



A Light-Space-Time Quantum-Computational Model of Subtle-DNA & Genetics

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Abstract— Subtle-DNA can be thought of as a conceptual-construct consisting of a double-helix structure, arranged as a light-based downward-strand and a time-based upward-strand. Light imagined existing at different constant speeds far greater than the known speed of $c - 186,000$ miles per second - offers a unique view of quanta and quantum computation, and the precipitation of such light from higher to lower speeds offer insight into the conceptual downward-strand of subtle-DNA. Such a downward-strand structures an involutory-reality that seeds space, and subsequently becomes the basis of an evolutionary-reality structured as a time-based upward-strand of subtle-DNA. Analyses of such a composite light-space-time structure further provides a unique point of view into the origin and possibilities of genetics. Genetics can be seen as having a diverse light-based functional, as opposed to a solely form-based foundation. Genetics can also be perceived as being the output of a persistent quantum-level computation. Such a modeling provides useful hypotheses into the subtle conceptual structure of DNA, into the architecture of mutation and the likely processes of constructive and destructive mutation, and the mechanism of heredity. Further the relationship and possible impacts of the quantum-based processes of entanglement and superposition on genetics, and future possibilities due to practically infinite amount of information in antecedent layers of light can be constructed.

Keywords— **Genetics, Mutation, Quantum Computation, Heredity, Symmetries in Light, Superposition, Entanglement, Genetic-Type Information, Quanta, Upward-Strand, Downward-Strand, Double-Helix**

I. INTRODUCTION

The Cosmology of Light computational model (Malik 2018a, b; 2019, 2020) explored a mathematical structure of Light composed of light traveling at different constant speeds beyond the known speed of light, of $c - 186,000$ miles per second in vacuum - in the physical universe. Light at different speeds engenders different realities, which will be summarized in Sections II and III, and as a result engenders different kinds of information. This vast variety of information is proposed as being the origin of genetic-type information and genetics.

Light at different speeds, from an imagined speed of infinite miles per second, down to $c - 186,000$ miles per second in vacuum - creates different though mathematically symmetrical realities based on four underlying properties suggested to be implicit in light. This gives rise to a quaternary-based multi-layered mathematical structure in which the unity of light traveling infinitely fast separates in an increasing display of distinct functionality to create the reality of infinite functional diversity we are familiar with in this reality where light travels at c . This happens through a process of precipitation. This process of precipitation can also be perceived as a “subtle” backbone or strand not unlike the backbone or downward-strand of the double-helix DNA structure that animates every living cell.

Such a downward-strand structures an involutory-reality in which the seeds of functionality are grounded in the matrix of space and form the basis of a time-based evolutionary-action that thereby structures an upward-

strand of subtle-DNA. In other words, the very basis of genetic structure may potentially be tied to the process of precipitation of light, and its subsequent unfolding through time-dynamics.

Further, as light slows down the codification implicit in the state where it is imagined travelling infinitely fast begins to further materialize and generates “libraries” of information as it were, that are accessible to all subsequent layers created by “slower” light. These libraries are the bases of genetic information and heredity.

The process of mutation will be seen to vary depending on which layer of light is involved. Massively significant mutations such as took place on the SRY gene and led to the evolution of human from the chimpanzee species (Ridley, 1999) are suggested to be due to layers of light traveling faster than c . By contrast degenerative mutation leading to dysfunction and disease are hypothesized to be linked to the layer of reality so set up by light projected at slower than c speeds or zero speed.

Section IV will review the action of time-dynamics and suggest a generalized equation for mutational-sequence. Such mutational-sequence is a play of possibilities that have already been seeded in space, due the precipitation action of light forming the downward-strand of subtle-DNA.

Section V integrates the mathematical modeling from the previous sections and arrives at a proposed composite light-space-time quantum-computational model of genetics.

Section VI will review all the afore-mentioned genetic concepts from the point of view of a light-space-time-based quantum-computational model.

Section VII will summarize and conclude with some thoughts on future directions of genetic research in such a light-space-time-based quantum-computation model.

II. LIGHT AND THE ORIGIN OF GENETICS

Practically, the finite speed of light implies that light will take a finite amount of time to travel from one point to another. This is significant even when viewed at the atomic scale. If there is a source of electromagnetic radiation in the nucleus or due to the electrons changing orbits around a nucleus that radiation will be experienced only a finite time later. It can be inferred that this phenomenon is related to quanta. Energy of quanta is specified by (1), where ‘ E ’ is energy of quanta, ‘ h ’ is Planck’s constant, ‘ ν ’ is frequency of the radiation. Hence (1):

$$E = h\nu$$

Eq. 1: Energy of Quanta

Further, the speed of light ‘ c ’, frequency of radiation ‘ ν ’, and wavelength of radiation ‘ λ ’, are related by (2):

$$c = \nu\lambda$$

Eq. 2: Speed of Light

Combining (1) and (2) the inverse relationship between c and h can be observed in (3) for any fixed level of ‘ E ’:

$$E = \frac{hc}{\lambda}$$

Eq.3: Inverse Relationship Between c and h

Assume now a thought experiment to bring home the creative nature of light and why all of life would possibly emerge from it. Imagine light traveling at an infinite speed. If this were so then the inverse relationship between c and h would necessitate that h approach 0. In other words matter would be unable to form. Conversely if light were to slow down, to approach c , then h would progressively increase to some threshold where energy is able to sustain itself in quanta and matter would emerge. So finite speed of light creates quanta, which creates matter. Therefore all of matter emerges from light.

Note that such an interpretation of quanta suggests that quantum computation needs to be thought of differently than we currently think of it as. This was examined in ‘Light-Based Interpretation of Quanta and its Implications on Quantum Computing’ (Malik, 2020) and in The Emperor’s Quantum Computer (Malik, 2018b). Further, every act of computation yields an output. It is proposed that genetic-type information is the output.

Additionally, in this view it can be seen that the big bang is nothing other than light slowing down and creating matter as a result of that (Malik, 2018a). So if all matter is an action of light then any universe arising is

only a result of it. There are then likely some overarching properties that would be true of light and therefore also true of everything that was to arise in any such universe. It may even be that these properties would be fundamental and would determine structure of matter and everything that emerges out of it.

So, what can be inferred about the properties of light?

The speed of light is known to have implications on the experienced nature of reality. The finiteness, c , at 186,000 miles per second in a vacuum, creates an upper bound to the speed with which any physical object may travel. This also implies that objective reality will be experienced as a past, a present, and a future, from the point of view of that object (Einstein, 1995). These characteristics – a past, a present, and a future – can therefore be thought of as implicit in the nature of light and become part of objective reality because of the speed of light.

Further, it can be observed that c also creates a lower bound when inverted ($1/c$) being proportional to Planck's constant, h . 'h' as we know pegs the minimum amount of energy or quanta required for expression at the sub-atomic level (Isaacson, 2008). Planck's constant, h , therefore allows matter to form (Lorentz, 1925) and for the reality of nature with a past, present, and future, to also be progressively experienced as a phenomena of connection between seemingly independent islands of matter. This characteristic of 'connection' is therefore also proposed to be implicit in the nature of light and becomes part of objective reality because of the speed of light.

As suggested in The Fractal Organization (Malik, 2015) a 'present' equates to 'vitality' because in the present there is a working out of the play of forces where the most energetic, powerful, or 'vital' force will express itself over others. 'A 'past' equates to 'physicality' because all can be viewed as established reality, as defined by what the eye or other lenses of perception can see. Such lenses see what has already 'physically' been formed in time. A 'future' equates to 'mentality' since cause, or seed, or direction, implies meaning that drives the emergence of phenomena.

These implicit characteristics – physical, vital, mental, connection – of the nature of light as experienced at the layer of reality set up by a finite speed of light may hence be summarized by (4). c_U refers to the speed of light of 186,000 miles per second, that has created the perceived nature of reality, U :

$$c_U: [Physical, Vital, Mental, Connection]$$

Eq. 4: Nature of Light at c

It is known however that at quantum levels the nature of reality is at least characterized by wave-particle duality. Light and matter may be experienced as both particles and waves (Feynman, 1985; De Broglie, 1929; Ekspong 2014). Such duality, as will be explored shortly is related to the notion of quantum. But for matter to be experienced as waves implies that 'h' has become a fraction of itself, $h_{fraction}$. This further implies that c must have become greater than itself, c_N , such that the inequality specified by (5) holds:

$$c_N > c_U$$

Eq. 5: Inequality of Speed of Light

Note that what is implied here is that there must be another nature of reality specified by N that is the result of a speed of light greater than 186,000 miles per second, just as there is a nature of reality specified by U that is the result of the speed of light being 186,000 miles per second. This is consistent with recent developments in physics with the notion of property spaces being separate from but influencing physical space as explored by Nobel Physicist Frank Wilczek (Wilczek, 2016).

It is also to be noted that in Perkowitz's recent treatment of today's breakthroughs in the science of light (Perkowitz, 2011) he suggests that the theory of relativity does not disallow particles already moving at speed c or greater.

It stands to reason that current instrumentation, experience, and normal modes of thinking having developed as a bi-product of the characteristics so created in the layer of reality U may be inadequate to access N without appropriate modification.

The notion of wave-particle duality already challenges the notion of normal thinking perhaps because particle-like phenomena may be viewed as a function of less than or equal to c motion, while wave-like phenomena may be viewed as a function of faster than c motion. That these may be happening simultaneously is reinforced by principles such as complementarity in which experimental observation may allow measurement of one or another but not of both (Whitaker, 2006).

III. GENETIC-TYPE INFORMATION IN LIGHT

But then taking this trend of a possible increase in the speed of light to its limit, this will result in a speed of light of infinite miles per second. The question is, what is the nature of reality when light is traveling at infinite miles per second? And what kind of information would be created in that reality?

In any space-time continuum be it an area or volume, regardless of scale, light originating at any point will instantaneously have arrived at every other point. Hence light will have a full and immediate *presence* in that space-time continuum. Further, that light will *know* everything that is happening in that space-time instantaneously – that is know what is emerging, what is changing, what is diminishing, what may be connected to what, and so on - or have a quality of *knowledge*. It will connect every object in that space-time completely and therefore have a quality of connection or *harmony*. Finally nothing will be able to resist it or set up a separate reality that excludes it and hence it will have a quality of *power*.

These implicit characteristics of the nature of light as experienced at the layer of reality set up by light traveling infinitely fast may hence be summarized by (6), where c_∞ refers to the speed of light of ∞ miles per second, that has created the perceived nature of reality, ∞ :

$$c_\infty: [Presence, Power, Knowledge, Harmony]$$

Eq. 6: Nature of Light at ∞

But it can also be noticed from (4) that ‘physical’ is related to presence, ‘vital’ is related to power, ‘mental’ is related to knowledge, and ‘connection’ is related to harmony.

The question then, is how do these apparent qualities at ∞ precipitate, translate into, or become the physical-vital-mental-connection based diversity experienced at U? This may be achieved through the intervention or action of a couple of mathematical transformations. First, the essential characteristics of Presence, Power, Knowledge, Harmony that it is posited exist at every point-instant by virtue of the ubiquity of light at ∞ will need to be expressed as sets with up to infinite elements. Such a precipitation is none other than an act of quantization since something implicit in the layer where light travels faster is collecting in ‘quanta’ to be expressed more materially in the layer where light travels slower. Second, elements in these sets will need to combine together in potentially infinite ways to create a myriad of seeds or signatures that then become the source of the immense diversity experienced at U. This, similarly, is also an act of quantization or the action of a quantization-function. This suggests that all that is seen and experienced at U may be nothing other than ‘information’ or ‘content’ of light and as such that there are fundamental mathematical symmetries at play where everything at U is essentially the same thing that exists at ∞ .

It may also be inferred that wherever wave-particle duality exists, it does so because of a more observable

quantum-translation from one speed of light to another, through the device of quanta.

Assuming that the first transformation occurs at a layer of reality K where the speed of light is c_K , such that $c_U < c_K < c_\infty$, this may be expressed by (7):

$$c_K: [S_{Pr}, S_{Po}, S_K, S_H]$$

Eq. 7: Nature of Light at K

S_{Pr} signifies ‘Set of Presence’ and may have elements associated with the qualities of being present everywhere, or of creating a physical basis in or on which other functions or characteristics can manifest. Hence S_{Pr} may have elements as expressed by (8):

$$S_{Pr} \\ \ni [Service, Diligence, Perseverance, Stability, ...]$$

Eq. 8: Set of Presence

S_{Po} signifies ‘Set of Power’ and may have elements associated with the qualities of being powerful, or of the play of vitality and experimentation which creates all possibility. Hence S_{Po} may have elements as expressed by (9):

$$S_{Po} \\ \ni [Power, Energy, Adventure, Experimentation, ...]$$

Eq. 9: Set of Power

S_K signifies ‘Set of Knowledge’ and may have elements associated with the qualities of knowledge, or the search and codification of knowledge. Hence S_K may have elements as expressed by (10):

$$S_K \\ \ni [Knowledge, Making of Laws, Spread of Knowl., ...]$$

Eq. 10: Set of Knowledge

S_H signifies ‘Set of Harmony’ and may have elements associated with the qualities of harmony, or creating relationship and love. Hence S_H may have elements as expressed by (11):

$$S_H \\ \ni [Harmony, Relationship, Love, Specialization, ...]$$

Eq. 11: Set of Harmony

Equations (8 - 11) then, shed insight not only into the nature of reality in light’s precipitation toward speed c, but also the type of information that may be generated in this precipitation. This information, it is proposed, is genetic-

type information, and has a bearing on information that materializes in genes in the layer of reality where light travels at speed c .

Assuming that the second transformation occurs at a layer of reality N where the speed of light is c_N , such that $c_U < c_N < c_K < c_\infty$, this may be expressed by (12):

$$c_N: f(S_{Pr} \times S_{Po} \times S_K \times S_H)$$

Eq. 12: Nature of Reality at N

The unique seeds are therefore a function, f , of some unique combination of the elements in the four sets S_{Pr}, S_{Po}, S_K, S_H . This also suggests the basis of vast genetic diversity, due to the functional variety of information available in layers of light antecedent to the layer traveling at c .

The relationship between the layers of light may be hypothesized by the following matrix (13):

$$\left[\begin{array}{l} c_\infty: [Pr, Po, K, H] \\ (\downarrow R_{c_K} = f(R_{c_\infty})) \\ c_K: [S_{Pr}, S_{Po}, S_K, S_H] \\ (\downarrow R_{c_N} = f(R_{c_K})) \\ c_N: f(S_{Pr} \times S_{Po} \times S_K \times S_H) \\ (\downarrow R_{c_U} = f(R_{c_N})) \\ c_U: [P, V, M, C] \end{array} \right]_{Light}$$

Eq. 13: Relationship Between Layers of Light

The matrix suggests a series of transformations leading from the ubiquitous nature of light implicit in a point – presence, power, knowledge, harmony - to the seeming diversity of matter observed at the layer of reality U which is fundamentally the same presence, power, knowledge, and harmony projected into another form of itself.

The first transformation is summarized by (14):

$$R_{c_K} = f(R_{c_\infty})$$

Eq. 14: First Transformation

This is suggesting that the reality at the layer specified by the speed of light c_K , R_{c_K} is a function of the reality at the layer specified by the speed of light c_∞ . This transformation translates the essential nature of a point into the sets described by (8 – 11). Note that (14) is essentially a quantization-function, in that something of the reality of light existing at R_{c_∞} , is translated into reality experienced at R_{c_K} .

The second transformation is summarized by (15):

$$R_{c_N} = f(R_{c_K})$$

Eq. 15: Second Transformation

This is suggesting that the reality at the layer specified by the speed of light c_N , R_{c_N} is a function of the reality at the layer specified by the speed of light c_K . This transformation combines elements of the sets into unique seeds as suggested by (12). This transformation can also be thought of as the result of a quantization-function such that something of R_{c_K} is collected as unique seeds at R_{c_N} .

The third transformation is summarized by (16):

$$R_{c_U} = f(R_{c_N})$$

Eq. 16: Third Transformation

This is suggesting that the reality at the layer specified by the speed of light c_U , R_{c_U} is a function of the reality at the layer specified by the speed of light c_N . This transformation builds on the unique seeds suggested by (12) to create the diversity of U as specified by (4). This transformation is therefore also the result of a quantization-function such that the seed-aspect of R_{c_N} is translated into the immense diversity experienced at R_{c_U} .

In this framework the notion of wave-particle duality hence may become complementary block-field-wave-particle quadrality where block refers to phenomenon resident to ∞ , field to phenomenon resident to N , wave to phenomenon resident to K , and particle to phenomenon resident to U . The essential translation from one level to the next is due to a series of quantization-functions, so that (13) essentially summarizes an algorithm for life (Malik at al., 2019), where an implicit quaternary basis of presence, power, knowledge, and harmony, sets up potentially infinite number of elements derived from sets of presence, power, knowledge, and harmony. The implication of this is that quantization, and in fact this genre of *quantum computation* that arbitrates a structure as summarized by (13) is fundamentally creative, resulting in the vast variety of genetic-type information. As such quantum computation should be thought of as a fundamentally creative process arbitrating abstract possibilities in Light into a rich variety of genetic-type information, that subsequently express itself in material existence.

Equation (13), with modification, can also be expressed as a light-based quantum computational model of genetics as in Eq (17). In this modification it is assumed that light is projected at zero-speed which would effectively create the opposite reality to light existing at infinite speed. Hence in (17) c_0 implies light at zero-

speed, and D, W, I, and C imply Darkness, Weakness, Ignorance, and Chaos, the opposites of Presence, Power, Knowledge, and Harmony, respectively:

$$\left[\begin{array}{c} c_{\infty}: [Pr, Po, K, H] \\ (\downarrow R_{CK} = f(R_{C\infty})) \\ c_K: [S_{Pr}, S_{Po}, S_K, S_H] \\ (\downarrow R_{CN} = f(R_{CK})) \\ c_N: f(S_{Pr} \times S_{Po} \times S_K \times S_H) \\ (\downarrow R_{CU} = f(R_{CN})) \\ c_U: [P, V, M, C] \\ \uparrow \\ c_0: [D, W, I, C] \end{array} \right]_{Light}$$

Eq. 17: Light-Based Quantum-Computational Model of Genetics

IV. EXAMINATION OF A TIME-BASED UPWARD STRAND OF SUBTLE-DNA & GENERALIZED ARCHITECTURE OF MUTATIONAL-SEQUENCE

The previous section proposed an essential framework for a light-based quantum-computational model of genetics. This model highlighting a process of precipitation sets up a downward-strand of subtle-DNA, and in this section the compression of such possibility into ‘space’ is considered to shed insight into an upward-strand of subtle-DNA recognizable through the action of time. Such an upward-strand is organic in nature suggesting likely paths or mutational-sequences determined by what sets of influences are active. Yet the possibilities are wholly determined by the downward-strand and the overarching organizational principles it puts in place in its precipitating scheme from an infinite to zero speed.

Hence, starting with the physical, which recall is suggested as being a projection of Light’s property of Presence, an equation, Equation 18, is summarized as:

$$Physical = \left[\begin{array}{c} M_3 \rightarrow System_{Pr} \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_{Pr}} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_P \\ (\uparrow > P_P) \\ U \rightarrow Physical_U \end{array} \right]_{TC} \rightarrow Physical_T$$

Where $\left[\begin{array}{l} Physical_U \ni [inertia, lethargy, status quo, ...] \\ Physical_T \ni [adaptability, durability, strength, ...] \end{array} \right]$

Eq 18: Possible Mutational-Sequence in Physical-Type Systems

Essentially this equation is laying out the conditions of moving from the untransformed or negative physical state represented by $Physical_U$ to the transformed or positive physical state represented by $Physical_T$.

The first matrix should be read from the bottom to the top:

$$\left[\begin{array}{l} M_3 \rightarrow System_{Pr} \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_{Pr}} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_P \\ (\uparrow > P_P) \\ U \rightarrow Physical_U \end{array} \right]$$

Hence, at the bottom is the starting point ‘U → $Physical_U$ ’ which identifies the default or untransformed (U) level of the physical. The next row up, ($\uparrow > P_P$), states that when the patterns of the untransformed physical (P_P) have been overcome ($>$), movement to the next level (\uparrow) is facilitated. Breaking through to the next level, $M_1 \rightarrow Sig_P$, allows its dynamics to become active. Hence, the signature or uniqueness of the physical (Sig_P) becomes active at meta-level 1 (M_1). As this signature becomes more like a Force ($Sig \rightarrow F$), the conditions for breakthrough (\uparrow) to the next level are achieved. This next level is referred to as meta-level 2 (M_2), and indicates that the architectural forces represented by the set of system-presence ($S_{System_{Pr}}$) have become more consciously active. When this Force becomes Integral ($F \rightarrow I$) then the conditions for breakthrough (\uparrow) to the next level are achieved. The next level is notated as M_3 for meta-level 3, and the dynamics here indicate that the equation for system-presence becomes active. Becoming active basically means that the respective meta-level dynamic begins to act at the once ‘untransformed’ level (U) further modifying it. Modification or transformation began when M_1 became active. Transformation is accelerated when M_2 becomes active, and even further accelerated when M_3 becomes active.

The rate of the transformation can be better envisioned when considering action of the Transformation Circle, or TC. The TC can be thought of as 4 concentric circles, with M_3 at the center. M_3 is surrounded by M_2 , which is

surrounded by M_1 . The outer circle is U. If TC is considered to be a clock, than at time 't = 0', the 'physical' can be thought of as being entirely in U. The clock starts ticking only when some initial patterns P_p are overcome ($>P_p$). From this point on as time proceeds the conditions for breakthrough become riper, and a sinusoidal wave begins to integrate more of the concentric circles together. The sinusoid wave (sin) is itself modulated by an euler function, e^x , where 'x' is determined by the strength to overcome patterns (\uparrow) which will likely vary over time but will likely tend to be positive once the clock has started ticking because of the joy experienced with progressive movement. Being that the limit is the outer boundary of the concentric circles, there is further modulation by π until the 4 concentric circles have been integrated. TC, hence, may be represented by Equation 19:

$$TC \equiv (> P_p) \rightarrow \text{mod}(\sin, e^x, \pi)$$

Eq 19: Transformation Circle

Hence, the initial nature of the physical that may be characterized by the set comprising of elements such as, lethargy, acceptance of the status quo, amongst other such elements, is represented by:

$$(Physical_U \ni [inertia, lethargy, status quo, ...])$$

This transforms into a physical more characterized by elements such as adaptability, durability, strength, and so on. That is:

$$(Physical_T \ni [adaptability, durability, strength, ...])$$

This transformation represents the inherent creativity-dynamic driving any mutation sequence within physical-type systems.

Similarly, the equation for the 'Vital', Equation 20, which recall is suggested as being a projection of Light's property of Power, also shows the built-in transformation that represents the innovation-dynamic within the vital:

$$Vital = \begin{bmatrix} M_3 \rightarrow System_p \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_p} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_v \\ (\uparrow > P_v) \\ U \rightarrow Vital_U \end{bmatrix} TC \rightarrow Vital_T,$$

$$\text{Where } \begin{bmatrix} Vital_U \ni [aggression, exploitation, ...] \\ Vital_T \ni [energy, adventure, enthusiasm, ...] \end{bmatrix}$$

Eq 20: Possible Mutational-Sequence of Vital-Type Systems

The equation for the 'Mental', Equation 21, which recall is suggested as being a projection of Light's property of Knowledge, is similarly summarized as:

$$Mental = \begin{bmatrix} M_3 \rightarrow System_s \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_s} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_M \\ (\uparrow > P_M) \\ U \rightarrow Mental_U \end{bmatrix} TC \rightarrow Mental_T$$

$$\text{Where } \begin{bmatrix} Mental_U \ni [fixation, fragmentation, ...] \\ Mental_T \ni [understanding, imagination, ...] \end{bmatrix}$$

Eq 21: Possible Mutational-Sequence of Mental-Type Systems

The equation for the 'Integral', Equation 22, suggested as being a projection of Light's property of Harmony, is similarly summarized as:

$$Integral = \begin{bmatrix} M_3 \rightarrow System_N \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_N} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_I \\ (\uparrow > P_I) \\ U \rightarrow Integral_U \end{bmatrix} TC \rightarrow Integral_T$$

$$\text{Where } \begin{bmatrix} Integral_U \ni [possession, usurpation, hidden agendas, ...] \\ Integral_T \ni [appreciation, shift POV, MPV, synthesis, ...] \end{bmatrix}$$

Eq 22: Possible Mutational-Sequence of Integral-Type Systems

The preceding equations can be generalized by Equation 23:

$$\text{Mutational - Sequence}_{orientation-x} = \begin{bmatrix} M_3 \rightarrow System_x \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{System_x} \\ (\uparrow Sig \rightarrow F) \\ M_1 \rightarrow Sig_x \\ (\uparrow > P_x) \\ U \rightarrow x_U \end{bmatrix} TC \rightarrow x_T, \text{ where } \begin{bmatrix} x_U \ni [...] \\ x_T \ni [...] \end{bmatrix}$$

Eq 23: Generalized Mutational-Sequence Equation

In this generalized equation, *Mutational - Sequence_{orientation-x}*, refers to the inherent innovation or mutation-possibility within a specific

orientation. Orientation refers to the physical, the vital, the mental, or the integral.

V. TOWARD A MORE COMPLETE LIGHT-SPACE-TIME QUANTUM-COMPUTATIONAL MODEL OF GENETICS

The previous section provides insight into a generalized equation of mutational sequence. This can be summarized as an evolving-form as in Equation 24:

$$\begin{aligned}
 & \text{Mutational – Sequence}_{\text{orientation-x}} \\
 & = \left(\begin{array}{l} M_3 \rightarrow S_{\text{System}_x} \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{\text{System}_x} \\ (\uparrow \text{Sig} \rightarrow F) \\ M_1 \rightarrow \text{Sig}_x \\ (\uparrow > P_x) \\ U \rightarrow x_U \end{array} \right) TC \rightarrow x_T, \text{ where } \begin{array}{l} [x_U \ni \dots] \\ [x_T \ni \dots] \end{array} \quad (x_U|x_T)
 \end{aligned}$$

Eq 24: Evolving Form of Generalized Equation of Mutational-Sequence

The added notation of $(x_U|x_T)$ implies that the output of the previous iteration of the equation of innovation, x_T , where the subscript T implies relatively-transformed, now becomes the input, x_U , for the next iteration of the equation, where U implies relatively-untransformed. Hence through time there is greater and greater transformation that pushes experienced reality to greater and greater levels of functional-richness.

But further, given that quanta are proposed to be a doorway to deeper worlds of Light, that in fact allow aspects of those worlds or layers to become active at the surface layer U, the question is when have those aspects become active in manifest time. The following timeline based on generally accepted models of universal history (Particle Data Group, 2015) suggests when. Note too that the subsequent sections of exploring pre-genetic and genetic information at the levels of the electromagnetic spectrum, matter, and life, will explore in far greater detail some of the statements made in the following timeline:

- At time, $t \leq 0$ seconds, only M_3 is active, and then remains active for all $t < \infty$. Recall that M_3 represents the four-fold reality present in every ubiquitous-point-instant.
- At time, $0 \geq t > \infty$, M_2 the set of architectural forces continually gets added to, thereby increasing the size of the sets of forces.

- At time, $t \geq 0$, space, time, energy, gravity, the first clear expression of the four-fold order, emerges. This first expression is significant because it sets in motion the interplay between the antecedent quantum-layer and the layer where matter will materialize. Note that the antecedent quantum-layer likely houses the ever-enhanced four-base logic-encoding ecosystems critical to genetics and evolution.

- At time, $0 > t \geq 10^{-36}$ seconds, the equation of Innovation, $Innovation_{\text{orientation-x}}$, is such that M_1 also becomes active. The activation of M_1 begins to result in unique expressions or signatures of the set of architectural forces, and in this case in the reality of the essentially ubiquitous electromagnetic-spectrum (EM Spectrum) as a vehicle of the four-fold order that expressed itself in all that existed and in all that unfolded from that point in time on.

- At time, $t \sim 10^{-10}$ seconds, fundamental particles emerge as an essential material basis of the four architectural forces that frame all further development. As in the case of the EM Spectrum this implies the activity of M_1 , and then also of U.

- At time, $t \sim 3 \times 10^5$ years light atoms emerge, and at time $t \sim 10^9$ years heavier atoms in the stars emerge. These also imply the continued activity of M_1 and U.

- At time, $t \sim 13.8 \times 10^9$ years, a further clear expression of the same fourfold order as the bases of an even more complex organization, that of cellular life and all that is founded on it comes into being. This time-point will be represented by the notation $t \sim E_{\text{cell}}$, where 'E' stands for emergence. This too implies the activity of M_1 . Note that the sets of architectural forces specified by M_2 continue to increase the number of elements they comprise of as the complex interaction between the layers continues.

- At time $t > 13.8 \times 10^9$ years, human-beings, and more complex social organizations emerge. Here TC acts with an implicit direction of operation from U to M_3 . This time-point will be represented by $t \sim E_{\text{Human}}$.

Note that the emergence of space-time-energy-gravity, and subsequently of the electromagnetic spectrum, quantum particles, and atoms, implies that any possible pre-genetic information in their conceived four-base logic-encoding ecosystems

must also be present in some form in genes as appear later with the advent of cellular life. As such, the logic of cosmic fundamentals and of the very basis of matter is deeply ingrained in all things, inanimate and animate.

Based on the aforementioned timeline and description Equation 25 for Emergence true of any space-time scale may be generalized as the following:

$$\begin{aligned}
 & \text{Emergence}_{\text{space-time}} \\
 & \left[\begin{array}{c} M_3 \rightarrow \text{System}_x \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{\text{System}_x} \\ (\uparrow \text{Sig} \rightarrow F) \\ M_1 \rightarrow \text{Sig}_x \\ (\uparrow > P_x) \\ U \rightarrow x_U \end{array} \right]_{\text{Space}} \\
 = & \left[\begin{array}{c} M_3 : -\infty \leq t \leq \infty \\ \downarrow \\ M_2 : 0 \geq t > \infty \\ \downarrow \\ M_1 : 0 > t > \infty \\ \downarrow \\ U \rightarrow \begin{array}{l} t \leq E_{\text{Cell}}; \text{TC: } M_3 \rightarrow U \\ t \sim E_{\text{Human}}; \text{TC: } U \rightarrow M_3 \end{array} \end{array} \right]_{\text{Time}} \\
 & \text{TC} \rightarrow x_T, \text{ where } \begin{bmatrix} x_U \ni [\dots] \\ x_T \ni [\dots] \end{bmatrix} \quad (x_U | x_T)
 \end{aligned}$$

Eq 25: Space-Time Emergence

An implication of this equation, brought out more explicitly through the elaboration of the 'Time' component, is that the layers U, M₁, M₂, and M₃ exist simultaneously. Adding the 'Light-Matrix' derived in Section III enhances Equation 25 to the Light-Space-Time Emergence form as represented by Equation 26:

$$\text{Emergence}_{\text{light-space-time}} =$$

$$\begin{aligned}
 & \left[\begin{array}{c} c_\infty: [Pr, Po, K, H] \\ (\downarrow R_{C_K} = f(R_{C_\infty})) \\ c_K: [S_{Pr}, S_{Po}, S_K, S_H] \\ (\downarrow R_{C_N} = f(R_{C_K})) \\ c_N: f(S_{Pr} \times S_{Po} \times S_K \times S_H) \\ (\downarrow R_{C_U} = f(R_{C_N})) \\ c_U: [P, V, M, C] \\ \uparrow \\ c_0: [D, W, I, C] \end{array} \right]_{\text{Light}} \\
 & \left[\begin{array}{c} M_3 \rightarrow \text{System}_x \\ (\uparrow F \rightarrow I) \\ M_2 \rightarrow S_{\text{System}_x} \\ (\uparrow \text{Sig} \rightarrow F) \\ M_1 \rightarrow \text{Sig}_x \\ (\uparrow > P_x) \\ U \rightarrow x_U \end{array} \right]_{\text{Space}} \\
 & \left[\begin{array}{c} M_3 : -\infty \leq t \leq \infty \\ \downarrow \\ M_2 : 0 \geq t > \infty \\ \downarrow \\ M_1 : 0 > t > \infty \\ \downarrow \\ U \rightarrow \begin{array}{l} t \leq E_{\text{Cell}}; \text{TC: } M_3 \rightarrow U \\ t \sim E_{\text{Human}}; \text{TC: } U \rightarrow M_3 \end{array} \end{array} \right]_{\text{Time}} \\
 & \text{TC} \rightarrow x_T \quad (x_U | x_T)
 \end{aligned}$$

Eq 26: Light-Space-Time Emergence

In (26) there is a 1:1 mapping between the Light and Space matrices in that M₃ reflects the ever-present C_∞, M₂ reflects C_K, M₁ reflects C_N, and U reflects C_U. The Time matrix simply gives estimates at which time each of the layers became active.

VI. KEY CONCEPTS OF GENETICS FROM THE LIGHT-BASED POINT OF VIEW

1) The Origins of Genetics

The infinite information codified in Light is the origin of genetics. As discussed previously Light in its state where it travels infinitely fast, possesses characteristics of presence, power, knowledge, and harmony, and contains vast possibility within it. This vast possibility can be thought of as information, and its structure related to the four characteristics, as the basis of genetics.

2) The Light-Based Downward-Strand

All-possibility that exists in the reality of light traveling infinitely fast is progressively materialized through a mathematical arrangement by which the subtle-infinite becomes the astounding material-diversity experienced when light travels at c. The mathematical process, by which this transformation takes place, creates the light-based downward-strand.

3) The Time-Based Upward-Strand

The possibilities seeded in the structure of space arise or mature through the passage of time, and this process is summarized by the Space-Matrix or upward-strand.

The fundamental structure of the upward-strand mirrors the downward-strand and its possibilities are intimately tied to the levels that exist in the downward-strand.

4) *The Essential Structure of Subtle-DNA*

The essential structure of subtle-DNA comprises of a largely pre-existent Light-Matrix or downward-strand and a resulting Space-Matrix or upward-strand. Libraries of subtle pre-genetic information exist in the downward-strand. Genetic-type information expresses itself through the upward-strand as it were, and is due to the interaction between the possibilities embodied by the downward and upward strands.

5) *Subtle-Libraries of Pre-Genetic Information*

The progressive materialization of light has been modeled by a series of mathematical transformations in the Sections II and III. These transformations take the vast amount of information existing where light travels infinitely fast, to effectively create a series of precipitated subtle-libraries also of practically infinite pre-genetic information. This series of subtle-libraries subsequently allows infinite material diversity to come into being.

6) *Material-Fabric*

Just as genetic information is housed in DNA in living cells, there has to exist some structure to house the proposed pre-genetic information that exists at a pre-cellular stage. It is proposed that such pre-genetic information is housed in a structure termed 'Material-Fabric'. This material-fabric exists at the interface or could be the interface between the antecedent quantum-layer and the reality that emerges at c_U .

7) *Four-Base Logic-Encoding Ecosystems*

Four-base logic-encoding ecosystems are imagined containing logic in the quantum-layer antecedent to the reality emerging at c_U . These four-base logic-encoding ecosystems can be subject to change in the interplay with the material layer and may be related to the processes of mutation.

8) *Superposition in Genetics*

In the process of quantum-computation, by which four-base logic-encoding ecosystems, the pre-genetic and the genetic libraries, can be altered, the different dynamics representative of realities created by light traveling at different speeds are always present. This

presence exists in superposed fashion and the real-time quantum-computation determines which superposed possibility will manifest materially.

9) *Entanglement in Genetics*

The information inherent to a particular layer, created through light traveling at a different speed, generates libraries of possibility through a mathematical process. Due to different dynamics of space and time representative of the layer created by light at a particular speed, these libraries exist differently in an entangled state, therefore being subtly present or influencing layers of light traveling at a slower speed relative to that layer. Common DNA existing in every cell at the material layer may be thought of as a logical outcome of this process of antecedent-entanglement.

10) *Heredity*

The presiding or generally accessible four-base logic-encoding ecosystems may be thought of as the primary bases of heredity.

11) *Constructive-Mutation*

Constructive-mutation is imagined occurring when patterns of a largely obstinate nature at the material level are broken as a result of which other possibilities existing in the higher levels of the light-based downward-strand are allowed to manifest. Of necessity this means that an inherent process of integration is taking place since light is unifying with its deeper nature. Constructive-mutation is intimately tied to this notion of integration.

12) *Destructive-Mutation*

When obstinate or disintegrating patterns persist or are chosen destructive-mutation will result. In its essence this suggests that light is moving away from its essential unified reality more towards the reality typified by disaggregation, that can be imagined to exist were light to be projected at zero-speed as suggested by c_0 in Eq (17).

13) *Interpretation of Matter*

Matter is the result of a constant computation involving the existing material layer, the material-fabric, four-base logic-encoding ecosystems, and the antecedent light layers. This means that matter can and will change as the interplay between these layers changes.

14) *Evolution and the Possibilities of Genetics*

Evolution is a process by which pre-genetic possibilities in antecedent layers of light materialize due to the existence of the right material conditions. This will also imply that the pre-genetic material existing in the four-base logic-encoding ecosystems will change.

15) Post-Genetic Code

In its possibilities of materialization information in light may house itself in subtle-libraries generated at various layers of light, four-base logic-encoding ecosystems at the quantum-level, the material-fabric, or in genetic code in living cells. But it is also possible through the process of evolution that the "structure" housing further possibilities in light may take on a hybrid form that may be referred to as Post-Genetic Code.

VII. SUMMARY AND FURTHER RESEARCH

The light-space-time quantum-computational model of genetics described in this paper suggests several avenues of further research.

In this model there are multiple layers of light that house different kinds of fourfold information. The model is subject to a persistent quantum computation which creates genetic-type information as its output. In this model the origin of genetics is seen as being the antecedent layers of light traveling faster than c . Such layers of light can mathematically be structured as non-physical property-spaces that impact physical reality. The question is whether such a configuration of light-based property-spaces are valid in terms of thinking about genetics, and further what other kinds of property-space models may be valid as a basis of comparison?

The precipitation of light is suggested to have a bearing on the downward-strand of DNA. This downward-strand forms an involutory-reality, is seeded as functional possibility or seeds in space, and becomes apparent through the unfolding of time.

Subtle-libraries of genetic-type information are suggested to be inputs in a process of quantum computation that also have a bearing on how genetic information materializes.

In terms of further research, is there indeed such a precipitation in the existing conception of the downward-strand of regular DNA? Is there a corresponding time-based upward-strand seeded in space? Further, is there some relationship between the four nitrogenous bases in DNA of guanine, adenine, cytosine and thymine and the four properties envisioned to be implicit in light?

For such a computational model to be viable there needs to be another housing structure for genetic-type information. It is proposed that there is some kind of 'material-fabric' at the quantum level where light precipitates to light at speed c . Is this indeed the case?

Further, as a result of being at the quantum-level, phenomenon such as superposition and entanglement may also influence genetic information. Is the model of superposition and entanglement proposed briefly in this paper a possible way in which these quantum phenomenon affect genetics?

Persistence of information in such a material-fabric is the basis of heredity. Constructive mutation is due to interaction with layers of light traveling faster than c where the root of all function is proposed to exist. Destructive mutation may be perceived as being due to interaction with light existing at zero-speed, where disaggregation increases. These views of heredity and mutation need to be elaborated further.

If light is indeed the origin of genetics and if light-based processes such have been briefly discussed in this paper are valid, then what are implications for non-invasively and positively influencing processes of genetics? Experiments to begin to check the validity of this possibility can be created.

REFERENCES

1. De Broglie, L. 1929. The Wave Nature of the Electron. Nobel Lecture.
2. Einstein, A. 1995. Relativity: The Special and General Theory. New York: Broadway Books.
3. Ekspong. 2014. "The Dual Nature of Light as Reflected in the Nobel Archives". *Nobelprize.org*. Nobel Media AB 2014. Web. 15 Oct 2016.

4. Feynman, RP. 1985. QED The Strange Theory of Light and Matter. New Jersey: Princeton University Press
5. Holland, P. 1995. The Quantum Theory of Motion: An Account of the de Broglie-Bohm Causal Interpretation of Quantum Mechanics. Cambridge: Cambridge University Press.
6. Isaacson, W. 2008. Einstein: His Life and Universe. Simon and Schuster. New York.
7. Lloyd, S. 2007. Programming the Universe: A Quantum Computer Scientist Takes On the Cosmos. New York: Vintage
8. Lorentz, H.A. 1925. The Science of Nature. Vol. 25, p 1008. Springer
9. Malik, P. 2015. The Fractal Organization. New Delhi: Sage Publications
10. Malik, P., Pretorius, L., Winzker, D. 2017. Qualified Determinism in Emergent-Technology Complex Adaptive Systems. Conference Proceedings IEEE TEMSON 2017.
11. Malik, P. 2018a. Cosmology of Light. Google Books
12. Malik, P. 2018b. The Emperor's Quantum Computer. Google Books.
13. Malik, P. 2019. The Origin and Possibilities of Genetics. Google Books.
14. Malik, P. Pretorius, L. 2019. An Algorithm for the Emergence of Life Based on a Multi-Layered Symmetry-Based Model of Light. 2019 IEEE 9th Annual Computing and Communication Workshop and Conference (CCWC). 10.1109/CCWC.2019.8666554
15. Malik, P. "Light-Based Interpretation of Quanta and its Implications on Quantum Computing," 2020 10th Annual Computing and Communication Workshop and Conference (CCWC), Las Vegas, NV, USA, 2020, pp. 0719-0726, doi: 10.1109/CCWC47524.2020.9031279.
16. Particle Data Group. 2015. Lawrence Berkeley National Laboratory. http://www.cpepphysics.org/main_universe/universe.html
17. Perkwitz, S. 2011. Slow Light. London: Imperial College Press
18. Ridley, M. Genome: The Autobiography of a Species in 23 Chapters.. Great Britain: Fourth Estate.
19. Whitaker, A. 2006. Einstein, Bohr and the Quantum Dilemma: From Quantum Theory to Quantum Information. Cambridge: Cambridge University Press
20. Wilczek, F. 2016. A Beautiful Question: Finding Nature's Deep Design. New York: Penguin Books