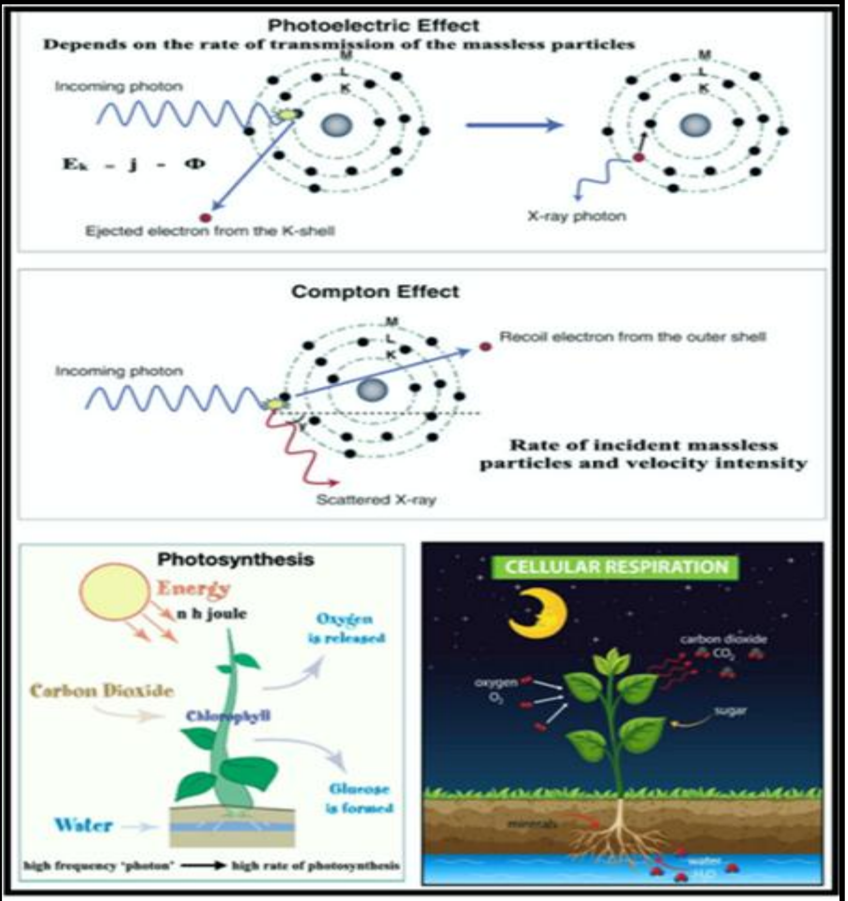

Figure 4. Schematic diagram that supports Einsmax theory in Photoelectric effect, Compton effect and Photosynthesis experiments.

A 7) Compton Effect: The photon used here is normally either X-ray or γ-ray, both are of high energy radiations. Hence, the binding energy of the atomic electron, could be treated as comparatively being free. Part of the energy of the photon is transferred to the recoiling electrons. The X-ray photon results in a decrease of energy, after lending part of its energy to the electron in the metal plate. The very essential momentum, demanded by the Compton effect, towards the kick start to be given to the electron, is met by the rate of propagation of the stream of massless particles of the electromagnetic radiation of velocity C that impinges on unit area of the metal surface, the intensity [Fig.4].

A 8) Photosynthesis: When the light from its source (sun) attacks the primary target (the plant or the open ground), the rate of massless particles impinging on unit area of the plant may be high (high intensity). The requirement of intensity of massless particles differs from plant to plant and accordingly some plants can grow well, only when they receive high intensity of massless particles and they need a higher momentum of kick start (which would opt to be primary targets). The intensity of the massless particles on the secondary target is comparatively less. Some plants may need for the kick start the massless particles of low intensity from the scattered light and so they may be kept under shade.

As per the prediction of the electromagnetism[20], the frequency of the incoming electromagnetic wave cannot be altered by the changed direction implied by scattering. It means that the rate of transmission light energy, d(E)/dT in other words the frequency also is the same on the primary or the secondary targets and so on. Plants kept in shades also avail the same frequency of the light wave. The sun light first acts on 'Chlorophyll a', by giving a 'kick start 'by the same massless particles to the bonding electron, following which the electron avails the light energy from every photon of the wave part. Thus, photo ionisation of the 'Chlorophyll a', transfers the excited electron to an electron acceptor. As light intensity increases, the rate of the light dependent reaction, and therefore the photosynthesis generally increases proportionately. Light with a high proportion of energy (high frequency 'photon'), will produce a high rate of photosynthesis [Fig.4].

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Thus, the wave component of the scattered light retains its frequency, and the scattered light wave can even travel in darkness. Hence, such a scattered light cannot bring about photochemistry or photosynthesis in absolute darkness, because in absolute darkness, the massless particles of electromagnetic radiation is completely absent (and hence no chance of kick start to produce excited electron)

B Different role of the light wave from that of the massless particles in image formation

TABLE 2 : List of experiments supporting role of massless particles in image formation in the role of the light wave form

S.No	Experiment	Light Phenomena	Einsmax Outcome
1A & 1B	A camera in the absolute darkness, photographing a faroff object kept in brightness	Scattering (Photography)	Object that is made bright by glittering massless particles falling on the object is linked to the camera by the light wave that travels into absolute darkness. [Fig.5]
2	Obstruction caused by light waves and massless particles from another light	Scattering (Photography)	The light wave from the object to the camera is obstructed resulting in the loss of 50% of clarity of the object in the image. [Fig.5]
3	Dark Optical camera	Scattering (Camera Obscura) (Image formation)	The light wave links the object to the camera because the Light wave travels into absolute darkness.
4	Learning from the Shadow	Scattering (Shadow Formation)	Light wave and the glittering massless particles quit the primary target momentarily.
5	Image formed by IR Radiations	Scattering (Photography)	Entirely different function of the massless particles from that of the light wave part.
6	Image by reflection using a mirror	Reflection	Entirely different function of the massless particles from that of the light wave part.
7	Reflection of an object in a mirror from the image of a bright object from another mirror both kept in absolute darkness.	Reflection (In dark region) (Photography)	The shining image is being carried to the photographic plate in absolute darkness by the light wave alone which is not glittering by itself.
8	Scattered light wave alone falling on the object in darkness	Scattering (Photography)	Light wave alone from the object that is not clothed by the massless particles cannot produce image in the camera.
9 to 11	Effect of the image of a slanting pencil or a coin inside the water	Refraction (Photography)	The scattered light wave from the object being clothed with the massless particles, must reach the camera to form the image.

The necessary and sufficient condition to form an image in the eyes is that, the scattered light wave from the object being clothed with the massless particles, must reach the eyes, either straight after simple scattering or after getting reflected or even refracted.

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B I. Scattering and Photography

a) Visible Radiation

Experiment 1 A: (open system) A film shooting of a dance program was made inside a forest in a very dark night. A very bright focus light F1 was focusing its light, from above, west to east, down on a dancer, who was standing at east facing the west. Here the dancer was the primary target of the light. A man-X with a photographic film camera, was standing at west, facing east at the dancer, at about 200 m away from the dancer. When the light ray was falling on the dancer, minimum of the light corpuscles alone was scattered, only to a very short distance in all other directions, because they are only the massless particles unlike the light wave.

According to the prediction of the electromagnetism, the frequency (as well as the wavelength) is the property of the electromagnetic wave, and hence cannot be altered by the change of direction, as implied by scattering[20]. It must be noted that out of the journey of 200 m distance made by the scattered light wave from the dancer to the camera, nearly at least the final 50 m distance of the region, in front of the camera, was absolutely dark in the very dark night in the forest. Normally any object is visible to our eyes, only when the light wave that got scattered from that object, falls on our eyes, and this is what the primary mechanism of physical observation[23]. The fact that the image of the dancer was formed in the camera as well as in the eyes of the man-X, in spite of both the camera and the man-X being only in the absolute darkness, indicates that the light wave alone, even though not accompanied by its glittering corpuscles, does travel even through the region of absolute darkness, and also, that it is only the light wave alone, scattered from the dancer that enters the eyes of the man-X and the camera to form the image of the dancer. The region deprived of the light corpuscles only is dark.

In addition to this, the clarity and brightness of the image of the dancer, was found to be depending only on the brightness on the dancer, which was decided by the intensity of the light focused on her face, on the density of the massless glittering particles that were continuously falling on the dancer, which depended on the number of watts of the focus light F1. Hence, it is a very clear inference that the process of photography is assisted by both the two components of the light, the light wave part (the reach of which on the photographic plate) and then the massless particles of the light (the function of which is to make the object be glittering) that can cause the image to gain brightness and clarity on the photographic plate. The interaction being caused by the light wave on every peripheral part of the dancer's face, is made very bright by the corpuscles, and is being carried along as the picture to the photographic plate, only by the light wave, which is continuously linking both the dancer and the camera.

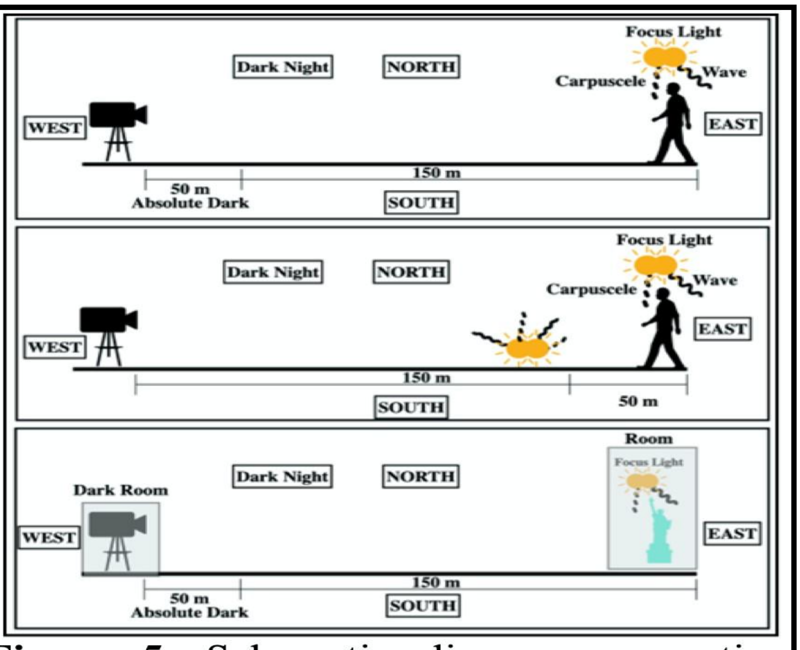

Figure 5. Schematic diagram supporting einsmax outcome in the visible light radiation experiments.

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Experiment 1 B: (closed system) A similar observation was also made by repeating the experiment 1 at present in a closed system, while the same man-X and the camera were in a very dark room-1 in a very dark night. A Focus Light was switched on to fall on a statue of 2m height in a bright room-2, which was about 200 m away from room-1. The image of the statue was formed in the camera, and also in the eyes of the man-X in the very dark room-1. Of course, there was a perfect darkness at least 50 m around room-1. In addition to this, the density of the corpuscles on the statue, which was decided by the number of watts of the bulb in room-2, did decide the brightness of the image of the statue. Thus, the inference of these experiments is that, during scattering, the light wave alone (without the light corpuscles) could travel even in the darkness to room-1. Also, at the moment the statue being photographed in the dark room-1, it is inferred that there must be a clean link by means of the light wave between the statue that is made glittering by means of the light corpuscles in the bright room-2 and the photographic plate.

Experiment 2: It was an extension of the experiment I. Here an extra focus light 2 was fixed at a distance of 5 m south to the line joining the dancer at east and the camera man-X at west, and at a distance of 50 m from the dancer. This extra focus light 2 was focusing 90° straight towards the north, but not at all towards the dancer. The effect of this extra focus was that, the clarity of the image of the dancer was reduced to 50%. The reason must be that the light wave that got scattered from the dancer's face, on its way to reach the man-X was prevented and obstructed both by the light wave and corpuscles from the focus light F2, from properly forming a clear and bright image of the dancer in the camera (compared to the earlier image in the Experiment 1)

Dark optical chamber: '**Camera Obscura 'and the Image: (Camera–room; Obscura-dark**):

Experiment 3: 'Camera Obscura 'device consists of a box with a small hole in one side. Light from an external scene passes through the hole and strikes a surface inside, where the scene is reproduced inverted and reversed. If a building or a place or a land scape is illuminated by the sun, a small hole is drilled in the wall of a room in a building facing this, which is not directly lighted by the sun. Then all objects illuminated by the sun, will send their images through this aperture, and will appear upside down on the wall facing the hole. When appropriate concave mirrors and convex lenses are used, the images become erect.

"You will catch these pictures on a piece of white paper, placed vertically in the room, not far from that opening but you will see all the above objects, on your paper in their natural shapes or colours[24]."

"It is impossible to express its beauty in words. The art of painting is dead, for this is life itself, or something higher, if we could find a word for it." The dark optical chamber has become the model of the eye ball. It was the dark optical camera that led to the important new vision of the eye. So, vision occurs through an image of the observed object, formed on the concave surface of the retina. But there's a problem. There's to date, no single direct evidence to support the idea behind the dark optical camera. What's not so clear is, exactly how the opportunity to manipulate the projections, offered by the 'camera obscura', helps to develop the new optical concepts of the time. This requires more study. The sources of the dark optical chamber, force the scientists to rewrite their understanding the optics and vision"[25].

Inference from the formation of shadow: Maximum of both the light wave and the light corpuscles, that start from the light source, after hitting the target, get scattered and go back immediately to the source from the target, while the remaining light wave and the corpuscles, get scattered in other different directions and quit the primary target immediately. This is very well inferred and confirmed from the formation of shadows by the following experiment:

Experiment 4: At 10 P.M, a man was walking from the south towards the north. To his right, to his east there was a focus light. To his left, to his west he could see his shadow falling on the ground. Just before he made another step forward toward the north, there was continuously the light wave and the shining corpuscles, together falling on the ground, just at the north of his shadow. But when the moment he put forward his next step towards his north, he could not see any more the same light wave and the shining corpuscles to his left, which he was seeing just before, but he could see only his new dark shadow. Thus, it is very clear that the light wave and the shining corpuscles are quitting the target spot then and there, immediately after they strike the target.

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b) Images using IR radiation and X-Rays:

Experiment 5: The same theory can be extended to the image obtained from the electromagnetic radiations such as infrared and X-rays. During the dark night, when the massless particles of these radiations continue to fall on the object, which are flooded and get coated on the object to be photographed, then the scattered wave from the object, at once simultaneously draws (fixes) the image on the photo film. Of course, the human eyes cannot get the image, because these radiations do not belong to the visible region. If the massless particles are not residing on the object, the light wave that would have got scattered from the object, even though enters the camera, it would not have formed the image on the photo film because the brightness or glittering caused by the corpuscles on the object alone provides brightness and clarity to the image. Thus, the entirely different function of the massless particles (corpuscles) of the light part, from that of the wave part of the light in photography confirms that the light exists in two different forms, both as wave and massless particles.

B 2. Reflection (in comparison with scattering)

When the primary target of the light ray is a polished glass mirror, then the components of the light, both the light wave and the light corpuscles, together get 100% reflected in a specified direction (following the law of reflection), depending on the angle of incidence.

Experiment 6: A plane mirror was held against the sun light and when the reflected light was allowed to fall on the eyes of the man-X, immediately his eyes were dazed, because the soft muscles of the eye balls were irritated and pinched by the light corpuscles. Now the experiment 1 A discussed above, can be compared with the experiment 5. In the experiment 1 A, the light fell on the dancer and only the light wave alone was fully scattered, reached the camera and also the eyes of the man-X, but the scattered massless particles of the light could not travel beyond the distance of 150 m from the dancer and as a result beyond that distance there was perfect and absolute darkness. The light wave had reached the man-X to produce the image of the dancer but his eyes were never dazed in the experiment 1 A. This clearly indicates the very indisputable fact that it was only the corpuscles free light wave alone, that fell on the eyes of the man-X in the experiment 1 A, and so the eyes were never irritated. Thus, it is clear that the light has only two components. So, they get completely separated as the light wave and the light corpuscles[1,2]. From the observations of the above experiments, it is also inferred that the function of the light corpuscles is entirely different from that of the light wave.

Experiment 7: The experiment -1A was again repeated exactly with the same situation, but with a only difference of keeping a big plane mirror A in the place of the photographic camera. The position of the camera was shifted and was so adjusted to be in front of the mirror A, to photograph the image of the dancer already formed (and reflected) by the plane mirror A. Another new plane mirror B, was then placed at the new position of the photographic film camera, such that the image of the dancer in the mirror A could fall in the mirror B. Again, the photographic film camera was shifted to yet another position, and its position was so adjusted to be in front of the mirror B, to photograph the image of the dancer reflected from the mirror B (which got the image of the dancer from the mirror A). It is thus very clear, that only the light wave alone got reflected, that too in that very dark region. Also, it was only the scattered light wave having travelled in a very dark region, that too got reflected in the very same dark region, consequently in two plane mirrors, that formed the image in the photograph. Hence it is very true that the image alone shines in the darkness and the darkness has never put it out**.** At the same time, it is the sure fact that the shining image is being carried to the photographic plate by the light wave alone which is not by itself glittering, and also at the same time the light wave has been travelling in the region of absolute darkness.

Experiment 8: The experiment 1 A was still again repeated exactly with the same situation, only with a difference of keeping a big statue of just 2 m height at a distance of just 1 m from the man-X in the area of darkness. The wave part alone of the light, scattered from the dancer, travelled 50 m through the utter darkness could fix the image of the dancer in the eyes of the man-X. Thus, the light wave alone, that was scattered from the dancer, after again got scattered from the statue, would also have fallen on the eyes of the man-X. But, the eyes of the man-X, could not get the image of the big statue, which was standing only very close to him, but his eyes could very well get the image of the dancer alone. The reason is that the light wave, after getting scattered from the primary target, the dancer, could straight fall on the eyes and the camera (the secondary targets), producing the image of the dancer. But, the light wave in the utter darkness, after falling on the statue (the secondary target, which was not clothed by the corpuscles) and got further scattered and then fell on the eyes and the camera (the tertiary targets) but, could not produce the image of the statue. Hence it is very clearly inferred that the absence of the image of the statue, is only because of the statue not being clothed by the massless particles of the light. Later, only when the man-X sent light to the statue by switching on a torch light, the eyes of the man-X, as well as the camera could get the image of the statue.

Image in Periscope: In periscope the scattered light wave from the object gets reflected consecutively by two plane mirrors. The light wave can draw (form) the image in the eyes of the observer. The scattered light wave from the object does not even reach the eyes of the observer straight, but reaches only after being reflected by two consecutive plane mirrors. The light wave scattered from the object, forms the first image in the first mirror. Now the first image becomes the object, which with the help of the light wave forms an image in the second mirror. The image in the second mirror now becomes the object, whose image is formed in the eyes of the observer.

B 3. Refraction When the target of a light is a transparent one, such as either a transparent liquid or a super cooled liquid (like a transparent glass), the light together as both wave and particles is refracted in addition to partly reflecting. It is only the refraction of light, along with its light wave and light massless particles are responsible for the image formation in lenses and eyes.

Experiment 9: A person looked at a pencil, which was placed at a slant partially in the water. In general, the sun light along with the light wave and the light corpuscles from above, fell on the free surface of the water, and got refracted down to the water. Since the light met on its way inside the water the object pencil, the light wave and the corpuscles got scattered at the pencil in all possible directions, and also got refracted back towards the free surface the light wave alone reaching the Man-X. The pencil appeared bending at water's surface. This is due to bending of light rays, as they move from water to the air. Once the waves reached the eyes, the eyes traced them back as straight lines (lines of sight). The lines of sight intersected at a higher position than where the actual waves originated (than at the tip of the pencil, clothed by the massless particles of the light). Hence the necessary and sufficient condition to form an image in the eyes is that, the scattered light wave from the object being clothed with the massless particles, must reach the eyes, either straight or after getting reflected or even refracted.

Experiment 10: A coin was kept inside the water at different depths and the coin was visible to the eyes, but beyond a particular depth, the coin was not seen by the eyes. The general condition for the coin to be seen by the eyes is that, the light wave must reach the eyes after being scattered from the coin, that has to be being clothed by the glittering massless particles. When the depth of the coin still increases, the massless particles are getting slowly lost on their way downward, due to the scattering by water molecules, as they go on meeting many more layers of water. Hence no more sufficient glittering corpuscles are available to clothe the coin at the depth and hence the light wave scattered from such a coin and refracted back to our eyes, cannot help the eye forming the image.

Experiment 11: In the photic zone, at the depth of 15 m of the sea, the man-X went with a safety kit along with the oxygen cylinder and also with a cage of glass covering his face. The scattered sun light from the corals reached the eyes of the man-X who was close to the corals at that depth of 15 m. He could also photograph the corals. On the next day, when the man was sitting on a boat, the bottom of which was fixed with the glass through which he could also see with his eyes the same beautiful corals.

This work introduces the "Einsmax Theory of Light Quanta and Massless Particles", a unified framework asserting that, light is inherently transmitted as both as an oscillating wave and a stream of massless particles. The experiments show that the emission and the absorption of energy by photon result respectively in decrease and increase of the amplitude of the light wave of the photon. Also in the Black body radiation curve, the energy emitted against a particular wavelength λ 'is not equal to

h c/ λ 'but is equal to n' h c /λ', n'' h c/ λ', n''' h c/ λ 'etc., in different quantum levels

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CONCLUTION

This work introduces the "Einsmax Theory of Light Quanta and Massless Particles", a unified framework asserting that, light is inherently transmitted as both as an oscillating wave and a stream of massless particles. The experiments show that the emission and the absorption of energy by photon result respectively in decrease and increase of the amplitude of the light wave of the photon. Also in the Black body radiation curve, the energy emitted against a particular wavelength λ 'is not equal to h c/ λ 'but is equal to n' h c /λ', n'' h c/ λ', n''' h c/ λ ' etc., in its different quantum levels. Hence the Einsmax Theory attributes the amplitude of the light wave of the photon to be vested with the quantum levels 1,2,3…n, that act as energy storage tank for emission and absorption of electromagnetic energy. A distinctly different component from the light wave is the glittering massless particles of the light falling on the target body, which plays a critical role in image formation. The intensity that is nothing but the rate of impingement of the massless particles of velocity c on unit area of the target metal does gain sufficient momentum required for the kick start in Compton effect.

This redefinition offers a compelling resolution of Einstein's long standing dissatisfaction with the concept of light quanta and aligns with experimental observations that remain unexplained by conventional quantum theory. The theory preserves all classical propagation equations while extending them to account for amplitude - driven energy transfer. By reexamining a wide range of light – matter interaction phenomena - including Constructive Interference, Circular Dichroism, IR Spectroscopy and the Photoelectric and Compton effects - The Einsmax Model provides a coherent and predictive structure that aligns with both classical and quantum results. In particular it explains the amplitude - sensitive transitions that are difficult to reconcile within existing frequency – based quantization models.

We assert that amplitude is not a passive parameter but a primary quantization variable governing the energy of each cycle of the light wave. This insight opens a new theoretical path in Optical physics and Quantum Electrodynamics. To advance this theory, future work must include formal mathematical derivation, comparison with quantum field theory and targeted experimental validation. If substantiated, the Einsmax Theory could redefine the foundational understanding of electromagnetic energy transmission and its role in light – matter interaction.

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Conflict of Interest

Author disclose there is no conflict of interest associated with this article.

REFERENCES

1. Jia-Kun Li. Light: Science & Publications 12, Article number: 18 (2023)
2. Ding et al. Light: Science & Applications (2025)14:82 http://doi.org/10.1038/s41377-025- 01759-4
3. Dimitrova, T. L. ; Weis, A., American Journal of Physics Vol: 76 issue: 2 pages: 137 – 142 : Feb 2008
4. Ma Hai – Qiang; Li Lin – Xia; Wang Su – Mei; et al. Acta Physica Sinica Vol:59 issue:1 pages 75 – 79 published: Jan 2010.
5. Albert Einstein, The Born-Einstein Letters 'Max Born, translated by Irene Born, Macmillian Philip Lenard Annalen der Physik 313, pp. 149 – 198 1902
6. O.W. Richardson, K. T. Compton, The Photoelectric Effect Philosophical Magazine 24, pp. 575 – 594
7. Chandrasekara Venkata Raman A Classical derivation of the Compton Effect Indian Journal of Physics 3, pp 357 – 69 1928

8. Kuhn, T.S. (1978). Black – Body Theory and the Quantum Discontinuity. Oxford University Press. ISBN 0-19-502383-8.
9. Williams, George A Physical Science Mc. Graw Hill. 1979
10. Ockenga, Wymke. Phase Contrast. Leika science Lab, 09 June 2011. “If two waves interfere, the amplitude of the resulting light will be equal to vector sum of the amplitudes of the two interfering waves”.
11. Thomas Young (1804 -01- 01). “The Bakerian Lecture: Experiments and calculations relative to physical optics”. Philosophical Transactions of the Royal society of London, 94: 1-16. 10.1098/rstl.1804.0001…. (Note : This lecture was presented before the Royal society on 24 November 1803)
12. Augustin – Jean Fresnel (1816) “Memoire sur la Diffraction de la lumiere, oul ’on examine partiulierement le phenomene des franges colorees que presentent les ombres des corps eclairs par un point lumineux” (Memoir on the diffraction of light, in which is examined particularly the phenomenon of colored fringes that the shadows of bodies illuminated by a point source display), annales de la chimie et de physique, 2nd The requirement of light intensity series, vol.1,pages 239-281 (presented before / .Academic des sciences on 15 October 1815).
13. Excerpts from Fresnel’s paper on diffraction were published in 1819 : A Fresnel (1819) “Memooire sur la diffraction de la Lumiere” (Memoire on the diffraction of light), Annales de chimie et de physique, 11 : 246-296 and 337-378.
14. Christian Huygens. Traite de la Lumiere (Leiden, Netherelands : Pieter vander Aa, 1690). Chapter From P.15: “Jay done monster de quelle facon 1 ’on peut concevoir que la Lumiere s elend successivement par des ondes spheriques ….” “I have thus shown in what manner one can imagine that light propagates successively by spherical waves…) (Note: Huygens published his traite in 1690; however, in the preface to his book, Huygens states that in 1678 he first communicated his book to the French Royal Academy of Sciences).
15. Planck, M. (1900c). “Entropic und Temperatur strahlender Warme”. Annalen der Physik. 306 (4): 719-737. Bibcode: 1900AnP… 306 …719P
16. M. Planck, Ann. Physik, 4:553, 1901
17. Kragh, H (December 2000) “Max Planck:The reluctant revolutionary”. Physics World
18. Planck, M (1914). The theory of Heat Radiation. Masius, M (transt) (2nd ed.) P. Blakistan’s Son & Co. 715 4661M
19. Physics for Scientists and Engineers (2nd ed.). Prentice Hall. 136-9. ISBN 0-13-805715-X
20. Zhang. Q. (1996). “Intensity dependence of the photoelectric effect induced by a circularly polarised laser beam”. Physics Letters A. 216(1-5) : !@5.Bibcode:1996PhLA..216..125Z...
21. Lenard, P (1902). “Ueber die lichtelektrische Wirkung”. Annalen der Phyik. 313(5): 149-198. Bibcode: 1902 AnP ….313…149L
22. Kerker, M. (1969). “The Scattering of Light”. New York: Academic. ISBN 0-12-404550-2. kjM Josef Maria Elder History of Photography translated by Edward Epsteen Hon. F.R.P.S Copyright Columbia University Press Constantijn Huygens, Letters 162