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On the Nature of Light According to Augmented Newtonian Dynamics

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Abstract: ***Augmented Newtonian Dynamics (AND) offers a new theory on the nature of light and electromagnetic radiation (EMR), presenting an aether-based framework that extends traditional Newtonian principles into the sub-atomic realm. Unlike conventional theories, which treat light as a purely quantum phenomenon or a wave propagating through space, AND proposes that EMR is mediated by a dynamic aether—a fundamental, photon-based medium that permeates the universe. This aether, emerging from the high-energy conditions following the Big Bang, is not merely a passive entity, but an active and evolving structure that influences the behavior of light and energy across cosmic scales. Through this lens, AND reinterprets the interactions of light with matter, offering new insights into the propagation of photons and the discrete nature of electromagnetic radiation. By grounding its principles in the origins of the universe AND provides a fresh framework that aligns with both observed electromagnetic phenomena and the broader evolution of cosmic structures.***

Keywords: Light, EMR, photons, aether, Dark Matter, CMBR, electrons, propagation of light, virtual photons, Big Bang Theory

1. Introduction to Augmented Newtonian Dynamics (AND)

Augmented Newtonian Dynamics (AND) represents a paradigm shift in our understanding of light (EMR) and the large-scale structure of the universe. Unlike relativity, which views light through the lens of time dilation and length contraction, or quantum mechanics, which seeks to treat light as an abstract mathematical wave-function, that operates through quantum fields, AND proposes that light propagates through a dynamic, photon-based aether that permeates all of space. This aether, which traces its origins to the earliest moments of the Big Bang, serves as the medium through which electromagnetic interactions occur, offering a comprehensive framework that enhances our understanding of the universe's forces. AND builds upon the principles of Newtonian physics, providing an elegant solution that accounts for the missing elements in the classical framework. In essence, AND preserves the simplicity of Newtonian Dynamics while incorporating a deeper, more nuanced view that explains the phenomena not accounted for in traditional models, such as how could light manifest as action at a distance in the absence of a medium. By introducing a fundamental aether that has evolved since the universe's creation, AND challenges both relativistic and quantum mechanical views of light, offering a new, unified perspective on how light propagates through the vast reaches of the Universe.

The aether described in AND is not a static or mythical substance but an active, photon-based field, intricately linked to the fabric of space itself. This network of photons was formed in the earliest stages of the universe, when matter and radiation were intricately bound together. Over time, as the universe expanded and cooled, the energy of these photons diminished, and they evolved into a low-energy, virtual state. However, their presence persists, providing the foundational structure for the behavior of matter and gravity throughout the cosmos. In this way, AND offers a theory that not only explains the dynamics of galaxies and large-scale cosmic structures but also addresses long-standing mysteries, such as the effects attributed to dark matter and the fine-tuning of gravitational forces. By rethinking the nature of light as mediated by this aether, AND provides a powerful alternative to both relativistic and quantum mechanical theories, offering a unified framework that accounts for the forces shaping the universe and the origin of light itself.

Augmented Newtonian Dynamics and the early Universe:

In the earliest moments following the Big Bang, the universe existed in a state of extreme temperature and density, during the Planck epoch, the Grand Unification epoch, and the Inflationary epoch. These phases saw the universe expand rapidly, and in this dense plasma environment, particles of matter and photons were in constant interaction. For every particle of matter that formed, an immense number of photons were produced — hundreds of trillions per second, resonating at optical light frequencies. These photons were real, not virtual, and their production occurred within the high-energy environment of the early universe. The number of photons generated in this way is consistent with current measurements from optical atomic clocks, which resonate at optical frequencies. According to recent research, optical atomic clocks exhibit precision at the optical frequency level, demonstrating the kind of photon production seen in the early universe, and that continues till the present day. As explained by [2] Oates et al. (2019), "Optical clocks, which operate at much higher frequencies than microwave-based cesium clocks, provide a direct link to photon production rates where optical frequencies are concerned." These photons filled the universe and interacted within the dense plasma, forming a network of energy. Despite the sheer number of photons produced, the dense plasma prevented them from propagating freely.

The question then arises: where did all these photons go? Since there is no "edge" to the universe, these photons could not escape or travel beyond any boundary, because, by definition, no such boundary exists. Instead, the photons accumulated within the universe, filling every part of it.

With their dipole structure, these photons were able to link with one another, forming a vast, interconnected network that permeated the entire cosmos. This network acted as a kind of "aether," an energy fabric that connected all matter within the universe, providing a foundational structure for everything that followed. As the universe expanded, the energy of these photons began to decrease due to the expansion of space. The expansion of the universe stretched the wavelengths of these photons, decreasing their energy over time. Initially resonating at optical frequencies, the energy of each photon diminished significantly as the universe grew. Eventually, the energy of these photons dropped to incredibly low values of around 10^{-51} joules. At this point, the photons ceased to be "real" in the conventional sense and became virtual photons, forming a nearly imperceptible background field. This background fabric of the Universe, serves as a subtle, cosmic aether, linking all of space and underpinning the continued evolution of the universe.

Dark Matter as the Aether in Augmented Newtonian Dynamics

One of the most profound mysteries in modern cosmology is the existence of dark matter, an invisible substance that appears to make up a significant portion of the universe's mass but eludes direct detection through conventional means. [1] (Rubin et al., (1980). "Rotation of the Andromeda Nebula from a spectroscopic survey of emission regions." *The Astrophysical Journal*, 238, 471–487. "The rotation curves of galaxies imply that approximately 85% of the mass in the universe is in the form of dark matter, which cannot be detected through electromagnetic radiation." Traditional models of gravity and matter, based on general relativity and quantum mechanics, have struggled to account for the effects attributed to dark matter—particularly the observed discrepancies in galactic rotation curves and the gravitational effects on large-scale cosmic structures. In contrast, Augmented Newtonian Dynamics (AND) offers a radical reinterpretation, suggesting that dark matter may not be a distinct form of matter at all, but rather, an inherent property of the universe's aetheric medium.

The presence of dark matter [1] is inferred from various cosmological observations, with estimates indicating that it accounts for approximately 85% (if not more) of the total mass of the universe's matter. This estimation arises from a combination of galaxy rotation curve studies and gravitational lensing, as well as the behavior of galaxy clusters. Despite its significant mass, dark matter has remained undetectable by any conventional means of direct observation. It neither emits, absorbs, nor reflects light, rendering it invisible to electromagnetic radiation detection methods. Consequently, dark matter cannot be detected using traditional telescopes or particle detectors based on electromagnetic or nuclear interactions. It is classified as "non-luminous" and "non-interacting" with known forces, existing only through its gravitational influence on visible matter.

Within the AND framework, the aether is not a static or invisible substance, but a dynamic, photon-based network that permeates the entire cosmos. This network of photons, formed in the earliest moments of the Big Bang, interacts with matter and influences the motion of galaxies, stars, and even individual particles. As the universe expanded, the energy of the photons that formed the aether decreased, evolving into low-energy virtual photons that permeated the entire Universe, occupying both the vacuum and matter itself, subtly influencing gravitational forces. These virtual photons may be responsible for the phenomena we associate with dark matter—such as the unexplained rotational velocities of galaxies and the large-scale gravitational effects observed in galaxy clusters.

A key concept in understanding the longevity of these virtual photons lies in Heisenberg's Uncertainty Principle, which states that:

$$\Delta T \Delta E \geq \hbar \quad (1)$$

where ΔT is the uncertainty in time, and ΔE is the uncertainty in energy. For a photon with extremely low energy — on the order of $E = 10^{-51}$ J — the uncertainty in its energy is extremely small. According to the Uncertainty Principle, this implies that the uncertainty in its time duration (ΔT) can be incredibly large, meaning these virtual photons can persist for vast amounts of time without violating conservation laws. The low energy of these photons ensures that they do not significantly interact with matter or other particles, allowing them to remain undetectable and undisturbed by conventional measurement techniques. Therefore, these virtual photons can exist for billions of years, subtly influencing gravitational forces while remaining hidden from our detection methods. It should be noted that the dark matter described in this context possesses identical properties to those attributed to the erstwhile aether. It was odorless, massless, and undetectable by all known means, including electrical and magnetic interactions. These characteristics align perfectly with the properties of the virtual photons that make up Dark Matter (the aether) in AND. In this sense, what we observe as dark matter is not an exotic form of matter, but rather the subtle, undetectable influence of the aetheric field.

Thus, in AND, dark matter is reinterpreted as a manifestation of the aether, a medium through which EMR propagates, linking matter and energy at a fundamental level. Rather than viewing dark matter as an enigmatic substance that exists independently of the universe's structural fabric, AND suggests that what we perceive as dark matter is simply the gravitational influence of the aetheric field that permeates all space. This reinterpretation not only resolves many of the issues surrounding dark matter but also deepens our understanding of light and EMR.

QM and electron photon interactions:

In quantum mechanics, the concept of excitation of the electromagnetic field and its interaction with an electron is foundational yet abstract. The question of how such an excitation manifests to the electron requires an understanding of how quantum fields and particles interact. At the core of this interaction is the idea that all particles, including electrons, are excitations of their respective quantum fields. For the electron, this field is the electron field, and for the photon, it is the electromagnetic field. These fields pervade space, and particles like electrons are simply localized disturbances or excitations of these fields.

When we speak of the "excitation of the electromagnetic field," we refer to fluctuations or disturbances in this field, which can be quantized into discrete units known as photons. These photons, in turn, are the fundamental carriers of the electromagnetic force. However, it's important to note that the excitation of the field is not something an electron "senses" in the classical sense; instead, the interaction occurs at a deeper quantum level.

When an electron is in an energy state, it exists as a wavefunction, a mathematical description of its position and energy. This wavefunction can interact with the quantized electromagnetic field, meaning that the electron is, in essence, coupled to the electromagnetic field. For an electron to absorb or emit a photon, the energy of the field excitation (the photon) must match the difference between the electron's current energy state and another available state. For photon absorption, this process occurs when the electromagnetic field presents a photon with the exact energy required to promote the electron to a higher energy level. The photon is not "seen" by the electron directly, but rather the electron's wavefunction interacts with the electromagnetic field, absorbing the energy associated with the photon. The electron then transitions to a higher energy state, having taken up the energy of the photon. This can be visualized as the electron "borrowing" energy from the field, which excites it to a new state. For photon emission, the opposite happens. When the electron transitions from a higher energy state to a lower one, the excess energy is released in the form of a photon. The electron's wavefunction changes, and this transition corresponds to the excitation or de-excitation of the electromagnetic field. Here, the energy lost by the electron is carried away by the photon, which propagates as an excitation in the electromagnetic field. Thus, the electron "feels" the excitation of the field not in the classical sense of detecting individual photons, but through its wavefunction's interaction with the electromagnetic field. This interaction is governed by the rules of quantum electrodynamics (QED), which provides the mathematical framework for describing how electrons and photons interact as part of the larger quantum field.

AND Rebuttal of the quantum mechanics view of electron photon interaction:

Although the quantum mechanics (QM) view of how electrons and photons interact might have a strong theoretical basis, a deeper examination reveals significant inconsistencies and gaps in the model. For example, optical microscopes are limited by the size of the wavelengths of visible light, meaning they cannot distinguish objects smaller than approximately 300 nm. This suggests that the spatial extent of photons is crucial to understanding their interactions. When considering a photon with a wavelength of 500 nm, we must ask: what happens when it interacts with an electron's wave function or electron cloud? The maximum size of the electron's wave function is on the order of 10^{-10} m, corresponding to the size of an atom—about 5,000 times smaller than the wavelength of a 500 nm photon. Consequently, the spatial area occupied by such a photon's wavelength could theoretically cover 78,000,000 atoms (or electron wave functions) if we consider the area. This raises the question: how can such a large, spatially extended photon interact with an individual electron if the photon is much larger than the electron's wave function?

The photon wavelength of 500 nm (5×10^{-7} m) implies a cross-sectional area for the photon, which can be approximated as a circle:

$$A_{photon} = \pi(5\times10^{-7}\ \text{m})^2 = 7.854 \times 10^{-13}\ \text{m}^2 \quad (3)$$

Next, calculate how many of these atomic-sized areas fit into the cross-sectional area of the photon. Let's assume the atomic area (or the area associated with the electron wave function) is on the order of 10^{-10} m (since the size of an atom is around 1 angstrom, or 10^{-10} m). To find the area ratio, we divide the photon's cross-sectional area by the area corresponding to the size of the atom (or electron wave function):

$$\text{Area Ratio} = \frac{A_{\text{photon}}}{A_{\text{atomic}}} = \frac{7.854\times10^{-13}\text{m}^2}{10^{-20}\text{m}^2} = 7.854 \times 10^{7} \quad (4)$$

This shows that the area of the photon's wavelength is 78 million times larger than the size of the electron's wave function, raising further questions about how such a large photon interacts with the electron. Other factors militating against the QM interpretation of photon emission and absorption is the sheer speed and volume of photon emission and absorption by the bound electron, [2] as is the fact that QM does not have an explanation for the fact that light does not travel backwards.

Augmented Newtonian Mechanics and the structure of the Photon:

It is curious that despite the central role photons play in mediating energy and enabling the propagation of light and electromagnetic radiation, there has been limited exploration into their fundamental structure. The question of what a photon truly is—how it comes into existence at precisely the right time, with the correct energy, and in the vast quantities observed—remains as perplexing as the photon itself, at least in its current conceptualization. Describing photons merely as excitations of the electromagnetic field provides little insight into what is one of the most important and enigmatic components of modern physics

In developing the Augmented Newtonian Dynamics theory of the structure of the photon, a departure from the statistical approaches commonly used in quantum mechanics, which rely heavily on complex mathematical formulas involving imaginary numbers and multiple dimensions, is used. In quantum mechanics, the photon is viewed as an excitation of the electromagnetic field, often referred to as a "quantum" of the field. It is not considered a traditional particle in the classical sense, but rather a discrete, quantized fluctuation in the electromagnetic field that carries energy and momentum. This perspective emphasizes the wave-particle duality of light, where the photon behaves both as a particle in certain contexts and as a wave in others, depending on the experimental setup. AND, opted for a more logical method to envision a structure for the photon, based on observation, hypothesis, experimentation, and theory — the approach used before the advent of quantum mechanics. This approach mirrors the path taken by Crick and Watson in constructing a new physical model for the structure of DNA,

which relied on data collection, analysis, and observation rather than purely theoretical speculation.

The initial focus of the research was on the photon, whose physical properties have been extensively observed and studied in the past, without a realistic model emerging. These properties of the photon were systematically recorded and analyzed to explore how they could be incorporated into a physical or mechanical model that would account for all observed characteristics of the photon.

The key observed properties of the photon are as follows:

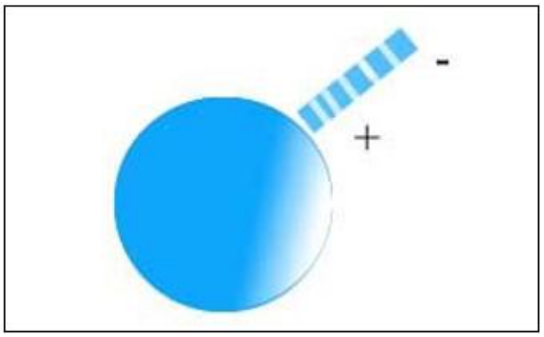
1) The photon has no mass.
2) The photon is always in motion and never at rest once emitted.
3) The photon travels at a constant speed of 299,792 km/s, the speed of light in a vacuum.
4) The photon is electrically neutral.
5) The photon adheres to the inverse square law of dispersion, behaving like a wave in a medium.
6) The photon preserves its energy and identity over vast distances; its energy remains unchanged and does not dissipate, which gives it a particle-like quality.
7) The photon exists across a broad spectrum of frequencies, wavelengths, and energies.
8) Radio waves share the same properties as photons, though they have much larger wavelengths; for example, a 60Hz radio wave has a wavelength of 5,000,000 meters.
9) All photons originate from electrons.
10) The photon exhibits characteristics of both a wave and a particle.

These properties formed the basis upon which the new structural model for the photon was built. The rationale behind the creation of this model is as follows:

Since the electron is a charged particle, it may have the ability to mediate its energy by emitting or absorbing pulses of electric energy. Upon further consideration, the idea that the electron emits pulses of electrical energy appears plausible. This approach would place the electron in control of the energies it absorbs or emits. By employing such a method, the electron could release highly precise quantities of energy. For example, this model of energy transfer would allow the electron to distinguish between photon energies differing by even small fractions of an electron volt.

By adopting this energy transfer method, the electron could accurately mediate its energy through the emission of electrical pulses, which would take the form of stable configurations. This process would enable the electron to effortlessly emit or absorb trillions of different photon combinations, each with its own unique frequency, wavelength, and energy. Furthermore, these photons, composed of electrical pulses, could be formed and emitted or absorbed by the electron extremely rapidly, in time intervals on the order of $<10^{-15}$ seconds.

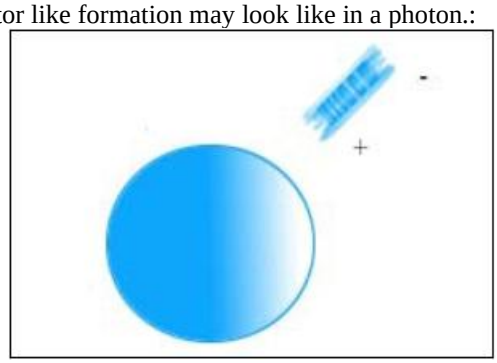
Thus, photons are produced by the electron on demand, and in prodigious numbers. To understand how the electron emits bursts or pulses of electrical energy to construct a photon, see the image below:



Pulses of electrical energy from electron are polarised

Figure 1

The pulses of electric energy are separated by a di-electric this means that these bands of energy can act as a capacitor and preserve their energy almost indefinitely. Look at the picture below to get an idea of how polarisation and the capacitor like formation may look like in a photon.:



Solen Field take shape around pulses of energy forming a photon

Figure 2

Thus, there now emerges a model of the photon that possesses a structure that

1) Has no mass.
2) Is electrically neutral.
3) Can preserve its energy (identity) almost indefinitely
4) Always travels at c.
5) Is both wave and particle simultaneously.
6) Is easily emitted and absorbed by electrons.
7) Follows the inverse square law of dispersion.
8) Consists of all electromagnetic radiation, from radio-waves with a wavelength of 5000 Km to photons with a wavelength of a few nanometres.

This photon model satisfies all the properties expected of a photon and aligns closely with Max Planck's groundbreaking discovery of energy quanta, which identified electromagnetic radiation as being made up of minute, infinitesimal, discrete, indivisible packets of energy. Consequently, the structure of the photon, as developed by AND Theory, represents a symbiosis of both wave and particle characteristics. It can exhibit wave properties, but by maintaining its configuration (dimensions) and preserving its energy, it also possesses particle-like qualities, somewhat analogous to how ultrasonic waves can shatter kidney stones. As discussed in earlier sections, this model offers a clear understanding of the photon. The next question is: How does such a photon propagate, always traveling at a speed of 299,792,458 m/s in straight lines?

According to AND Theory, the entire Universe is permeated by a 'virtual photon' aether, which we recognize as Dark Matter. These 'virtual photons' are identical to the photons described above, except they possess extremely low energies, on the order of 10^-51 J, rendering them undetectable. As a result, these virtual photons, although present everywhere, do not interact with matter in a meaningful way. No atom can use photons of such low energy, so the virtual photon aether can pass through matter as though it doesn't exist. It can pass through planets, such as Saturn or the Sun, without any interaction, and vice-versa. Thus, in AND Theory, the Universe is filled with these virtual photons, which are, for all practical purposes, almost stationary electromagnetic dipoles. Because of this electromagnetic property, when a real photon is emitted by an electron, the virtual photons of the aether align in the direction of the real photon's propagation. This creates a line along which the energy of the real photon travels, much like how metal filings align with a magnet. It is crucial to note that it is the energy of the real photon that travels along the line of virtual photons, not the photon itself. As the real photon moves forward, it also disperses energy laterally, following the inverse square law. The following illustrates what both a real photon and a virtual photon might look like:

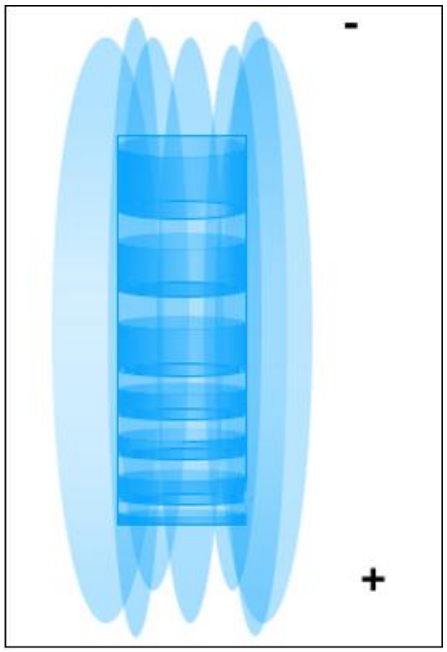


Figure 3

To gain some idea of how virtual photons came to permeate the entire Universe, it is first necessary to examine in detail another of the out-dated concepts of quantum mechanics. This is the concept of the frequency of a photon. According to quantum mechanics: [3] Leonard Susskind, "The Theoretical Minimum: Quantum Mechanics"

"A photon is an excitation of the electromagnetic field, and its energy is related to the frequency of the field's oscillation, E=hf. However, unlike a classical wave, the photon itself does not have a frequency in the conventional sense. Instead, we say that the frequency of the photon corresponds to the frequency of the electromagnetic wave it would form if viewed as a wave."

Another way of stating this is by $f = \frac{e}{h}$ this means that if you know the energy of the photon it is possible to determine its frequency by dividing the photon energy by h planck's constant. Whatever the answer might be it is fairly obvious that the quantum mechanics concept of what the frequency of a single photon might be is shrouded in obscurity; due to the wave-particle duality there can be no definite answer to the question. This presents a problem when looked at from a purely mechanical point of view. The problem arises as follows, if one looks at a modern-day smart phone one is aware that it is ***processing*** data at the rate of several gigabits per second. Consider what the term ***processing*** denotes, it means taking input data, evaluating it and outputting the result. The electron is miniscule in size and the distances over which it has to oscillate are even smaller. It is then only natural that the electron should oscillate at frequencies of several hundreds of terahertz and emit photons at that rate. In fact, not to do so would be odd. AND Theory, therefore, takes the concept of photon frequency away from the fuzzy abstract notions of quantum mechanics where it is an abstract vague property of the photon and puts it on a sound practical basis. Therefore, when we talk of an electron emitting photons with a frequency of 600 THz it means exactly that. The electron is emitting photons at the prodigious rate of 600,000,000,000,000 photons per second. In what direction are these photons emitted? These photons are emitted in a single direction as a line of photons of the same frequency, wavelength and energy. Why? If one looks at the physics behind the emission of a photon, it is apparent that the electron absorbs energy and mediates its energy by emitting that energy in the form of a photon, the process involves the force of recoil. To cope with these forces of recoil the electron rebounds against the nucleus returns to its original position and absorbs more energy and again emits this energy at the exact same position as before, hence photons are emitted as a line of photons in a specific direction. Proof that this is indeed the case can be seen in the working of any [2] atomic clock. Frequency is directly related to the rate of emission of photons by the electron or to put it another way by the electron's rate of oscillation. There exists ample evidence that this theory of how photon frequency is linked to rate of emission or oscillation of the electron is correct in the working of atomic clocks.

The size of the photon depicted in Figure 3 has a diameter of approx. 10^{-16} m and a length dependent on the energy content of the photon. The following points should be considered:

a) This structure of the photon means that the photon possesses no mass. Yet it has a stable structure and identity in the form of its energy. It is a massless particle.
b) This model of the photon is electrically neutral. It has the structure of an electric dipole that is electrically neutral and physically stable.
c) This model of the photon has a fixed energy that is maintained intact from the time it is emitted to the time it is absorbed.
d) This model of the photon has a stable configuration that cannot be easily disrupted.
e) This model of the photon explains how optical photons are produced directly by the electron. Higher energy

photons such as gamma rays and lower energy photons such as radio-waves have a similar but different genesis. Gamma rays are formed during the annihilation of the nucleus while radio waves are formed by a different process that shall be explained in a subsequent paper.

Therefore, this model of the photon fulfills all of the requirements and physical properties that a photon is supposed to possess. Further:

1) This size of the photon means that it can easily be formed and emitted by an electron in a time interval of 10^{-18} s.
2) The fact that an individual electron can deal on a one on one basis with incoming photons, means that it is possible for the electron to oscillate at the rate of several hundreds of Terahertz per second and to absorb and emit photons at that rate.
3) This extremely high rate of oscillation means that it is possible to explain the rectilinear nature of light, a property that accounts for, among other things, the casting of shadows. This is explained by the fact that for as long as the electron is being irradiated by photons from a given direction and source, it will continue to emit photons at the rate of 10^{14} Hz or more, all of which are identical to each other in terms of frequency, wavelength and energy. These photons will all be emitted in keeping with the classical laws of reflection where ∠ i = ∠ r. (angle of incidence equals angle of reflection). This results in rays or lines of hundreds of trillions of connected photons being formed per second all of which are identical to each other, creating a ray of monochromatic light.
4) This structure of the photon as a stable electric dipole also explains how light propagates according to the inverse square law, since it enables the photon to link up with other photons.
5) Most importantly, it explains the manner in which photons are linked to electrons in a comprehensible and vivid manner instead of depending upon the explanation that photons are the result of quantum fluctuations in the electromagnetic field.
6) According to AND Theory electric and magnetic fields do not exist neither does an electromagnetic field; only the virtual photon field exists that serves both electric and magnetic functions. An electric field consists of a field of polarized virtual photons and a magnetic field consists of an energized field of virtual photons, wherein energy is flowing.
7) The physical space that exists between pulses of electrical energy emitted by the electron during the formation of a photon, is devoid of molecules and atoms. Hence, representing a pure dielectric between the pulses of energy. Allowing the photon to maintain its energy intact for very long periods of time.

In conclusion to this section, it should be stated that AND Theory has evolved a very satisfactory model for the structure and formation of the photon. According to AND Theory, photons have their Genesis inside electrons; they are not something apart and external as theorized by Quantum mechanics. AND Theory makes the photon an integral part of the electron, light (photons) is therefore an integral property of electrons and not a result of the interaction of electrons with excitations of the electromagnetic field as is currently held by quantum mechanics.

Examining a single interaction of an electron with an incoming photon, this is what takes place. A radiating source emits a photon, note that the size of the photon with a diameter of 10^{-16} m makes it possible for a specific electron in a specific atom to easily absorb and emit specific photons, the emitted photon is absorbed by an electron with the proper energy level within the atom. The absorption of the photon imparts momentum to the electron propelling it in the direction of the nucleus. Since the size of a proton (nucleus) is approximately 2000 times the size of the electron, the nucleus appears to the electron to be a perfectly flat, perfectly smooth surface. As the electron approaches the nucleus, there is a slight increase in its speed, instead of smashing into the nucleus, when the electron and nucleus touch, the equal and opposite charges possessed by the electron and proton are temporarily neutralised. It should be remembered that the atom is neutral because overall, the charge of electrons to protons is equal. Any extra interaction that takes place can therefore be treated as an individual interaction between electron and proton. Electrical charges, when they are equal, neutralise. The electron, therefore, rebounds or recoils off the nucleus, following the laws of classical recoil and reflection where the angle of incidence = the angle of recoil. When the electron reaches the energy level at which it had absorbed the photon but at a location exactly opposite to its original location, it emits a photon of the same value it had absorbed. In order to cope with the forces of recoil resulting from the emission of a photon it retraces its path and ends up in its original position at n = 3, where it absorbs another photon and the whole process repeats. This process takes place at the rate of hundreds of trillions of repetitions of absorptions and emissions every second and continues for as long as the excitation from that particular source continues. If the energy of the emitted radiation from the source continues and the direction remains unchanged, rays of connected photons are formed.

On the propagation of light according to AND:

When an electron within an atom that is orbiting the nucleus (note the new terminology) is excited and emits a photon, the photons of the virtual photon aether (Dark Matter if you like) form into a line whose ends rest on the shoulders of infinity and the energy of the real photon travels along this line of aligned virtual photons. Note that it is the energy of the real photon that travels and not the photon itself. This brings the propagation of light into line with the way in which all waves travel. Since photons are emitted by electrons at a very high rate (10^{14} Hz) each line of aligned virtual photons consists of huge numbers of identical photons all possessing identical energies, wavelengths and frequencies. This transforms the line of aligned virtual photons into a ray of monochromatic light. As the lead photon in this ray of photons comes into contact with a virtual photon of the virtual photon aether (Dark Matter), it promotes that virtual photon into a real photon by passing on all of its energy to the virtual photon it is in contact with. The energy of the lead photon is immediately replenished by the line of real photons behind it. In the meantime, the virtual photon that has been promoted to a real photon also passes on all of its energy to virtual photons that it comes

into contact with, and its energy is similarly replenished from the line of real photons. This is how light spreads out in keeping with the inverse square law. Therefore, all of the photons on the wave front that is built up in this manner possess identical energies frequencies and wavelengths, although the intensity (fewer photons in line behind the lead photons on the wave-front) will be diminished. This transfer of energy from real photon to virtual photon is lossless as it occurs on top of the existing virtual photon energy of 10^{-51} J. The virtual photons are part of a vast linked network of virtual photons that permeates the whole of the Universe and their base energy cannot easily be disturbed.

The above description of the propagation of light refers to the propagation of monochromatic light. The description of the propagation of incoherent light is far more chaotic. Copper possesses approx 8.42 x 10^{-19} atom per cubic centimetre, each copper atom possesses 29 electrons, large fraction of these electrons will be involved with absorbing and emitting light at various frequencies. Each of the rays of light emitted by these electrons will be travelling in a different direction, hence the isotropic nature of incoherent light. In coherent light the photons forming the core of beam of light are shielded by the external layer of photons from the virtual photon aether and hence do not interact, this means that coherent light like lasers can travel a much further distance before eventually succumbing to the provisions of the inverse square law.

2. Conclusion

In this paper, the nature of light and electromagnetic radiation (EMR) within the framework of Augmented Newtonian Dynamics (AND) has been explored, offering a fresh perspective on these fundamental phenomena. By reinterpreting the behavior of light through the lens of a dynamic, photon-based aether, AND extends traditional Newtonian mechanics to account for both the wave and particle properties of light. Unlike conventional models that treat light purely as either a particle or a wave, AND proposes that light is fundamentally connected to an underlying medium that influences its propagation and interactions with matter.

The introduction of a dynamic aether—formed in the aftermath of the Big Bang—provides a coherent and novel foundation for understanding the energy transfer and propagation of photons. By relating the energy of a photon to the frequency of its associated electromagnetic wave, AND highlights the inherent link between wave-like and particle-like descriptions of light, offering new insights into the nature of electromagnetic radiation. This approach not only aligns with cosmological observations but also provides a broader, unified framework for future exploration. While much remains to be explored, the principles outlined here suggest that AND could provide a more comprehensive understanding of EMR, one that transcends the limitations of classical Newtonian mechanics and quantum theory. Further research could refine these ideas, offering deeper insights into the interaction between light, matter, and the fundamental structure of the universe. Ultimately, AND offers a promising new avenue for conceptualizing light and its role in the broader fabric of reality, bridging the gap between classical and quantum descriptions of nature.

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