

# Modeling Objective Reality as Content in a Universal MIND

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A mathematical model unifying MIND and matter is developed. Based on the notion that the universe consists of light only, it is shown how the stochastic nature of quantum mechanics can be explained by the constant speed of light combined with the underlying dynamics of consciousness. The conclusion is that the universe is made of light moving either in linear patterns (creating space) or in curved patterns (creating matter). The model gives a new insight into the cause of consciousness, based on mathematical concepts, suggesting possible new avenues of consciousness research. Finally it offers a foundation for unifying relativity and quantum mechanics at a conceptual level.

*Keywords: consciousness, law of attraction, will, light, mind, relativistic quantum mechanics*

## I. INTRODUCTION

While relativistic quantum mechanics is fairly well understood in terms of practical application, unifying relativity and quantum mechanics at a conceptual level has proven more difficult. In [Buchholz et al., 2000] Paul Dirac, the pioneer of relativistic quantum mechanics, is quoted as saying that

*There is no acceptable physical theory but only an ugly set of rules.*

The issue is of course the absence of a single principle that unifies the concepts of the theories and illuminates the underlying idea. It is my suggestion that this unifying principle is MIND\* itself. By MIND is meant a universal and transcendental MIND that transcends and includes all of existence. According to physicist Nick Herbert [Herbert, 85, p249]:

*Science's biggest mystery is the nature of consciousness. It is not that we possess bad or imperfect theories of human awareness; we simply have no such theories at all.*

The problem may have been that while science has tried to explain reality (and consciousness) based on mathematical models, what we may need to do, is to explain the presence of a mathematical order in the universe based on concepts of MIND. In effect this idea is simply an extension of Einstein's assertion that:

*Time and space are modes by which we think, and not conditions in which we live [Wheeler, '90, p3].*

### A. Physics Emerging from Consciousness Research

The present work is in some ways a very unorthodox piece of research since the impetus to formulate these ideas has emerged from consciousness research and an attempt to reconcile the results of this research with the laws of physics. A key idea behind this work emerged from [Bailey, 62], which claims that reality is essentially an unbroken wholeness, manifesting in three domains of being *of which only one is governed by mathematical laws.*

The three domains are:

1. **Life or Being** (which is the transcendent *cause* of all that IS), governed by “the law of synthesis” which is related to spirit or *will*.
2. **Form** (which is the *appearance* of life in space and time) governed by “the law of attraction” which is related to consciousness or *love*.
3. **Matter** (which is the *substance* allowing life to become manifest) governed by “the law of economics”, which is mathematical in nature and related to *intelligence*.

The aim of this article is to show how the laws of nature can be understood as an interaction between

- **the laws of economics**, governed by mathematics, and
- **the law of attraction**, governed by consciousness.

*Thus the model is a consciousness theory that offers an explanation of the origin of natural law.*

### B. Articulating the hypothesis

The fundamental hypothesis is that:

*Objective reality is content in MIND subject only to the limitation of a constant speed of light.*

From a physical point of view, the key insight presented in this article is that a constant speed of light imposes some very definite limitations on a conceptually unlimited creative MIND. It will be shown that these limitations correspond exactly with the limitations described by quantum mechanics, thus unifying relativity and quantum mechanics conceptually.

The basic conception of the universe is that MIND *wills* a limitation imposed on itself, which births a dual phenomenon:

- An “**objective**” manifestation in spacetime (matter)
- A “**subjective**” experience of being in spacetime (consciousness).

Taken together this dual phenomena allow life to become physically manifest and experience a shared reality.

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\* Note that some words are written in CAPS to indicate that these concepts are used in an absolute sense, such as absolute REALITY etc.

## II. A NEW CONCEPT OF LIGHT

The basic approach to the model presented is that MIND IS. It is REAL and creative. But in order to become manifest, it needs a domain of manifestation. It must be presumed that many different kinds of realities can potentially exist. However, in order to create a reality characterized by the kind of experience we have in *this* universe, MIND must create a domain of space and time, corresponding to what we know as spacetime.

This domain can conceivably be created by giving a definite meaning to the concepts of space and time via the relationship (in 1-D):

$$x = ct \Leftrightarrow \frac{dx}{dt} = c \quad (2.1)$$

which can also be expressed as the invariant relativistic distance in 4-D spacetime:

$$S^2 = x^2 + y^2 + z^2 - c^2 t^2 \quad (2.2)$$

where  $x, y, z$  represents the three spatial coordinates and  $t$  the time. The condition for light being

$$S^2 = 0 \Leftrightarrow x^2 + y^2 + z^2 = c^2 t^2 \quad (2.3)$$

Now, in these definitions, nothing has been said about *how* MIND can behave inside this domain. We generally assume that light, which is the manifestation of MIND, moves in a linear pattern, because this we observe. But if the hypothesis is correct, then light ought to be able to move *in any patterns it likes*, subject to the conditions above, which *define* the meaning of spacetime. It is therefore postulated that light can move in

- a **linear pattern**, creating space, or
- a **curved pattern** creating matter.

As it turns out, the requirement that everything in the universe must move at the speed of light, results in a mathematical limitation on curved light which matches the quantum mechanical wave equations.

### A. Linear space

To begin with, the equation governing light can be shown to be a direct *mathematical* consequence of definition 2.1. If we define a function  $\psi$  to represent an object on the 1-D spacetime domain ( $x, t$ ) subject to the relation Eq. 2.1 then it follows from the chain-rule of differentiation that

$$\frac{\partial \psi}{\partial t} = \frac{\partial \psi}{\partial x} \frac{\partial x}{\partial t} = c \frac{\partial \psi}{\partial x} = c \psi'$$

$$\frac{\partial^2 \psi}{\partial t^2} = \frac{\partial \psi'}{\partial t} = \frac{\partial \psi'}{\partial x} \frac{\partial x}{\partial t} = c \frac{\partial \psi'}{\partial x} = c^2 \frac{\partial^2 \psi}{\partial x^2}$$

yielding the basic 1-D wave equation (easily extended to 3-D)

$$\frac{\partial^2 \psi}{\partial t^2} = c^2 \frac{\partial^2 \psi}{\partial x^2} \quad (2.4)$$

This equation, which is a *direct* consequence of 2.1, shows us that the object has a wave nature.

### B. Curved Space is an Expression of Attraction

The key innovation at the level of physics lies in a re-interpretation of the meaning of quantum mechanics and in showing that the essential structure of this theory is a direct consequence of the nature of light, when understood as a manifestation of MIND.

In this picture quantum mechanics is a product of two factors, namely:

- A **mathematical limitation**, given by the constant speed of light.
- An **intrinsic intelligence in nature**, governed by the law of attraction, which is *not* mathematical in nature.

The result of combining these two, very different dynamics (mathematics and consciousness) is a behavior which is partly deterministic and partly indeterministic, which corresponds to the nature of quantum mechanics. From this perspective, the apparent paradoxes in quantum mechanics are not strange, but indeed required and natural consequences of the conceptual framework. It *has* to be like this, if reality is an expression of MIND.

### C. The Union of Polar Opposites

In all the world's major wisdom traditions, one encounters the notion that the universe is an undivided wholeness, apparently separated into individualistic or atomistic beings. This separateness leaves the separatistic beings (those experiencing themselves as isolated from the source) to search for a way to become whole again. In the human being, this dynamic is expressed in the sexual attraction. We search for our matching opposite and this attraction is very powerful and governs much of our behavior. It is suggested that this kind of attraction, which is essentially sexual in nature, because it is an attraction between polar opposites, is a fundamental dynamic at all levels of creation – also at the atomic level.

If we accept the fundamental notion that *it is an intrinsic quality of separatistic life to seek to get as close as possible to its polar opposite*, then this explains why light crystallizes into matter.

### D. The Crystallization of Light

To appreciate the dynamic, we need to distinguish between the form and the life that inhabits the form. Life itself has no form. It exists beyond space and time. Life can however conceptually take on form, through the wish to become manifest [Bailey, 62].

This can take place as follows:

When MIND seeks objective manifestation, it happens by light attempting to become as localized as possible, which causes it to curve as much as possible, giving rise to a localized vortex of energy.

The key idea is that the wave nature of light (Eq. 2.4) emerging from the condition of the constant speed of light (Eq. 2.1) constitutes the fundamental mathematical limitation to the creative unfoldment of MIND. This requirement dictates that the only way in which energy (light) can become localized is by curving and creating a local oscillation.

### III. THE DYNAMICS OF CURVED LIGHT

If we contemplate the dynamics of a curved photon then, due to self-interference effects, it must be presumed that the radius of such a movement must be subject to a condition that

$$R = n \frac{\lambda}{2\pi} \quad (3.1)$$

with  $n$  being a whole number greater than zero. The smallest possible radius is given by  $n=1$  yielding  $R=\lambda/2\pi$ . This requirement establishes and explains the condition for the quantization of action. As we shall see, the wavelength, in the case of the electron,  $\lambda=2\pi R$  turns out to be the Compton wavelength  $\lambda_c$ .

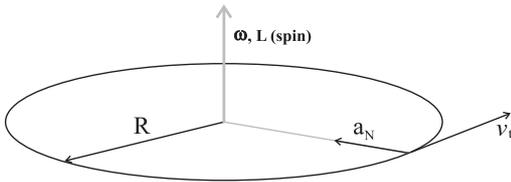


Figure 1: Illustration of a photon can be thought of as performing a localized oscillation or rotation in order to appear in spacetime as an object.

The localized oscillatory pattern can, in the case where we observe it from an inertial frame at rest in relation to it, be described by the equation:

$$-R \frac{d^2 r}{dt^2} = Ra_N = c^2 \quad (3.2)$$

which describes a photon with a constant acceleration  $a_N$  towards the center of rotation (shown in Figure 1). It must be made clear that the photon is not *governed* by Eq. 3.2, but it can be *described* by it. The photon is governed by the “law of attraction”, and ultimately the will of MIND. This equation essentially postulates that there exist a constant “curvature” of light when light or mind manifest as matter.

Using the expression for the normal acceleration  $a_N=\omega^2 r$  we can write this as

$$Ra_N = (R\omega)^2 = c^2$$

The instantaneous speed of a point at the periphery (the tangential velocity) is of course  $v_t=R\omega=c$ , for an observer at rest in relation to the center of the oscillation

In the general case, the orientation of spin  $L$  (shown in Figure 1) and the direction of the spatial velocity ( $v_x$ ) do not coincide. In a more realistic model, it will therefore be more appropriate to consider  $v_x$  as expressing a time averaged velocity, resulting from the net translation in space due to a large number of oscillations.

If, however, for the sake of simplicity, we assume that they *do* coincide we can model the combined movement of the localized oscillation and the movement through space as

$$v_t^2 + v_x^2 = c^2 \quad (3.3)$$

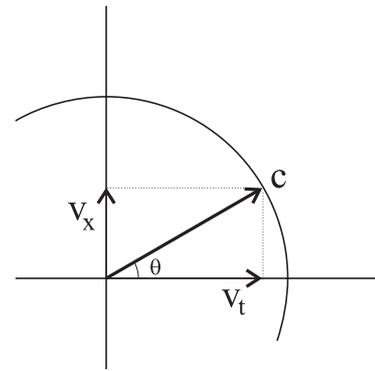


Figure 2: The tangential (rotational) and spatial components of the photonic velocities.

and in the case where both  $v_t$  and  $v_x$  are non-zero this relationship can be graphically illustrated as in Figure 2.

#### A. The Zitterbewegung Phenomenon

This highly oscillatory motion corresponds exactly to a phenomenon called zitterbewegung. The zitterbewegung phenomenon was predicted in 1930 by Schrödinger who pointed out that the Dirac theory implies that, superimposed on the observable linear motion of an electron, there is a circular motion about the direction of its spin with a radius equal to half the Compton wavelength

$$R = \tilde{\lambda}_0 = \frac{\lambda_c}{2} = \frac{\hbar}{2mc} = 1.9 \cdot 10^{-13} m$$

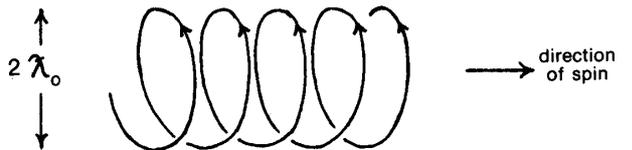


Figure 3: A spiraling helical movement of the free-electron. The phenomenon is called zitterbewegung.

This means that while the average speed of an electron is less than  $c$  (the speed of light), its instantaneous speed is

always  $\pm c$ . For an electron moving at the speed of light about a mean position this entails an angular momentum

$$\lambda_c(mc) = \hbar/2 \quad (3.4)$$

Calculating the radius of a photon due to the  $c^2$  curvature of space yields

$$E = \hbar\omega = mc^2 \Leftrightarrow \omega = \frac{mc^2}{\hbar} \quad (3.5)$$

$$(R\omega)^2 = c^2 \Leftrightarrow R = c/\omega = \frac{\hbar}{mc} = \lambda_c \quad (3.6)$$

$\lambda_c$  being the Compton wavelength. We thus see that the model yields the correct value of the spatial extent of the wave nature of the electron except for a factor  $1/2$ . The reduced radius is thought to be related to relativistic effects, causing the circumference of the rotation to contract to zero length, because the instantaneous peripheral velocity is always equal to  $c$ .

### B. Momentum Relations

If we model the electron as a curved photon we find that the photon has momentum  $p=cm$  at all times,  $m$  being the mass corresponding to the photonic energy according to  $m = h\nu/c^2$  (and subsequently the electrons mass). Acting on this rotating photon with a force  $F$  along the line of the current velocity (seen from the reference frame, for instance the laboratory), so as to increase its translational velocity, we get:

$$F = \frac{dp}{dt} = \frac{d(mc)}{dt} = c \frac{dm}{dt} \quad (3.7)$$

Showing that a change in the absolute amplitude of momentum requires a change of mass. Defining

$$p = mc \Leftrightarrow p^2 = (mc)^2 = m^2(v_t^2 + v_x^2) = p_t^2 + p_x^2 \quad (3.8)$$

allow us to identify  $p_x = mv_x$ ,  $p_t = mv_t$  with  $p_x$  being the spatial momentum and  $p_t$  the tangential momentum. Now in the case of the free particle observed from a non-accelerated inertial frame the particle will only be subject to the acceleration that comes from the helical movement, and the rotational properties (i.e. the angular momentum) will therefore not change regardless of the relative translational velocity ( $v_x$ ). For this reason the intrinsic angular momentum cannot change. This implies that

$$p_t = mv_t = m_0c = p_0 \quad (3.9)$$

with  $m_0$  being the mass of the electron at rest. Based on this Figure 2 allows us, from geometric considerations, to define

$$p_x = \sin(\theta)p$$

$$p_t = \cos(\theta)p$$

with  $\theta$  being the angle shown in (Figure 2). Expressing  $p_x$  in terms of  $p_t$  yields

$$p_x = \frac{\sin(\theta)}{\cos(\theta)} p_t = \tan(\theta) p_t \quad (3.10)$$

And

$$\tan(\theta) = \frac{v_x}{v_t} = \frac{v_x}{\sqrt{c^2 - v_x^2}} = \frac{v_x}{c\sqrt{1 - v_x^2/c^2}} \quad (3.11)$$

Resulting in

$$p_x = \frac{v_x}{c\sqrt{1 - v_x^2/c^2}} m_0c = \frac{v_x m_0}{\sqrt{1 - v_x^2/c^2}} = v_x m \quad (3.12)$$

with  $m$  being the ‘‘emergent mass’’, corresponding to the usual relativistic mass

$$m = \frac{m_0}{\sqrt{1 - v_x^2/c^2}} \quad (3.13)$$

The emergent mass can thus be understood as a geometric requirement for the angular momentum to be preserved when the inertial frame changes velocity. If this expression is squared and both sides multiplied by  $c^4(1 - v_x^2/c^2)$  one obtains the well-known energy-momentum relationship of Einstein

$$E^2 = (p_x c)^2 + E_0^2 \quad (3.14)$$

Recalling that  $p_x = \hbar k_x$  this can also be written as

$$\begin{aligned} (\hbar\omega)^2 &= (\hbar k_x c)^2 + (m_0 c^2)^2 \Leftrightarrow \\ \omega^2 &= k_x^2 c^2 + \frac{m_0^2 c^4}{\hbar^2} \end{aligned} \quad (3.15)$$

which is the dispersion relationship for the Klein-Gordon relativistic wave equation.

$$\frac{\partial^2 \psi}{\partial t^2} = c^2 \frac{\partial^2 \psi}{\partial x^2} - \frac{m_0^2 c^4}{\hbar^2} \psi \quad (3.16)$$

The key point here is that the dispersion relation (Eq. 3.15) and the Klein-Gordon equation *emerge* as a direct result of modeling the electron as curved light. Eq. 3.16 is therefore a natural consequence of the postulate of the constant speed of light and the conceptual framework. This allows us to interpret quantum mechanics as a manifestation of intelligence subject to the constant speed of light (Eq. 2.1).

The relativistic Dirac wave equation and the non-relativistic Schrödinger wave equation can both be derived as approximations to the Klein-Gordon equation. The Schrödinger equation emerges via a Taylor expansion of Eq. 3.16 for small  $k$ , equivalent to non-relativistic velocities. The Dirac equation emerges by requiring the right hand side of Eq. 3.16 to be a perfect square, whereby one arrive at a first order differential equation by taking the square root of each side. It turns out that this is possible if  $\psi$  is a 4 element matrix, yielding the Dirac matrix solutions.

Therefore, if we accept that the Klein-Gordon equation can be seen as a natural consequence of the curved photon model, then this model, explains the essential nature of quantum mechanics.

### C. Electricity and Gravity

Note that the model presented here requires a reinterpretation of the nature of the force fields thought to govern physics (the electrical and gravitational fields for instance). The reinterpretation concerns not the form of the equations, but the *meaning* of them. For instance the electromagnetic attraction between the positively charged nucleus and the negative electron is usually thought of as the force holding the electrons in their orbits. The current model implies, however, that this view may represent a *reversal* of cause and effect. We might instead picture the electron as being negative *because* it is attracted to the nucleus, while the attraction itself is governed by the law of attraction. If this is the case, then the electromagnetic force is simply a force of mind, subject to the limitation of the constant speed of light.

This will be expanded upon in a future article.

## IV. THE EQUIVALENCE OF MIND AND LIGHT

I will now turn to the interpretation of the model. The entire way of viewing the issues is turned upside down because it is MIND rather than matter that is the center of attention. This challenges many traditional notions about reality, but may ultimately hold the key to establishing a more appropriate way of thinking about reality.

### A. No States Can Exist in the Undivided Whole

From a conceptual point of view one must argue that no *states* of consciousness can exist in the unbroken whole. This is because the division into states imply separation, violating the premise of REALITY as an unbroken whole. In order to allow such states to arise MIND is thought to separate into two domains of awareness, namely:

- **outsideness** (perception of objective space) and
- **withiness** (perception of subjective space)

In order to appreciate the meaningfulness of this way of thinking, it is vital to understand that we define reality by *perception*. We cannot know reality outside ourselves, except through what we perceive with our senses, and their extensions in the form of measurement devices. Therefore

space and consciousness are both *defined* by what we perceive to be outside us or within us.

If reality really is an unbroken whole, then it implies that there exists a realm of being in which outsideness and withiness has no meaning.

Outsideness and withiness are however required in order for the experience of thought to arise. This is because the process of thought, as a minimum, require a separation between:

- The thinker (the subject).
- The thought (the object).

If the thought involves a “thing” (a physical idea, such as a spoon for instance) mind has to create the concept of space (to surround it) in order to conceptualize the thing. If the thought involves an abstract concept such as numbers for instance, physical space is not required to think the thought, but a conceptual distance is still required for the subject to *contemplate* the object (and not *be* the object).

Therefore space and time are intrinsically connected to the process of thinking, which essentially is what Einstein asserted when he stated that *time and space are modes by which we think, and not conditions in which we live.*

### B. Chance or Choice?

A cornerstone of the orthodox interpretations of quantum theory is that *chance* is an intrinsic property of nature. The present model challenges this concept. Modeling the universe as content in MIND implies that *nothing* is coincidental. Everything happens as a result of choice because the entire universe is a manifestation of MIND. Of course to an outside observer, the behavior of an intelligent system may *appear* to be random, because the observer does not know the reasons behind the actions (reflecting choices).

An analysis of probability will show that if something is possible and that some events have a higher amplitude of “possibility” than others, then in the case where an experiment is repeated many times with possible outcomes defined by the same wavefunction  $\psi$  then the probability function  $|\psi|^2$  will correctly predict the frequency of a particular outcome. The fact that one can predict the probability of an event does *not* mean however, that this outcome is governed by chance. It merely indicates that the outcome is governed by something beyond our ability to describe mathematically. This issue relates to a central theme in the discussion of quantum realities, which is the possibility of “hidden variables” in quantum mechanics (Bohm, ‘52, ‘80). Bohm showed that just because we cannot at present describe what governs the collapse of the wavefunction, it cannot be ruled out that there exist some kind of more profound order governing this collapse. What is suggested here is simply that *will itself is this “hidden variable” that governs the collapse of the wavefunction.* If this is the case it should be obvious that the best mathematical description one can make necessarily must be of a stochastic nature, since the behavior of  $\psi$  is governed by intelligence.

The crucial point is therefore this: *we cannot describe will mathematically, but we can describe certain*

*limitations of a mathematical nature imposed on willing, and understand these limitations as part of the mechanism giving rise to both consciousness and objective reality.*

### C. States of Consciousness

Taken together, outsideness and withinness conceptually allow a field of consciousness ( $\psi$ ) to exist on the spacetime domain  $(x,t)$ , defining a particular *state* of consciousness  $\psi(x,t)$ . The state is given a definite and unambiguous meaning by the simultaneous manifestation of a subjective and an objective phenomenon. Thus the subjective state (consciousness) and the objective state (the spacetime event) are intimately related and reflect a single phenomenon of MIND, deriving their meaning from each other. Note that this implies that consciousness as we know it is not a cause but rather an effect – the cause being will, perhaps to be equated with “spirit”.

We can furthermore conceive of  $\psi$  as a either

- a wave of limitation of mind, or
- a wave of possibilities of matter.

These are of course reciprocal concepts which are both meaningful if one accepts the premises they are based upon.

- If one conceptualize the universe as unintelligent matter governed by chance, then the concept of a *wave of possibilities* makes sense.
- If, however, one conceptualizes the universe as being a manifestation of intelligence, it is more reasonable to think of  $\psi$  as a *wave of limitations*.

The reason why it is meaningful to conceive of  $\psi$  as a wave of limitation, is that absolute free will, is considered to have no limits. The limitations imposed via  $\psi$  must therefore be seen in relation to *absolute freedom* to create with your mind.

### V. CONCLUSION

A model has been created showing that the properties of quantum mechanics can be explained by the properties of light, if we extend the known properties of light, with the ability to curve due to the law of attraction. It has been shown that the model of curved light yield the dispersion relation of the Klein-Gordon relativistic wave equation which is taken to mean that the quantum mechanical phenomenons can be understood as a consequence of the nature of curved light.

The model therefore correspond to the known facts of physics, but has not led to new and experimentally testable predictions. The difficulty with making such prediction arise because it is MIND itself that seems to limit what we can measure and that even if the model conceptually is simpler and perhaps more complete, its description of physical experiments may not be better than existing models.

In contrast to the prevailing “Copenhagen interpretation” of quantum mechanics, it implies the existence of an underlying “quantum reality” which is the reality of MIND itself. This reality is not physical, nor is it

objective, but it must nonetheless be considered more REAL than the physical universe. This is because the *cause* of a phenomenon necessarily must be granted a higher degree of REALITY than the *effects* hereof (in this case the physical universe), if such distinctions are to be made.

The main attraction of the model is that it offers a model of the universe from which the laws of physics, as well as the dynamics of consciousness, emerge in a natural way with little or no arbitrariness. As such it offers new possibilities for exploring reality and a new understanding of what reality is.

### VI. ACKNOWLEDGEMENTS

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