White spots in physics

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Summary

Physics appears to include quite a few white holes. Apparently, this is not very essential for the proper functioning of applied physics. Through some clever steps, some of the white patches can be addressed. That delivers striking and not thought results.

Introduction

In my youth, you saw on some maps of the world still white spots. That indicated areas where people from the Western world never entered to explore that place. Satellites that can analyze everything from above did not yet exist. Now that satellites exist and can map everything, all the white patches on the cards disappeared. There are still areas that we people do not know yet. A good example is physics. Some think that we can eventually solve everything in the field of physics as well.

Approach

The real physicists know that there are areas in physics where we will never know everything. This is mainly because these areas evade our perception. The human mind is often through reasoning still capable of forming an acceptable picture of how the situation could be configured. This is not always possible. The reason is that there is still no good basis on which this reasoning could be based. The result is that all kinds of fantasy theories are developed. Nobody is benefitted by that development. Science and, in particular, physics has responded by requiring that an appropriate experiment must verify every important physical statement. This approach is called the scientific method. The approach prevents fantasy theories but also has nasty consequences. If it is not possible to find an appropriate experiment for an acceptable verification, then that statement cannot be used in a physical theory. In mathematics, that is different. There one proceeds from postulates and axioms. They no longer need to be proven. Everything must be deduced from the principles by sound and generally accepted methods.

The Way Out

Now it is starting to appear that the physical reality is largely based on its own mathematics. This would mean that the mathematical methodology should also be useful inside physics. There are still many physicists who oppose. But to solve the white patches, there seems to be no other way out. To take this road, there is one thing indispensable. There must exist a foundation on which the theory can be established, and this foundation must be extendable by means of mathematical methods to more complicated layers of the structure of physical reality. There is still a danger that extension occurs in the wrong direction. However, it appears that the foundation behaves like a seed that can only develop into a certain type of plant. This obligation implies that mathematics itself imposes the necessary constraints on extending the foundation. This means that if the scientists have sufficient eye for the constraints imposed by mathematics, there is little danger that the development of fantasy theories from the foundation will gain opportunities. The scientific method should, therefore, permit this development.

Effect

One more problem remains. That is the discovery of the foundation of the physical reality. We have the luck that two scientists eighty years ago have discovered a useful foundation for physical reality. They did not release the discovered relational structure as the foundation of physical reality. Instead, they called their discovery “quantum logic” because the structure looks very much like the already known classical logic. At the same time, they demonstrated that a shortly before by David Hilbert and others discovered topological structure contains a substructure that is the same as the by Garrett Birkhoff and John Von Neumann discovered quantum logic. In fact, the Hilbert space discovered by David Hilbert emerges directly from the relational structure discovered by the duo. The Hilbert space behaves like a structured storage medium. The physical reality stores all dynamic geometric data of all the individual objects that appear in the universe in such storage media. This means that this storage medium embodies a book about the history of the universe. Each elementary particle has such a book. Elementary particles are basically elementary modules, and together they form all modules and modular systems that occur in the universe. This model tells the story of a creator who at the beginning archives all the data in the storage media and then leaves his creatures alone. This is a striking result that comes straight from the discovered foundation with the addition that there are elementary particles that compose almost all other objects. This addition has become clear since the discovery of the foundation. The meaning of this is that the creator is a modular designer and modular manufacturer.

Implementation

Another aspect that emerges from the early years of quantum physics is that the creator uses stochastic processes to fill the storage media. These processes have a characteristic function that acts like a control mechanism that ensures that the process produces a coherent result. This is arranged by the fact that the characteristic function is the spatial spectrum of the density distribution of the landing points that the process produces. The spatial spectrum and the landing location density distribution relate by a kind of Heisenberg uncertainty principle. On the one hand the elementary particle behaves like a particle that hops around in a hopping path, and on the other hand, the spectrum arranges that the swarm of landing locations can behave like an interference pattern. This explains the simultaneous wave and particle behavior of the elementary particles. The spectrum determines which waves can imitate the interference pattern. The fact that we are on the proper track is demonstrated by the fact that the location density distribution of the generated hop landing location swarm equals the squared modulus of the wavefunction of the particle.

Charges

The foundation also quickly leads to an explanation of the existence of electric charges. The Hilbert space uses numbers as superposition coefficients of Hilbert vectors. This captures the effective angle between the vectors and the length of the vectors by numbers. Through the same procedure, a mapping operator can control how values can be attached to a vector. The value becomes eigenvalue, and the vector will be the corresponding eigenvector. Together the eigenvalues constitute the eigenspace of the operator. This method archives the storage values. The Hilbert space can in this procedure only choose between a small set of number systems. Hilbert spaces must select number systems in which any number that is not equal to zero has a unique inverse. Only three number systems meet this condition. They are the real numbers, the complex numbers, and the quaternions. The latter Is interesting. The quaternions consist of a real scalar and a three-dimensional vector and are therefore ideally suited to archive a time stamp and a three-dimensional location. The quaternionic number systems exist in many versions that differ amid the coordinate

systems that can sequence their elements. Each quaternionic Hilbert space selects its own version of the number system. A mapping operator exists that maintains this version of the number system. The eigenspace of this reference operator is the private parameter space of the elementary particle. The selected version determines the symmetry of the Hilbert space and of the archived elementary particle.

A background Hilbert space exists that manages a background parameter space. The elementary particles float with their private parameter space over the background parameter space.

Like the private Hilbert space of an elementary particle, the background Hilbert space is separable. It means that all subspaces have a countable dimension and the eigenspaces of the mapping operators are countable. We now use the mapping operator that manages the parameter space to define a series of new operators. Each of these new operators uses the reference operator's eigenvectors. In addition, the new operator uses a quaternionic function. The reference operator's eigenvalues are used as a parameter of the quaternionic function. The target value of the function now goes as the new eigenvalue of the newly defined operator. The eigenvector associated with the parameter is used again as its eigenvector, but now for the new operator.

All the eigenvalues of the operators in the separable Hilbert space are rational quaternions. With each infinite dimensional separable Hilbert space, the sketched model now allows a unique companion non-separable Hilbert space in which the defined operators use all elements of the private parameter space. In this Hilbert space reside defined operators who maintain a continuum as their eigenspace. This continuum is described by a quaternionic function and defines the equivalent of a physical field.

Modeling Platform

In this way, we have derived from the foundation a powerful modeling platform in which elementary particles hover in a quaternionic separable Hilbert space relative to a background platform that is formed by an infinite dimensional separable Hilbert space and his non-separable companion-Hilbert space.

Gravitation

Apart from the floating elementary particles, this model contains the stochastic footprints of these particles. Due to symmetry breaking, the individual landing locations cause pulse responses in the underlying field. This field is formed by the eigenspace of a specialized operator that belongs in the non-separable Hilbert space. The field represents the universe in which we live.

The pulse responses form spherical shock fronts. Integrated over time, these shock fronts form the Green’s function of the field. The stochastic process causes the pulse reactions to overlap in time and in space. As a result, substantial and persistent deformation of the carrier field occurs. The Green’s function contains some volume, and the pulse injects this volume into the underlying field, where it spreads over the entire field. The spherical shock front describes this spread. The result is that the local deformation quickly ebbs away. However, the inserted volume will remain in the field and will cause the field to expand. This story forms the explanation of the origin of what is called gravitation. It also explains the expansion of the universe. Because the stochastic process must continuously generate new landing points, the expansion continues to increase while the deformation remains virtually constant. The deformation travels along with the particle.

Conclusion

The foregoing text sketches a picture of what can be achieved with a fresh unorthodox approach to physics. We have already encountered two important field types. The electric fields are caused by charges that locate in the geometric center of the platform of an elementary particle. The other field always exists and exists everywhere. It represents the universe in which we live and which, through the presence of each elementary particle, is continually deformed and expanded.

We also meet the creator who turns out to be a modular designer and constructor, and that abandons his creatures immediately after his creation action. He oversees and foresees the whole life story of all his creatures. Curiously enough, he uses stochastic processes to shape all dynamics.

This story is quite different from the stories we have been told about the creation. From further digging, it turns out that it continues. This makes an interesting voyage of discovery.

To understand all this well, a thorough knowledge of mathematics is necessary. Anyone with sufficient mathematical knowledge can come a long way. It is becoming increasingly apparent that the physics that we received in the school benches does not quite correspond to reality. However, it agrees quite an end. Especially applied physics proves to be very useful. Theoretical physics proves much less reliable. The physicists seem to be perfectly capable of living with these shortcomings. The white patches are not essential for the reliable use of physics.

Results

The physical reality uses a memory in which at the beginning all dynamic geometric data from discrete objects are already saved. After archival, the stored data no longer change.

The model behaves like a creator.

After the creation act, the creator leaves his creatures alone.

Observers have access to historical data only.

The physical reality uses quaternions as its preferred number system.

Fields can be described by quaternionic functions.

The behavior of fields is determined by quaternionic differential and Integral equations.

The storage media are quaternionic Hilbert spaces.

A field exists that represents the universe.

Observers receive their information via the field that represents the universe.

Small excitations of this field together form all the individual objects that occur in the universe.

In isolation these excitations cannot be detected.

The spherical excitations are caused by stochastic processes.

Elementary particles own storage of their own life history.

This storage exhibits a symmetry that determines the symmetry-related properties of the particle.

This means that elementary particles have an electrical charge.

The symmetry-related charges cause symmetry related fields.

Elementary particles are elementary modules. Together they form all the other modules and the modular systems.

Stochastic processes regulate the coherence and the bonds in the model.

There are two types of these stochastic processes. The second kind installs the bonds.

All massive objects are recurrently regenerated.

All fields are tracked in appropriate background storage.

The contents of the storage media of the elementary particles become embedded in the background storage. Stochastic processes describe this embedment.

The HBM describes the structure of elementary particles, of atoms and of molecules.

The HBM describes the structure of the photons.

The HBM gives a unique description of the beginning stage of the universe.

The HBM explains color confinement.

The HBM gives its own point of view on entanglement.

The HBM gives suggestions for dark matter and dark energy.

The HBM provides behavioral advice for intelligent beings based on the modular structure of creation.

In the creator's view, elementary particles never annihilate. Instead, they can zigzag in time. At the reflection instants, the observers perceive pair creation or pair annihilation events.

Reference

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