Spoken Text of the Base_Model PowerPoint Presentation

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Abstract

This is the text that is read aloud in the Base_Model PowerPoint presentation

The extra punctuation is used by the Zamzar.com utility to enter silent spaces into the text.

The conversion of the PowerPoint presentation to mp4 format introduces some inconsistencies that are difficult to prevent.

The numbers in the text relate to the slide numbers.

ReadAloudText

This is the spoken text of the Base Model presentation. … … … … … . … … … … …

2. … … … … … . … … … … …

A hierarchy of mathematical structures that are discovered by humans exists that starts from a founding structure. … … … … … It evolves into more complicated structures that together constitute a model, which shows the structure and behavior of the physical reality that we can observe. … … … … … . … … … … …

3. … … … … … . … … … … …

This indicates that physical reality applies similar mathematical structures that implement its structure and behavior. … … … … …

A seed evolves in a type of plant. … … … … …

Reality behaves as a seed that evolves in the type of physical reality that we observe. … … … … … . … … … … …

4. … … … … … . … … … … …

The hierarchy of increasingly complicated structures consists of. ... ...

The Hilbert lattice, this is an axiomatic foundation. ... ...

The Hilbertspace, this is a structured repository. ... ...

The Hilbert repository, this is a system of Hilbertspaces. ... ...

The Hilbert Book Model, this is a purely mathematical model of physical reality. ... ...

5. ... ...

We start with constructing a vector space from a field of scalars and a set of vectors. ... ...

The field of scalars is defined by axioms that set the arithmetic rules of the field. ... ...

6. ... ...

The vector space is specified by a set of axioms that define the linear combination of the set of vectors into the vector space. ... ...

7. ... ...

A vector space (also called a linear space) is a collection of objects called vectors, which may be added together and multiplied ("scaled") by numbers, called scalars. ... ...

8. ... ...

A subtle difference exist between separable Hilbertspaces and their underlying vector space. ... ...
The Hilbertspace applies a selected version of a number system for specifying the inner product of vector pairs. ... ...

The number system must be an associative division ring. ... ...
A Cartesian and a polar coordinate system determine the selected version. ... ...
These coordinate systems sequence the members of the selected version. ... ...
The selected version of the number system determines the private parameterspace of the Hilbertspace. ... ...
Its symmetry determines the symmetry of the Hilbertspace. ... ...

9. ... ...

The foundation of the Hilbert Book Model is a relational structure. ... ...
The discoverers John von Neumann and Garrett Birkhoff called it quantum logic because it is very similar to classical logic. ... ...
Mathematicians called it an orthomodular lattice. ... ...
The set of closed subspaces of a separable Hilbertspace is an orthomodular lattice. ... ...
Together, these subspaces constitute the complete Hilbertspace. ... ...
Later other mathematicians called this structure a Hilbert lattice. ... ...

10. ... ...

Together which others David Hilbert discovered the Hilbertspace. ... ...
The Hilbertspace is an extension of the concept of Euclidean space. ... ...
The Hilbertspace is a vector space endowed with an inner product that helps to make the vector space complete. ... ...

11. ... ...

David Hilbert introduced the infinite dimensional Euclidean space. ... ...
The name Hilbertspace was introduced by John von Neumann, who was assistant of David Hilbert. ... ...
This space was later called a separable Hilbertspace. ... ...
Non-separable Hilbertspaces were introduced much later. ... ...
The motto of David Hilbert is. ... ...
We must know. ... ...
We will know. ... ...

12. … … … … … . … … … … …

Hilbertspaces can only cope with number systems that are associative division rings. … … … … …
Every Hilbertspace selects a version of the number system. … … … … …
Coordinate systems determine the symmetry of the selected version. … … … … …
Only real numbers, complex numbers and quaternions are associative division rings. … … … … … . … … … … …

13. … … … … … . … … … … …

Several additions can be derived from the original concept of the Hilbertspace. … … … … …
A huge number of separable Hilbertspaces can share the same underlying vector space. … … … … …
All Hilbertspaces own a private parameterspace . … … … … …
All Hilbertspaces feature a symmetry that derives from the selected version of the number system. … … … … … . … … … … …

14. … … … … … . … … … … …

Every Hilbertspace has its own private parameterspace . … … … … …
The parameterspace determines the root geometry and the symmetry of the Hilbertspace. … … … … …
The geometrical centers of the parameterspaces may differ. … … … … …
In this way Hilbertspaces float with respect to each other. … … … … …
A dedicated reference operator manages the parameterspace in its eigenspace. … … … … … . … … … … …

15. … … … … … . … … … … …

A huge number of quaternionic separable Hilbertspaces constitute the final repository. … … … … …
These separable Hilbertspaces share the same underlying vectorspace. … … … … …
They distinguish in the version of the quaternionic number system that they apply to specify their inner product. … … … … …
In physical reality, elementary particles reside on the floating platforms and are represented by the eigenspace of a dedicated footprint operator. … … … … …

The hop landing locations of the elementary particles are archived in quaternionic eigenvalues that act as storage bins. ... ...
These storage bins combine a timestamp and a three-dimensional spatial location. ... ...
A stochastic process that owns a characteristic function generates the hop landing locations. ... ...
Its characteristic function controls the stochastic process. ... ...

16. ... ...

The dimension of the background separable Hilbertspace is infinite. ... ...
Therefore, this Hilbertspace owns a unique quaternionic non-separable Hilbertspace that embeds its separable companion. ... ...
Non-separable Hilbertspaces support normal operators that possess continuum eigenspaces. ... ...
Quaternionic functions describe these continuums. ... ...
The continuums represent physical fields. ... ...
The Hilbert repository adds the non-separable companion of the background separable Hilbertspace to the Base Model. ... ...

17. ... ...

The embedding of the floating platforms into the background platform tells the life-story of the elementary particle in a different way. ... ...

18. ... ...

In each Hilbertspace, a category of field-operators share the eigenvectors of the reference operator. ... ...
The field-operator selects a quaternionic function and applies the target value corresponding to the parameter value as its eigenvalue. ... ...
In this way the field-operator manages a field as its eigenspace. ... ...
The selected quaternionic function describes this eigenspace. ... ...
In a separable Hilbertspace, the eigenspace represents a sampled field. ... ...
In a non-separable Hilbertspace, the eigenspace represents a continuum field. ... ...

19. ... ...

The category of field-operators combines Hilbertspace operator-technology with quaternionic function theory. ... ...
Indirectly, it combines Hilbertspace operator-technology with quaternionic differential and integral calculus. ... ...

20. ... ...

A huge number of quaternionic separable Hilbertspaces constitute the final repository. ... ...
These separable Hilbertspaces share the same underlying vectorspace. ... ...
They distinguish in the version of the quaternionic number system that they apply to specify their inner product. ... ...
This version determines the private parameterspace of the separable Hilbertspace. ... ...
The parameterspace determines the symmetry of the separable Hilbertspace. ... ...
A dedicated normal operator manages the parameterspace in its eigenspace. ... ...
A category of normal operators share the eigenvectors of the reference operator. ... ... The corresponding eigenvalues are parameter values. ... ...
The new operators replace the eigenvalues of the reference operators by the corresponding target values of a selected quaternionic function. ... ...
The eigenspaces of the newly defined operators represent sampled dynamic fields. ... ...
One of the separable Hilbertspaces acts as a background platform and provides the background parameterspace. ... ...
All other separable Hilbertspaces float with the geometrical center of their parameterspace over the background parameterspace. ... ...
The difference in the symmetry between the floating parameterspace and the background parameterspace generates a symmetry-related charge. ... ...
This charge locates at the geometric center of the floating parameterspace. ... ...
This charge results in a source or a sink that produces a corresponding quaternionic symmetry-related field. ... ...

In physical reality, elementary particles reside on the floating platforms and are represented by the eigenspace of a dedicated footprint operator. … … … … … . … … … … …

21. … … … … … . … … … … …

The dimension of the background separable Hilbertspace is infinite. … … … … …
Therefore, this Hilbertspace owns a unique quaternionic non-separable Hilbertspace that embeds its separable companion. … … … … …
Non-separable Hilbertspaces support normal operators that possess continuum eigenspaces. … … … … …
Quaternionic functions describe these continuums. … … … … …
The continuums represent physical fields. … … … … …
The embedding of the floating platforms into the background platform tells the life-story of the elementary particle in a different way. … … … … …
Every hop landing of an elementary particle may cause a spherical pulse response. … … … … … . … … … … …

22. … … … … … . … … … … …

All elementary particles own a private parameterspace, which determines the symmetry of the platform of the particle. … … … … …
It is the symmetry of its selected version of the number system. … … … … …
The difference between the symmetry of the elementary particle and the symmetry of the background platform determines the symmetry-related charge of the particle. … … … … …
If the symmetry flavor is compared to the background parameterspace, then the symmetry flavors relate to electric charges and color charges. … … … … … . … … … … …

23. … … … … … . … … … … …

Each of the cooperating floating separable Hilbertspaces features a symmetry-related charge. … … … … …
That charge is raised by a source or a sink that is located at the geometric center of the private parameterspace . … … … … …
The charge corresponds to the difference in symmetry between the floating parameterspace and the background parameterspace . … … … … …

The floating parameterspace must have its Cartesian coordinate axes parallel to the Cartesian coordinate axes in the background parameterspace . ...

24. ... ...

The symmetry-related charge contributes to a symmetry-related field. ... ...
A short list of electric charges exists. ... ...
Anisotropy is characterized by color charges. ... ...
The short list of charges is minus three, minus two, minus one, zero, plus one, plus two and plus three. ... ...

25. ... ...

The elementary modules constitute a modularly designed set of modules and modular systems. ... ...
Stochastic processes define the composed modules via their characteristic functions. ... ...
These characteristic functions are dynamic superpositions of the characteristic functions of the components. ... ...
The superposition coefficients are displacement generators. ... ...
The displacement generators define the internal positions of the components. ... ...
Each module owns a displacement generator that determines the position of the module. ... ...

26. ... ...

Elementary particles behave as elementary modules. ... ...
Together, they constitute all modules that exist in the universe. ... ...
Some modules constitute modular systems. ... ...

27. ... ...

The composition of composite modules is defined by a stochastic process. ... ...
That stochastic process owns a characteristic function. ... ...
This characteristic function is a dynamic superposition of the characteristic functions of the components. ... ...

The superposition coefficients act as displacement generators. ... ...
The displacement generators determine the internal positions of the components. ... ...

28. ... ...

QUATERNIONIC FIELD THEORY. ... ...
All physical fields obey the quaternionic differential calculus that defines quaternionic field theory. ... ...
Different fields distinguish in their start and boundary conditions. ... ...
Our universe is a dynamic field that exists always and everywhere. ... ...
This field vibrates, deforms, and expands. ... ...
In the beginning this field was flat. ... ...
Symmetry-related fields are raised by sources or sinks that locate at the geometrical centers of the floating platforms. ... ...
The source or sinks represent symmetry related charges. ... ...
The value of these charges depend on the difference in symmetry of the floating platform and the background platform. ... ...

29. ... ...

Quaternionic fields are represented by the eigenspaces of normal operators. ... ...
In the quaternionic non-separable Hilbertspaces these fields can be continuums. ... ...
Quaternionic differential calculus describes the behavior of these continuums. ... ...
Second-order partial differential equations describe the interaction between point-like actuators and continuums. ... ...

30. ... ...

The first-order partial differential equation is the mother of all field equations. ... ...
The first-order partial differential represents the first-order change of the field. ... ...
The first-order change divides into five terms. ... ...
Each of these terms corresponds to a new field. ... ...
The terms are divergence, gradient, curl and temporal changes. ... ...

Also, a conjugate nabla exists. ... ... It defines the conjugate first-order change. ... ...

31. ... ...

In physics several of the partial changes get special symbols and names. ... ...
This happens in Maxwell equations for electromagnetic fields. ... ...
The real part of the change has no equivalent in the Maxwell equations,
Also, some higher order changes get special symbols and names. ... ...

32. ... ...

Second-order differential equations exist in several forms. ... ...
Some of them are well-known for several centuries. ... ...
Examples are the wave equation, the Poisson equation, and the Helmholtz equation. ... ...
The solutions of homogeneous equations superpose with other solutions. ... ...
Point-like actuators determine what kind of field excitations are generated. ... ...

33. ... ...

Dark energy objects are field excitations that act as moving energy packages. ... ...
Their effect is so tiny that in isolation this effect cannot be detected. ... ...
Only combined in huge quantities these field excitations become noticeable. ... ...
Dark energy objects behave as one-dimensional shock fronts. ... ...
During travel the front keeps its shape and its amplitude. ... ...
The front travels with light speed. ... ...
Photons are strings of equidistant one-dimensional shock fronts. ... ...
The strings obey the Einstein-Planck relation. ... ...
At emission, all photons feature the same emission duration and have the same length. ... ...

34. ... ...

This picture shows the internal structure of a photon. ... ...
The black arrows represent the polarization vector of the one-dimensional shock fronts. ... ...
The red line connects the tips of the arrows. ... ...
The picture looks a bit like the picture of a plane electromagnetic wave. ... ...
Photons are not electromagnetic waves. ... ...

35. ... ...

Dark matter objects are field excitations that behave as spherical shock fronts. ... ...
Their effect is so tiny that in isolation this effect cannot be detected. ... ...
Only combined in huge quantities these field excitations become noticeable. ... ...
During travel the front keeps its shape. ... ...
The front travels with light speed. ... ...
The amplitude of the front diminishes with increasing distance from the location of the pulse. ... ...
Over time, spherical shock fronts integrate into the Green's function of the field. ... ...
Thus, the pulse injects the volume of the Green's function into the embedding field. ... ...
Initially this locally deforms the field. ... ...
The front spreads the injected volume over the field. ... ...
Consequently, the deformation quickly fades away. ... ...
The injected volume temporarily deforms the field and persistently expands the field. ... ...

36. ... ...

Every hop landing of an elementary particle may cause a spherical pulse response. ... ...
The hop landings generate the footprint of the elementary particle. ... ...
The spherical pulse response only occurs when the hop landing location is isotropic discrepant with the background continuum. ... ...
This restriction causes color confinement. ... ...

37. ... ...

GRAVITY. ... ...
The gravitational potential describes the local deformation of the affected field by the presence of the considered massive object. ... ...
The gravitational potential defines the mass of the object. ... ...
Gravity implements a gravitational acceleration via inertia. ... ...
This induces a gravitational attractive force between massive objects. ... ...

38. ... ...

A stochastic process that owns a characteristic function generates the ongoing hopping path of the particle. ... ... This hopping path recurrently regenerates a coherent hop landing location swarm. ... ... A location density distribution describes this swarm. ... ... The square of the modulus of the wavefunction of the particle and the Fourier transform of the characteristic function are equal to this location density distribution. ... ... In this way the characteristic function ensures the regeneration of the wavefunction. ... ...

39. ... ...

The stochastic process that generates the hopping path owns a characteristic function
The process is an inhomogeneous spatial Poisson point process. ... ...
The process can be considered as a combination of a genuine Poisson process and a binomial process. ... ...
A spatial point spread function implements the binomial process. ... ...
The spatial point spread function equals the location density distribution of the recurrently regenerated hop landing location swarm. ... ...
The location density distribution equals the Fourier transform of the characteristic function of the process . ...

40. ... ...

Each hop landing causes a spherical pulse response that acts as a spherical shock front. ... ...
Over time the spherical pulse response integrates in the Green’s function of the embedding continuum. ... ...

Thus, the pulse injects the volume of the Green's function into the embedding field. ... ...
Initially this locally deforms the field. ... ...
The front spreads the injected volume over the field. ... ...
Consequently, the deformation quickly fades away. ... ...
The volume stays inside the field and persistently expands the field. ... ...

41. ... ...

The recurrently regenerated hop location swarm causes a persistent deformation that is described by the gravitational potential of the particle. ... ...
The gravitational potential of the particle approaches the convolution of the Green's function of the embedding field and the location density distribution of the swarm. ... ...
The gravitational potential of the particle is everywhere a smooth function. ... ...
Far from the geometrical center the gravitational potential gets the shape of the Green's function. ... ...

42. ... ...

A Gaussian distribution as an example characteristic function shows how the gravitational potential of an elementary particle can look. ... ... Fourier transform of the Gaussian distribution is again a Gaussian distribution. ... ... The convolution of the Gaussian distribution with the Green's function is an error function divided by its argument. ... ... Since the spherical pulse responses quickly fade away the actual result is slightly flatter than this function. ... ... The result shows that the gravitational potential of an elementary particle is an everywhere smooth function that far from the geometric center approaches the shape of the Green's function. ... ...

43. ... ...

Far enough at distance r of the center of mass of the object with mass M the gravitational potential equals Newton's gravitational potential. ... ...
This has the shape of the Green's function of the field. ... ...
This holds for all massive particles and for black holes. ... ...

44. … … … … … . … … … … …

We introduce an artificial field that represents the capability of physical reality to compensate the change of part of a field by the change of another part of the field. … … … … … The artificial field ζ consists of a real part that equals Newton’s gravitational potential and an imaginary part that equals the uniform speed of the corresponding massive object. … … … … … This field is defined such that physical reality tries to keep this change equal to zero. … … … … …
In this consideration the curl of the field is ignored. … … … … … . … … … … …

45. … … … … … . … … … … …

Inertia is used to compute the acceleration of a massive object in the neighborhood of another massive object. … … … … …
If two uniformly moving masses m one and m two exist in each other’s neighborhood then the gravitational force is shown by the formula. … … … … … . … … … … …

46. … … … … … . … … … … …

The gravitational potential of a unit mass at distance r from a point-mass with mass M equals the work that must be done by an external agent to bring that unit mass in from infinity to that point. … … … … …
The gravitational potential equals the gravitational potential energy of a unit mass at that location. … … … … … . … … … … …

47. … … … … … . … … … … …

In a non-separable Hilbertspace, a quaternionic field can be a mixture of a continuum and several enclosed regions that are countable. … … … … …
Inside those regions no field excitations exist. … … … … …
At the border of the enclosed region, shock fronts are blocked. … … … … …
No field excitations can enter the countable region. … … … … …
No field excitation can leave the countable region. … … … … …
These regions deform their surrounding continuum. … … … … …
Far from the center of the region, Newton’s gravitational potential describes the deformation of the surrounding continuum. … … … … … . … … … … …

48. … … … … … . … … … … …

At the border of the countable region, the energy of the one-dimensional shock fronts equals the gravitational potential energy of this region. ... ...
The mass equivalent of this energy is m times c-squared. ... ...
The gravitational potential energy of mass m at this border is m times the gravitational potential. ... ...
This sets the size of the black hole at radius that equals MG divided by c-squared. ... ...
The size increases proportional with the mass M of the region. ... ...

49. ... ...

Due to the strong gravitation, a huge number of elementary particles cling with the geometrical center of their parameterspace to the border of the black hole. ... ...
For a part, the active area of the private stochastic process of the elementary particle hovers over the countable region. ... ...
Outside the black hole the private stochastic process of the elementary particle generates the spherical pulse responses that constitute the footprint of the elementary particle. ... ...
Inside the black hole the private stochastic process of the elementary particle adds objects to the content of the countable region. ... ... This increases the size of the countable region. ... ...

50. ... ...

“Gravitational wave” is a misnomer. ... ...
The phenomenon is not a wave package. ... ...
Instead it is a superposition of many spherical shock fronts that are generated within a small region during a short cosmological event that occurred billions of years ago. ... ...
The duration of the cosmological event is short. ... ...
Spherical shock fronts travel with light speed. ... ...
The cross-section of the shape of each separate spherical front stays the same. ... ...
The amplitude of the front diminishes as the inverse of the travelled distance. ... ...
The combined fronts show what happened at the event. ... ...

51. ... ...

EPISODES. ... ...
In the Hilbert Book Model, the ongoing embedding of the floating platforms of the elementary modules mimics the activity of the stochastic process that populates the eigenspace of the footprint operator of the elementary module with the ongoing hopping path of the particle. ... ...
The stochastic processes perform their activity in the creation episode of the model. ... ...
The ongoing embedding occurs in the running episode of the model. ... ...
The notion of time only consists in the running episode. ... ...

52. ... ...

MYSTERIOUS. ... ...
The creation episode is the most mysterious part of the Hilbert Book Model. ... ...
The existence of the wavefunction guides to the existence of this episode. ... ...
The stochastic processes initiate and control the recurrent regeneration of all modules. ... ...

53. ... ...

RANGE OF TIME. ... ...
In the Hilbert Book Model, the range of time corresponds to the range of the archived timestamps. ... ...
The range of time has a begin and an end. ... ...
At the begin of time the spatial part of the universe field was equal to the spatial part of the parameter space of the quaternionic function that represents this field. ... ...
At the begin of time the dynamic field that represents the universe was flat. ... ...

54. ... ...

OBSERVERS. ... ...
The Hilbert Book Model considers all modules and modular systems as potential observers. ... ...
Observers must travel with the scanning time window. ... ...
Observers can only retrieve information from storage bins that for them hold historic timestamps. ... ...
The universe field transfers the retrieved data from the storage bin to the observer. ... ...
The observers perceive in spacetime coordinates. ... ...
A hyperbolic Lorentz transformation converts the Euclidean coordinates of the storage bin to the perceived spacetime coordinates. ... ...

. ... Thank you for your attention. … … … …
The Hilbert Book Model is treated in a Researchgate dot net project. ... ...