Structure in Physical Reality

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Last modified: 16 February 2018

Abstract

Physical reality has structure, and this structure has one or more foundations. These foundations are rather simple and easily comprehensible. The major foundation evolves like a seed into more complicated levels of the structure, such that after a series of steps a structure results that is like the structure of the physical reality that humans can partly observe. To show the power of this approach the paper explains the origin of gravitation and the fine structure of photons.

1 Introduction

The name physical reality is used to comprise the universe with everything that exists and moves therein. It does not matter whether the aspects of this reality are observable. It is even plausible that a large part of this reality is not in any way perceptible. The part that is observable, at the same time, shows an enormous complexity, and yet it demonstrates a peculiarly large coherence. The conclusion is that physical reality clearly has a structure. Moreover, this structure has a hierarchy. Higher layers are becoming more complicated. That means immediately that a dive into the deeper layers reveals an increasingly simpler structure.

Eventually, we come to the foundation, and that structure must be easily understandable. The way back to higher structure layers delivers an interesting prospect. The foundation must force the development of reality in a predetermined direction. The evolution of reality resembles the evolution of a seed from which a specific plant can grow. The growth process provides restrictions so that only this type of plant can develop. This similarity, therefore, means that the fundamentals of physical reality can only develop the reality that we know.

This philosophy means that the development of physics can occur in two different ways that meet each other at a certain point and then complement and correct each other.

1.1 Conventional physics

The first, already long in use mode uses the interpretation of perceptions of the behavior and the structure of the reality. This method provides descriptions that in practice are very useful. This fact is especially true if mathematical structures and formulas can capture the structure and the behavior. In that case, the result fits the description to not yet encountered situations. This effect has made the field of applied physics very successful. However, the method does not provide reliable explanations for the origins of the discovered structure and the discovered behavior. This situation gives rise to guesswork, that gambles for the discovery of a usable origin. So far, these efforts have not proved very fruitful.

1.2 From the ground up

The other way suggests the existence of a potential candidate for the foundation of physical reality. The method supposes that this foundation has such a simple structure that intelligent people have already added this structure as an interesting structure to the list of discovered structures. For them, there existed no need to seek the foundation of reality. We can assume that mathematics already includes the foundation of the structure of reality without this structure bearing the hallmark "Foundation of Reality." However, this structure will carry the property, which says that this simple structure automatically passes into a more complicated structure, which in turn also emerges into a more complicated structure. After some evolutionary steps, it should become apparent that the successors of the initial structure increasingly contain the properties and support the behavior of the observed reality. In other words, the two approaches will move towards each other.

2 Framework

The quest for a suitable candidate seems almost impossible, but we are lucky. About eighty years ago, two scholars discovered a mathematical structure that seems to meet the conditions. It happened in a turbulent time when everyone was still looking for an explanation for the behavior of tiny objects. One of the two scholars, John Von Neumann, searched for a framework in which scientists can model quantum mechanics. The other scholar, Garrett Birkhoff, was a specialist in relational structures, which the mathematicians call lattices. Together they introduced the orthomodular lattice, and they decided to name this structure quantum logic. They chose this name because the lattice structure of the already known classical logic closely resembles the newly discovered quantum logic. This choice was an unfortunate naming because the discovered structure proves to be no logical system at all. Its elements are not logical propositions. In the document, in which the duo introduced their discovery, they proved that a recently by David Hilbert discovered structure contains an orthomodular lattice as part of its structure. The discovery of David Hilbert is a vector space that can have a countable number of dimensions. Scientists called this new structure a Hilbert space. The elements of the orthomodular lattice correspond to the closed subspaces of the vector space. They are certainly not logical statements. Together they span the whole Hilbert space. The Hilbert space has as an additional feature that the internal product of two vectors produces a number that can be used to form linear combinations of vectors that become part of the vector space. In the number system that fits, must any number that is not equal to zero own a unique inverse. There are only three number systems that meet this requirement. These are the real numbers, the complex numbers, and the quaternions. This requirement immediately imposes a firm restriction on extending the orthomodular lattice to a more complex structure. This kind of constraint is what we seek when the foundation evolves to a higher level.

Mechanisms that map a Hilbert space onto itself are called operators. If the operator maps a normalized vector along itself, then the inner vector product of the vector pair produces an associated eigenvalue. The vector in question is the corresponding eigenvector. Quaternions prove to be an excellent repository for the combination of a time stamp and a three-dimensional location. The by Hilbert discovered structure proves to be a very flexible repository for dynamic geometric data of point-shaped objects. The operators are the administrators of these storage bins.

The extension to the Hilbert space is only a first step. Quaternionic number systems exist in many versions that differ in the way that Cartesian and polar coordinate systems can organize these number systems. This fact means that in a single underlying vector space a whole range of Hilbert spaces can be applied, with the corresponding versions of the number systems floating over each other. Each Hilbert space has a parameter space with its own set of coordinates systems. The version of the number system fills the parameter space with its numbers. A reference operator manages the parameter space.

By using the parameter space and a quaternionic function, the model can define a new operator. This new operator uses the eigenvectors of the reference operator and utilizes the function values as the corresponding eigenvalues. This procedure connects the operator technology of the Hilbert space to the quaternionic function theory. This base model is a powerful tool to model quantum systems.

One of the platforms acts as a background and thus provides the background parameter space.

It is possible to choose a real progression value and connect this value to the subspace corresponding to the background reference operator's eigenvectors whose real part of the eigenvalue corresponds to this progression value. The chosen progression value now divides the model into a historical part and a future part. The separated subspace represents the current status quo of the model. This result means that ordering the real parts of the eigenvalues of operators creates a dynamic model.

The Hilbert spaces, which have a countable dimension, support only operators with a countable eigenspace. These eigenspaces can only contain sets of rational eigenvalues. Each infinite dimensional countable Hilbert space possesses a unique non-countable companion Hilbert space that embeds his countable partner. The non-countable Hilbert space contains operators that possess eigenspaces which are not countable. These eigenspaces form continuums and are mathematically synonymous with fields. Quaternionic functions can describe these fields and continuums. The parameter spaces of these functions are flat continuums.

This structure is starting to become quite complicated but still contains very little dynamism. Only platforms that can float over each other form the so far conceived dynamic objects. Still, the structure constitutes a powerful base platform for modeling the structure and the behavior of physical reality.

3 Meeting

In this base model arise already agreements with the structure that conventional physics has discovered. The base model acts as a storage space for dynamic geometric data. Dynamics can occur if this storage space contains data that after sorting the timestamps tells a dynamic story. The model then tells the tale of a creator that at the time of creation fills the countable Hilbert spaces with dynamic geometric properties of his creatures. However, after the creation, the creator leaves his creatures alone. This result is an astonishing conclusion.

Conventional physics has discovered elementary particles. In fact, they are elementary modules because together they compile all the modules that occur in the universe and some modules form modular systems. The elementary modules appear to live on the floating platforms. They inherit the properties of their platform. The symmetry of the platform determines the intrinsic properties of the platform. At each new progression instant, the elementary particle gets a new location. How this exactly happens is not immediately clear, but the findings of conventional physics give a clue. The elementary particle possesses a wavefunction, which suggests that a stochastic process generates the locations. If this is true, then the elementary particle hops through a hopping path, and after some time, the landing locations form a landing location swarm. This swarm possesses a location density distribution, which is equal to the square of the modulus of the wavefunction. The elementary particle is thus represented by a private platform, by a stochastic process, by a hopping path, by a dense and coherent landing location swarm and by its wavefunction.

As for the elementary particles, the two approaches, therefore, match well. Apart from that, the quaternionic differential theory proves to deliver a great agreement with the equations that Maxwell and others found through interpretations of the results of experiments. The quaternionic differential calculus explains in deep detail how the fields respond to point-like artifacts. The artifacts are the hop landing locations. The field responds with a spherical shock front, which then integrates into a small volume. Mathematicians call the shape of this volume the Green's function of the field. Due to the dynamics of the shock front, the plop spreads all over the field. In summary, each hop landing causes a small deformation that quickly fades away. The hop landing also expands the volume of the field a little bit. The stochastic process ensures that the plops partly overlap each other in space and in time. This story explains why the elementary particle constantly deforms its living space and why the particle possesses a quantity of mass. At the same time, the story explains the origin of gravitation and makes clear that the hop landings expand the universe. The Green's function blurs the location density distribution, and the result equals the contribution of the elementary particle to the local gravitation potential.

It appears that both approaches can complement or correct each other.

> Observations and measurements cannot uncover everything. Only the application of deduction can expose the parts of the physical reality that resist observation. The interplay of measurements and deduction can bring about the necessary confidence. The requirement put by some scientists that experiments must verify everything is sound-ready crap. Much of the physical reality is inaccessible to measurement. In that case, deduction remains the only way of approach.

4 How gravitation works

By applying the sketched approach, this section explains in more detail how gravitation works.

Gravitation is an interaction between a discrete object and a field that gets deformed by the interaction. First, we focus on the tiniest interaction. It is a pulse response. These pulse responses are solutions of one of two quaternionic second order partial differential equations.

$$\varphi = \left(\frac{\partial^2}{\partial\tau^2} - \langle\boldsymbol{\nabla},\boldsymbol{\nabla}\rangle\right)\psi \tag{1}$$

$$\rho = \left(\frac{\partial^2}{\partial\tau^2} + \langle\boldsymbol{\nabla},\boldsymbol{\nabla}\rangle\right)\psi \tag{2}$$

The quaternionic nabla ∇ acts as a quaternionic multiplying operator. Quaternionic multiplication obeys the equation

$$c = c_r + \mathbf{c} = \mathrm{ab} = (a_r + \mathbf{a})(b_r + \boldsymbol{b}) = \mathrm{a}_r\, b_r - \langle\mathbf{a},\boldsymbol{b}\rangle + \mathrm{a}_r\boldsymbol{b} + \mathbf{a}b_r \pm \mathbf{a}\times\boldsymbol{b} \tag{3}$$

Thus, the first order partial differential follows from

$$\nabla = \left\{\frac{\partial}{\partial\tau},\frac{\partial}{\partial x},\frac{\partial}{\partial y},\frac{\partial}{\partial z}\right\} = \nabla_r + \boldsymbol{\nabla} \tag{4}$$

$$\phi = \nabla\psi = \left(\frac{\partial}{\partial\tau} + \boldsymbol{\nabla}\right)(\psi_r + \boldsymbol{\psi}) = \nabla_r\,\psi_r - \langle\boldsymbol{\nabla},\boldsymbol{\psi}\rangle + \nabla_r\boldsymbol{\psi} + \boldsymbol{\nabla}\psi_r \pm \boldsymbol{\nabla}\times\boldsymbol{\psi} \tag{5}$$

The first of the two second-order partial differential equations is the quaternionic equivalent of the well-known wave equation. The other second order partial differential equation divides into two first order partial differential equations.

$$\rho = \nabla^*\nabla\psi = \nabla^*\phi = (\nabla_r - \boldsymbol{\nabla})(\nabla_r + \boldsymbol{\nabla})(\psi_r + \boldsymbol{\psi}) = \left(\frac{\partial^2}{\partial\tau} + \langle\boldsymbol{\nabla},\boldsymbol{\nabla}\rangle\right)\psi \tag{6}$$

Integration over the time domain results in the Poisson equation

$$\rho = \langle\boldsymbol{\nabla},\boldsymbol{\nabla}\rangle\psi \tag{7}$$

A very special solution of this equation is the Green's function $\frac{1}{\boldsymbol{q}-\boldsymbol{q}'}$ of the affected field

$$\boldsymbol{\nabla}\frac{1}{\boldsymbol{q}-\boldsymbol{q}'}=-\frac{(\boldsymbol{q}-\boldsymbol{q}')}{|\boldsymbol{q}-\boldsymbol{q}'|^3} \tag{8}$$

$$\langle\boldsymbol{\nabla},\boldsymbol{\nabla}\rangle\frac{1}{|\boldsymbol{q}-\boldsymbol{q}'|}\equiv\langle\boldsymbol{\nabla},\boldsymbol{\nabla}\frac{1}{\boldsymbol{q}-\boldsymbol{q}'}\rangle=-\langle\boldsymbol{\nabla},\frac{(\boldsymbol{q}-\boldsymbol{q}')}{|\boldsymbol{q}-\boldsymbol{q}'|^3}\rangle=4\pi\delta(\boldsymbol{q}-\boldsymbol{q}') \tag{9}$$

For an isotropic actuator, this Green's function is the static pulse response of the field. It is the time integral over the corresponding single shot pulse response of the field. This dynamic pulse response is a solution of a homogeneous second order partial differential equation.

$$\psi=\frac{f(r\,\boldsymbol{i}\ \pm\tau)}{r} \tag{10}$$

For the wave equation, the imaginary vector $\boldsymbol{i}$ reduces to unity. Otherwise it points along the radius $\boldsymbol{r}$.

The Green's function has some volume. The volume that the dynamic pulse adds to the field quickly spreads over the full extent of the field. Thus locally, the pulse deforms the field, and this deformation quickly fades away. However, globally the volume is added to the field.

This solution is a spherical shock front. During travel, the shape f of the front stays constant, but its amplitude diminishes as 1/r with distance r from the trigger location.

A one-dimensional single shot actuator generates a one-dimensional shock front.

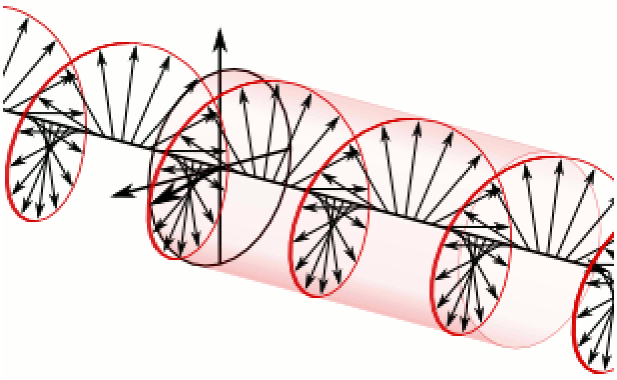
$$\psi=f(x\,\boldsymbol{i}\ \pm\tau) \tag{11}$$

During travel, the front keeps its shape as well as its amplitude. The one-dimensional shock front does not integrate into a volume. Therefore, it does not deform the affected field.

These interactions are so tiny, and the deformation vanishes so quickly that no observer can ever perceive the effect of a separate pulse response. This statement does not mean that huge ensembles of pulses cannot cause a noticeable effect.

4.1 Photons

For example, a long string of equidistant one-dimensional shock fronts can implement the functionality of a photon. The Einstein-Planck relation E = hν means that one-dimensional shock fronts represent a standard amount of energy. These shock fronts own an amount of energy, but they do not own mass. The string has a fixed emission duration. This duration relates to the Planck constant.



In the animation of this left handed circular polarized photon, the black arrows represent the moving shock fronts. The red line connects the vectors that indicate the amplitudes of the separate shock fronts. Here the picture of an EM wave is borrowed to show the similarity with EM waves. However,

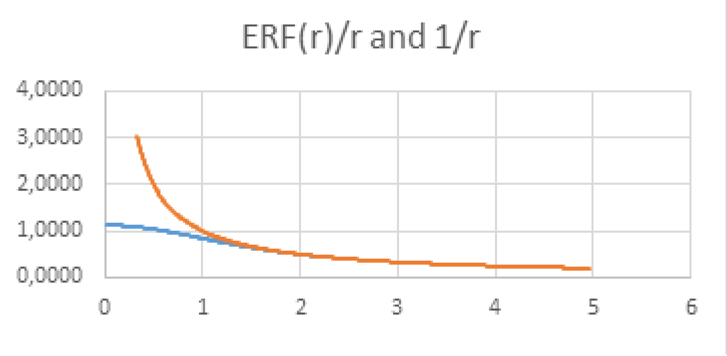
photons are not EM waves!

Photons are known to behave like waves. That does not mean that they themselves are waves. Photons are discrete one-dimensional objects. They are strings with a fixed spatial length. They follow the deformation of their carrier. Their emitters constitute a probability wave of photons. That swarm behaves like a wave. The photons behave as discrete objects.

4.2 Ensembles of spherical shock fronts

Recurrently regenerated dense and coherent swarms of hop landing locations create the overlap conditions that cause persistent and significant deformation of the field that embeds the hop landings. A stochastic process that generates the subsequent hop landing locations in a hopping path of a point-like object can generate such condition. At every subsequent instant, the process generates a new hop landing location. This location archives in the separable Hilbert space. The swarm must be coherent. It contains a huge number of elements. These conditions can be ensured if the stochastic process owns a characteristic function. The characteristic function is the Fourier transform of the location density distribution that describes the swarm. If the characteristic function contains a gauge factor, then this factor can act as a displacement generator. It means that on the embedding field the hopping path is not closed. It is closed on the platform on which the elementary particle resides. Thus, in first approximation, the swarm including the platform on which it resides, moves coherently and smoothly as a single unit. With other words, the platform, the stochastic process with its characteristic function, the hopping path, the hop landing location swarm, and the location density distribution represent the point-like object that both hops around and moves smoothly as a single object. The object is an ***elementary particle***. The squared modulus of its wavefunction equals the location density distribution of the swarm. The characteristic function acts as a wave package that is continuously regenerated. Usually moving wave packages disperse, but this one keeps being regenerated. Consequently, the object combines particle behavior with wave behavior. The hop landing location swarm can simulate interference patterns. The hop landing locations cause spherical shock fronts that integrate into a Green's function. The Green's function blurs the location density distribution. The result is the convolution of the Green's function with the location density distribution. This result is the contribution of the elementary particle to the local gravitation potential.

If, for example, the location density distribution of the swarm equals a Gaussian distribution, then ERF(r)/r describes the shape of the gravitation potential of the elementary module. This curve is a perfectly smooth function. At a small distance from the center, the gravitation potential gets the familiar 1/r shape.



Back-reasoning explains that the spherical shock fronts possess a mass capacity. They contribute part of that capacity to the mass of the elementary particle. In other words, the mass of the elementary particle is proportional to the number of elements of the hop landing location swarm. The notion of mass capacity can be used to explain the existence of multiple generations of elementary particles. The exploited part of the capacity determines the generation.

5 Particle platform

This description says nothing about the fact that for every generation the number of elements of the swarm is fixed. The elementary particle inherits many properties of the platform on which it resides. Every elementary particle exploits a private separable Hilbert space, and this platform exploits a private version of the quaternionic number system. This version determines the symmetry-related properties of the platform. For that reason, the platform features symmetry related charges that locate at the geometric center of the platform. The charges correspond to contributions to a symmetry-related field. The geometric center of the platform couples the gravitation field and the symmetry-related fields.

5.1 Symmetry flavor

The Cartesian ordering of its private parameter space determines the symmetry flavor of the platform, and then this result is compared with the reference symmetry flavor, which is the symmetry flavor of the background parameter space. 

Now the symmetry-related charge follows in three steps.

1. Count the difference of the spatial part of the symmetry flavor of the platform with the spatial part of the symmetry flavor of the background parameter space.
2. If the handedness changes from **R** to **L**, then switch the sign of the count.
3. Switch the sign of the result for anti-particles.

Symmetry flavor					
Ordering x y z τ	sequence	Handedness Right/Left	Color charge	Electric charge * 3	Symmetry type.
↑↑↑↑	⓪	**R**	N	+0	neutrino
↓↑↑↑	①	**L**	R	−1	down quark
↑↓↑↑	②	**L**	G	−1	down quark
↓↓↑↑	③	**L**	B	−1	down quark
↑↑↓↑	④	**R**	B	+2	up quark
↓↑↓↑	⑤	**R**	G	+2	up quark
↑↓↓↑	⑥	**R**	R	+2	up quark
↓↓↓↑	⑦	**L**	N	−3	electron
↑↑↑↓	⑧	**R**	N	+3	positron
↓↑↑↓	⑨	**L**	R	−2	anti-up quark
↑↓↑↓	⑩	**L**	G	−2	anti-up quark
↓↓↑↓	⑪	**L**	B	−2	anti-up quark
↑↑↓↓	⑫	**R**	B	+1	anti-down quark
↓↑↓↓	⑬	**R**	R	+1	anti-down quark
↑↓↓↓	⑭	**R**	G	+1	anti-down quark
↓↓↓↓	⑮	**L**	N	−0	anti-neutrino

The suggested particle names that indicate the symmetry type are borrowed from the Standard Model. Some differences exist with the selection of the anti-predicate. All considered particles are elementary fermions. The freedom of choice in the polar coordinate system might determine the spin. The azimuth range is 2π radians, and the polar angle range is π radians.

6 Modules

Elementary particles are elementary modules. Together the elementary modules configure all other modules, and some of the modules constitute the modular systems that occur in the universe.

Like with elementary modules, a stochastic process generates the footprint of modules. The characteristic function of this process equals a dynamic superposition of the characteristic functions of the components of the module. The superposition coefficients act as internal displacement generators and determine the internal positions of the components. The characteristic function of the module also contains a gauge factor that acts as a displacement generator, such that the module moves as a single unit. Therefore, the stochastic process of the module binds the components of the module. The footprint generates a swarm of spherical shock fronts that together deform the embedding field. This deformation determines the contribution of the module to the local gravitation potential.

7 The role of volume

A local deformation corresponds to a local extension of the volume of the embedding field. A global extension of the volume corresponds to the expansion of the universe that the field represents. Deformations tend to fade away by spreading over the complete field. The stochastic processes must keep pumping new deformations to ensure that a deformation becomes persistent.

The deformation volume increases faster than the overall volume. The space between the swarms becomes relatively smaller. As a result, the swarms seem to attract each other.

7.1 Mass inertia and gravity

From a larger distance, the gravitational potential of a module has the form $\frac{m}{|\boldsymbol{r}|}$ of the Green's function. If the module moves uniformly, then this scalar source function is seen as a vector function. If nothing else in the field changes, then an acceleration of the module means that a new term is added to the change of the field. This new term represents a new field that reworks the acceleration. This explains the mass inertia of accelerating objects. Here's a more detailed explanation.

Mathematically, the statement that in first approximation nothing in the field ψ changes indicates that the first order partial differential $\nabla\psi$ will be equal to zero.

$$\phi = \nabla\psi = \nabla_r\, \psi_r - \langle \boldsymbol{\nabla}, \boldsymbol{\psi} \rangle + \nabla_r \boldsymbol{\psi} + \boldsymbol{\nabla}\psi_r \pm \boldsymbol{\nabla} \times \boldsymbol{\psi} = 0 \tag{12}$$

The terms that are still eligible for change must together be equal to zero.

$$\nabla_r \boldsymbol{\psi} + \boldsymbol{\nabla}\psi_r = \boldsymbol{0} \tag{13}$$

Here plays $\boldsymbol{\psi}$ the role of the vector field and ψ_r plays the role of the gravitational potential of the module. If the relative speed $\boldsymbol{v}$ is constant, then both terms both equal zero. In addition

$$\boldsymbol{\psi} = \boldsymbol{v}\, \psi_r \tag{14}$$

Uniform acceleration $\dot{\boldsymbol{v}}$ of the module gives a new vector field $\nabla_r \boldsymbol{\psi}$ that shows the mass inertia of the module. The new field terms obey:

$$\nabla_r \boldsymbol{\psi} = \dot{\boldsymbol{v}}\, \psi_r = -\boldsymbol{\nabla}\psi_r = \frac{m\, \boldsymbol{r}}{|\boldsymbol{r}|^3} \tag{15}$$

Factor m represents the mass of the module. When two modules move relative to each other with uniform velocity $\boldsymbol{v}$ and then accelerate relative to each other, the mass inertia explains the gravity force that arises between the modules.

$$\boldsymbol{F}(\boldsymbol{r}_1 - \boldsymbol{r}_2) = \frac{m_1 m_2 (\boldsymbol{r}_1 - \boldsymbol{r}_2)}{|\boldsymbol{r}_1 - \boldsymbol{r}_2|^3} \tag{16}$$

The acceleration takes place because the space deforms and expands.

7.2 First inflation

This explanation sheds an interesting light at the beginning of the history of the universe. On that instant, the stochastic processes still had no work done. The balloon of the universe was still empty, and the quaternionic function that describes the universe was equal to its parameter space. It took a full generation cycle of the elementary particles to pump some volume in the balloon. This pump act raised the balloon that was flat in advance already over Its full extent. From that moment on, the volume grows almost isotropic.

7.3 Black holes

Black holes represent the densest packaging of entropy. This qualification might translate into the densest packaging of the pulses that generate spherical shock fronts.

8 Stochastic control of the universe

All elementary modules reside on a private platform that a private separable Hilbert space establishes. That Hilbert space applies a private parameter space that the elements of a version of the quaternionic number system constitute. This version determines the symmetry-related properties of the platform, and the elementary particle inherits these properties. At each subsequent instance, a private stochastic process generates a new hopping path location on this platform. A characteristic function ensures the coherence of the generated hop landing location swarm. The location density distribution of the swarm equals the Fourier transform of the characteristic function, and it equals the squared modulus of the wavefunction of the elementary module. The characteristic function includes a gauge factor that acts as a displacement generator. Consequently, at first approximation, the swarm moves as a single unit.

The stochastic process is the combination of a genuine Poisson process and a binomial process. A spatial point spread function that equals the location density distribution of the swarm implements the binomial process.

Together, the elementary modules constitute all modules that occur in the universe. Each composite module owns a stochastic process that possesses a characteristic function, which equals a superposition of the characteristic functions of the components of the module. The dynamic superposition coefficients act as displacement generators for the internal locations of the components. The overall characteristic function contains a gauge factor that acts as a displacement generator of the composite module. This fact means that the overall characteristic function binds the components of the module such that in a first approximation the module moves as a single unit.

This explanation does not apply forces and force carriers. Instead, it applies stochastic processes that own characteristic functions.

Explaining binding via force carriers requests explaining what generates these carriers. The Hilbert Book Model does not explain the origin of the stochastic processes. Similarly, contemporary physics does not explain the origin of the wavefunction.

9 Discussion

Everything that happens to discrete objects archives in the read-only repository. These objects can only interact via fields. The embedding field acts as the living space of the object. Embedding causes deformation of the living space. Also, may each elementary module give rise to interaction with the symmetry-related fields. The involved symmetry related charges reside at the geometric centers of their platform. The one-dimensional shock fronts transfer bits of energy between the modules. This act changes their potential energy or their kinetic energy.

Observers travel with the subspace that is determined by the progression parameter. Observers can only retrieve data from storage bins that correspond to a historic time stamp. The embedding field transfers this data from the observed event to the observer. Consequently, the observers perceive the data that were archived in the Euclidean format in quaternionic eigenvalues, in spacetime format. The hyperbolic Lorentz transform describes the corresponding coordinate transform. The data is also affected by the deformation of the information path that runs through the embedding field that acts as the living space for the observers.Apart from the observer's view the model also provides a storage view, which is the view of the creator. The creator can access all data.

References

The Hilbert Book Model Project [1] explores the mathematical foundation of physical reality. An e-print archive [2] contains documents that highlight certain aspects of this project.

[1] https://en.wikiversity.org/wiki/Hilbert_Book_Model_Project

[2] http://vixra.org/author/j_a_j_van_leunen