Steps to the Hilbert Book Model

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Summary

The Hilbert Book Model is a purely mathematical model of physical reality that starts with a solid foundation

Step 1

Select the orthomodular lattice as the foundation of the model.

Step 2

The orthomodular lattice emerges into a separable Hilbert space

Step 3

Hilbert spaces can only cope with number systems that are associative division rings.

Select the quaternionic number system. It is the most versatile associative division ring.

Step 4

Quaternionic number systems exist in many versions that differ in the way that Cartesian and polar coordinate systems sequence their elements. The selected version determines the symmetry of the Hilbert space.

Step 5

Multiple separable Hilbert systems can share the same underlying vector space.

This restricts the versions of the quaternionic number systems, such that coordinate axes of the Cartesian coordinate systems are parallel.

Step 6

All separable Hilbert spaces own a private parameter space that applies the selected version of the number system. A dedicated normal operator manages this parameter space as its eigenspace. This opens the possibility to define a category of normal operators that apply a function to specify a sampled continuum as their eigenspace.

Step 7

One infinite dimensional separable Hilbert space acts as the background platform and manages the background parameter space.

Step 8

All other separable Hilbert spaces float with the geometric center of their parameter space over the background parameter space. Symmetry related properties of the floating Hilbert spaces are determined relative to the background parameter space.

Step 9

On each floating platform resides an elementary particle.

Step 10

A private stochastic process that owns a characteristic function generates the hop landing locations of the particle and archives them as a combination of a scalar time stamp and a three-dimensional location in a quaternionic eigenvalue of a dedicated footprint operator, which resides in the floating separable Hilbert space. After sequencing the timestamps, the eigenspace of the footprint operator tells the complete life-story of the elementary particle.

Step 11

The stochastic process recurrently regenerates a hop landing location swarm. A location density distribution that equals the Fourier transform of the characteristic function describes this hop landing location swarm. The location density distribution equals the squared modulus of the wavefunction of the elementary particle.

Step 12

The background separable Hilbert space owns a non-separable Hilbert space that embeds its separable companion. This step combines Hilbert space operator technology with quaternionic function theory, quaternionic differential calculus, and quaternionic integral calculus.

Step 13

A dedicated operator in this non-separable Hilbert space manages a continuum eigenspace that acts as the dynamic field, which represents the universe that exists always and everywhere in the model.

Step 14

The life story of each elementary particle describes the ongoing embedding of the eigenspace of the footprint operator into the background platform. Disparity of symmetries cause field excitations in the universe field that may temporarily deform this embedding field and will persistently expand the universe. Spherical pulse responses act as spherical shock fronts that over time integrate into the Green's function of the field.

Step 15

Fermion elementary particles act as elementary modules. Together they constitute all modules that exist in the universe. Some of these modules constitute modular systems.

Step 16

All composite modules own a private stochastic process that own a characteristic function, which controls the composition of the composite module. The characteristic function equals a dynamic superposition of the characteristic functions of the components. The superposition coefficients act as displacement generators that determine the internal locations of the components.

Step 17

All modules and modular systems add a displacement generator to their characteristic function. This gauge factor determines the movement of the module as a single unit.

Step 18

The components of compound modules share the geometric center of their platforms. Thus, these components float as one unit. Chemists and physicists call them atoms or atomic ions.

Step 19

Molecules are conglomerates of atomic ions that share each other's electrons.

Step 20

One-dimensional shock fronts exchange a standard amount of energy with platforms of elementary particles. Photons are strings of equidistant one-dimensional shock fronts that obey E = h v.

References

The Hilbert Book Model is treated in detail on "The Mathematics of Physical Reality"; http://vixra.org/abs/1904.0388 and on

https://en.wikiversity.org/wiki/Hilbert_Book_Model_Project