

The Hilbert Book Model

A simple model of fundamental physics

<http://www.e-physics.eu>

Fundament

- The Hilbert Book Model (HBM) is strictly based on **traditional quantum logic**.
- This foundation is lattice isomorphic with the set of closed subspaces of an infinite dimensional **separable Hilbert space**.

Navigate

To Logic Systems slides:

<http://vixra.org/abs/1302.0122>

To Hilbert Book Model slides part 2:

<http://vixra.org/abs/1302.0121>

To “Physics of the Hilbert Book Model”

<http://vixra.org/abs/1307.0106>

Correspondences

- ≈1930 **Garret Birkhoff** and **John von Neumann** discovered the lattice isomorphy:

- Infinite, but **countable** number of atoms / base vectors

Quantum logic	Hilbert space
Propositions: a, b	Vectors: $ a\rangle, b\rangle$
atoms c, d	Base vectors: $ c\rangle, d\rangle$
Relational complexity: $C_{complexity}(a \cap b)$	Inner product: $\langle a b\rangle$
Inclusion: $(a \cup b)$	Sum: $ a\rangle + b\rangle$
For atoms c_i : $\bigcup_i c_i$	Subspace $\left\{ \sum_i \alpha_i c_i\rangle \right\}_{\forall \alpha_i}$

Atoms & base vectors

- *Atom*

- Contents not important
- Set is **unordered**
- Many sets possible

- *Logic*

- Lattice
- **Only relations important**

Atoms & base vectors

- *Atom*

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- *Base vector*

- Set is **unordered**
- Many sets possible
- Can be *eigenvector*
 - Eigenvalue
 - Real
 - Complex
 - Quaternionic

- *Logic*

- Lattice
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- *Hilbert space*

- Inner product
 - Real
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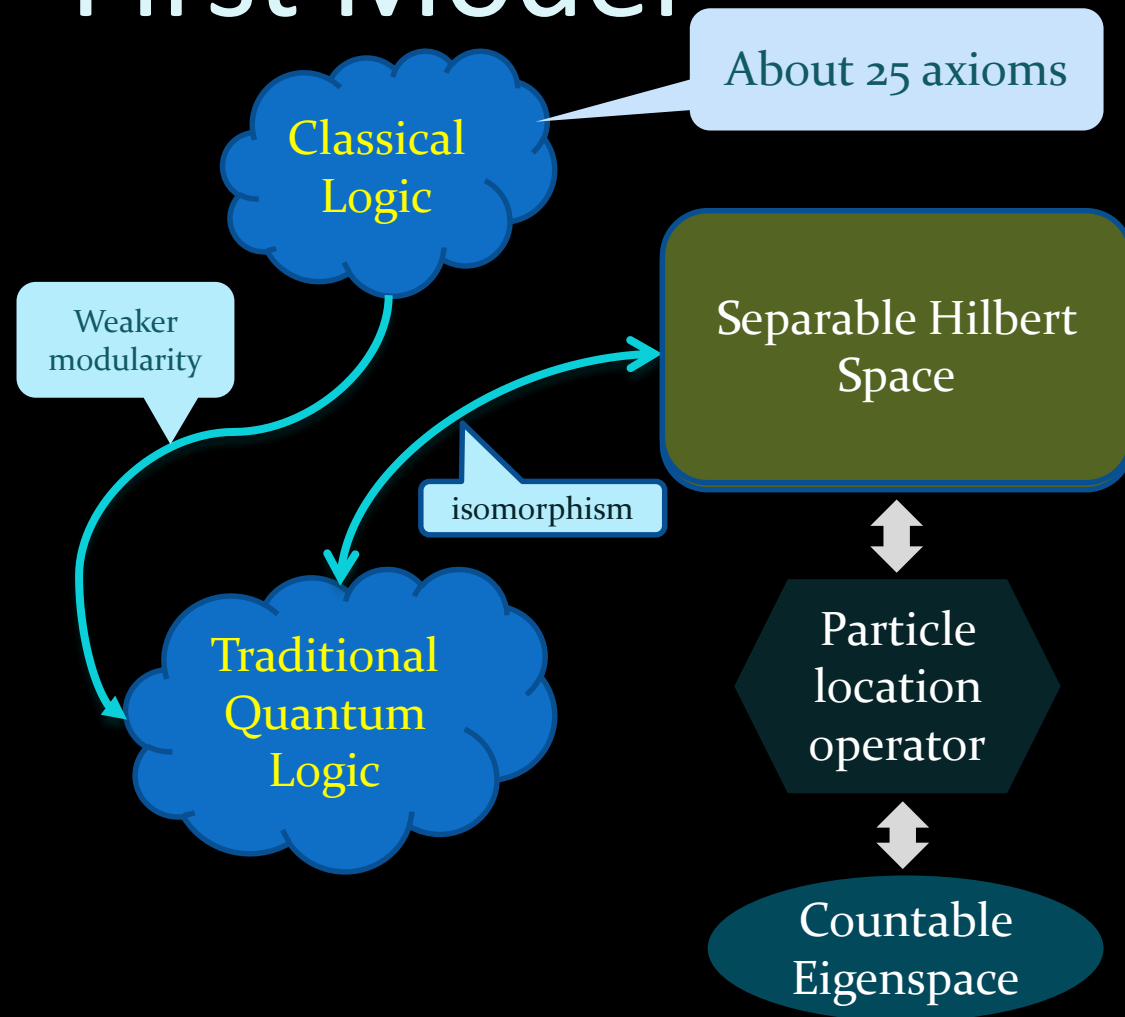
Constantin Piron:

Inner product $\langle x|y\rangle$ must be real, complex or quaternionic

$$\langle a|Pa\rangle = \langle a|pa\rangle = \langle a|a\rangle p$$

The eigenvalues are the same type of numbers as the inner products

First Model



Only
static
status quo
&
No fields

Representation

Quantum logic

Hilbert space

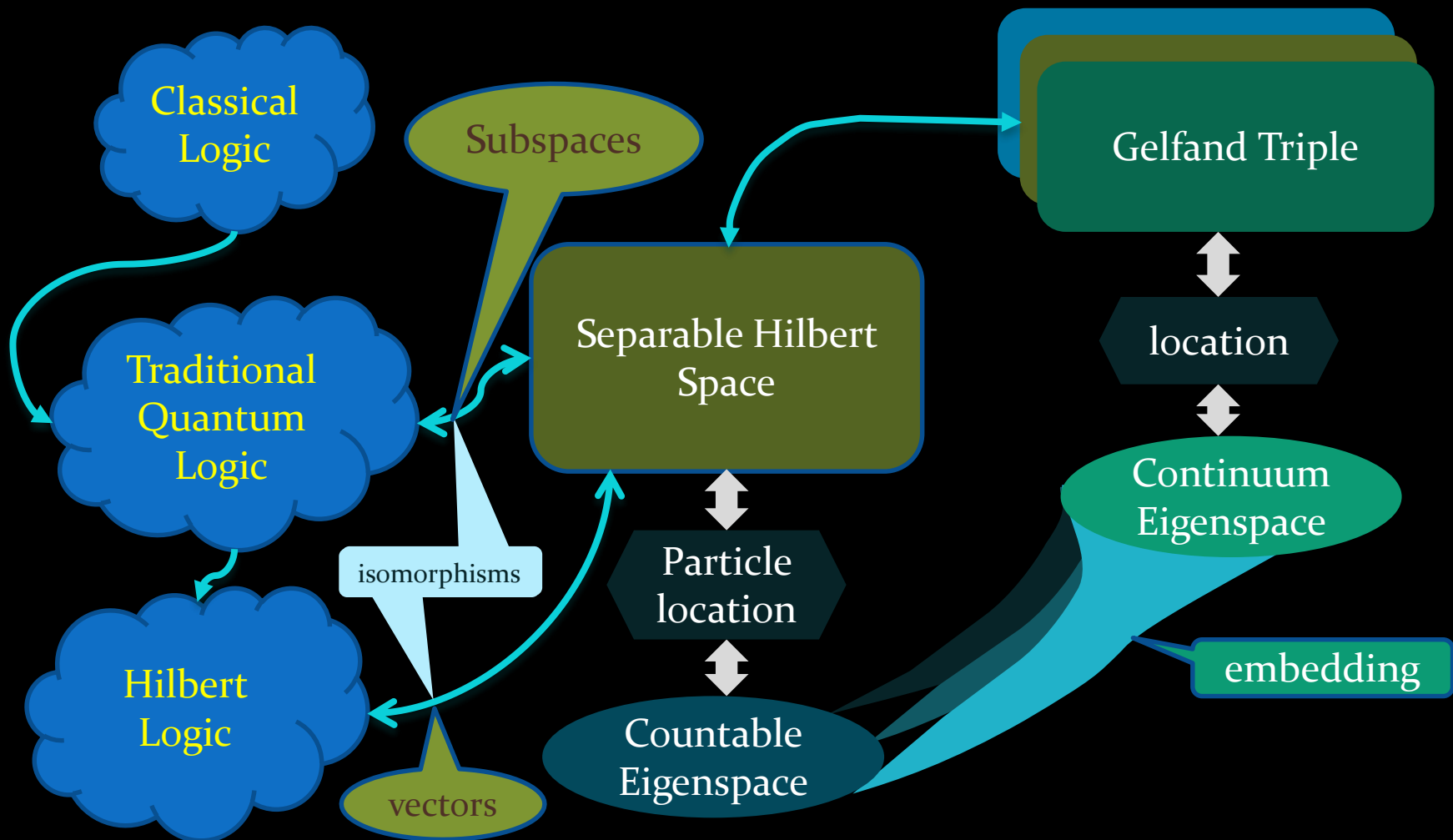


- No full isomorphism
- Cannot represent continuums

Solution:

- Add Gelfand triple
- Refine to Hilbert logic

Static Status Quo of the Universe



Implementing dynamics

The sub-models can only implement
a static status quo

Representation

Quantum logic

Hilbert logic

Hilbert space



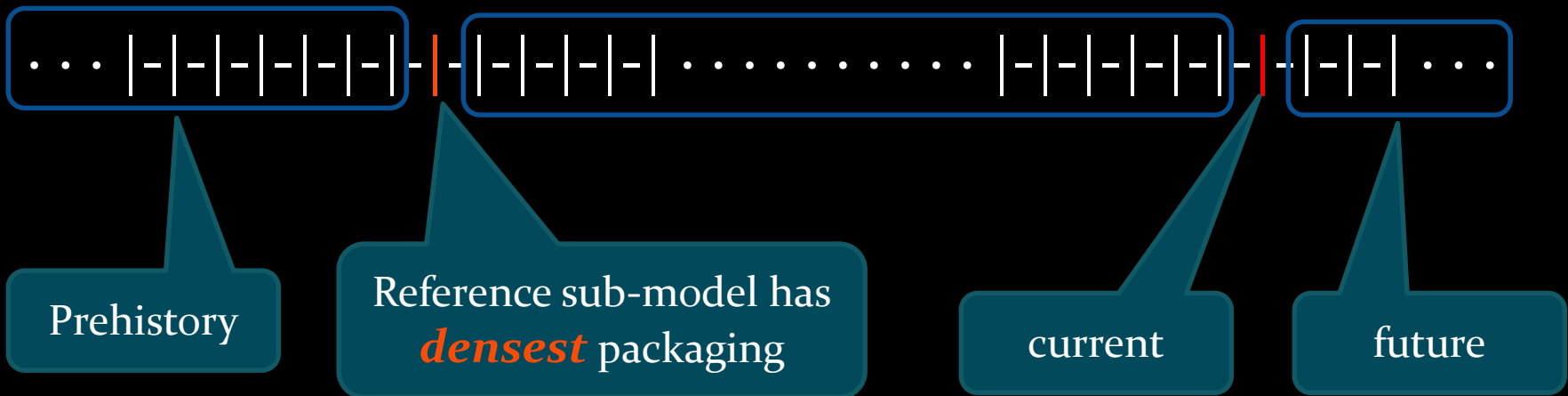
- Cannot represent dynamics
- Can only implement a *static status quo*

Solution:

An ordered sequence of sub-models

The model looks like a book where the sub-models are the pages.

Sequence



Reference Hilbert space delivers via its enumeration operator the “flat” **Rational Quaternionic Enumerators**

Gelfand triple of reference Hilbert space delivers via its enumeration operator the **reference continuum**

HBM has no Big Bang!

The Hilbert book model

- Sequence \Leftrightarrow **book** \Leftrightarrow HBM
- Sub-models \Leftrightarrow sequence members \Leftrightarrow **pages**
- Sequence number \Leftrightarrow **page number**
 \Leftrightarrow progression parameter
- ***Correlation vehicle***
 - must establish **sufficient coherence** between pages
 - Coherence **must not be too stiff**
 - Requires **identification** of atoms / base vectors
 - Implemented by:
 - Enumeration operator
 - Enumeration function

Progression step

- The dynamic model proceeds with universe wide progression steps
- The progression steps have a fixed size
- The progression step size corresponds to an ultra-high frequency (UHF)
- The UHF is the highest frequency that can occur in the HBM

Correlation vehicle

- Must install *sufficient cohesion* between the subsequent sub-models
- Coherence must *not be too stiff*, otherwise no dynamics occurs
- Requires *enumeration*

Correlation vehicle

- Requires ID's for atoms
- ID generator
 - Dedicated enumeration operator
 - Eigenvalues \Rightarrow rational quaternions \Rightarrow enumerators
 - Enumeration function
 - Maps parameter enumerators onto *reference continuum*

RQE = Rational
Quaternionic
Enumerator

Reference continuum

- Select a reference Hilbert space
- Criterion is densest packaging of enumerators^{*}.
- Take its Gelfand triple (rigged “Hilbert space”)
 - Has over-countable number of dimensions/base vectors
 - Has operators with continuum eigenspaces
- Select equivalent of enumeration operator in Hilbert space
- Use its eigenspace as reference continuum

(**Cyclic: Densest with respect to reference continuum*)

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- *Hilbert space & Hilbert logic*
 - Inner product
 - Real
 - Complex
 - Quaternionic
 - Enumerator operator
 - Eigenvalues
 - Rational quaternionic enumerators (RQE's)
 - Enumerates atoms

Enumeration

- *Hilbert space & Hilbert logic*
 - Enumerator operator
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Enumeration

- *Hilbert space & Hilbert logic*
 - Enumerator operator
 - Eigenvalues
 - Rational quaternionic enumerators (RQE's)
- *Model*
 - Enumeration function \mathcal{P}
 - Parameters
 - RQE's
 - Image
 - Qtargets

Enumeration

- *Hilbert space & Hilbert logic*

- Enumerator operator
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- *Model*

- Enumeration function
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 - Image
 - Qtargets

- Function $\mathcal{P} = \wp \circ \mathcal{S}$
 - Blurred \mathcal{P}
 - Sharp \wp
 - Spread function \mathcal{S}
 - Blur ψ

Enumeration

- *Hilbert space & Hilbert logic*
 - **Enumerator operator**
 - Eigenvalues
 - Rational quaternionic enumerators (RQE's)
 - *Model*
 - **Enumeration function**
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Blurred allocation function \mathcal{P}

Convolution

- Function $\mathcal{P} = \wp \circ \mathcal{S}$
 - Blurred \mathcal{P} \Rightarrow Produces QPAD \Rightarrow *Qtarget*
 - Sharp \wp \Rightarrow Produces planned *Qpatch*
 - Spread function \mathcal{S} \Rightarrow Produces *Qpattern* \Rightarrow **Blur**

- QPAD

- Quaternionic
Probability
Amplitude
Distribution



Blurred allocation function \mathcal{P}

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- QPAD ψ
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Probability
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Only exists at
current instance

Blurred allocation function \mathcal{P}

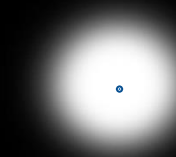
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Curved
space

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- QPAD ψ

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Curved space

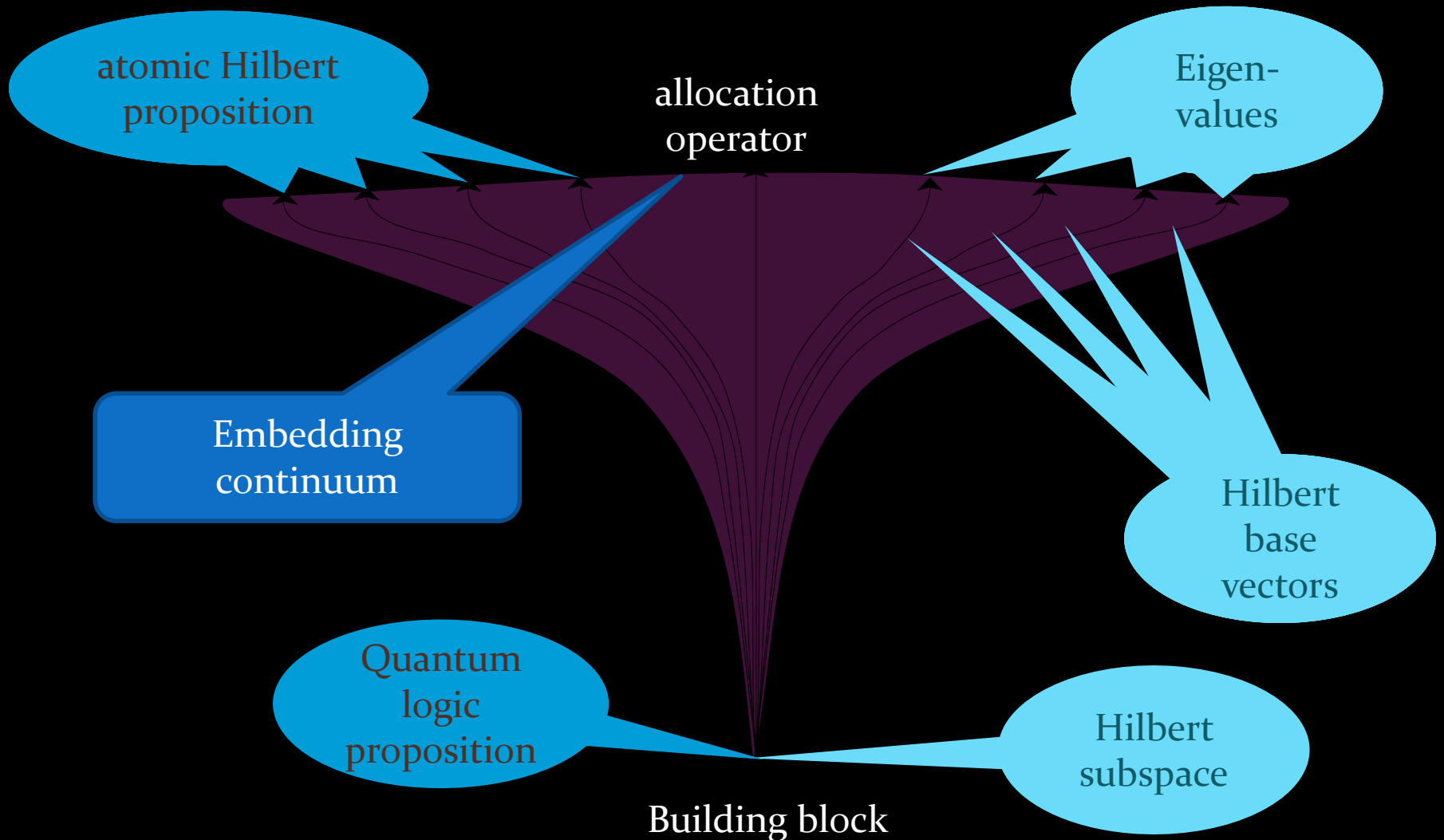
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- QPAD ψ

- Quaternionic Probability Amplitude Distribution

Blur ψ

Building block & allocation



Affine-like configuration space

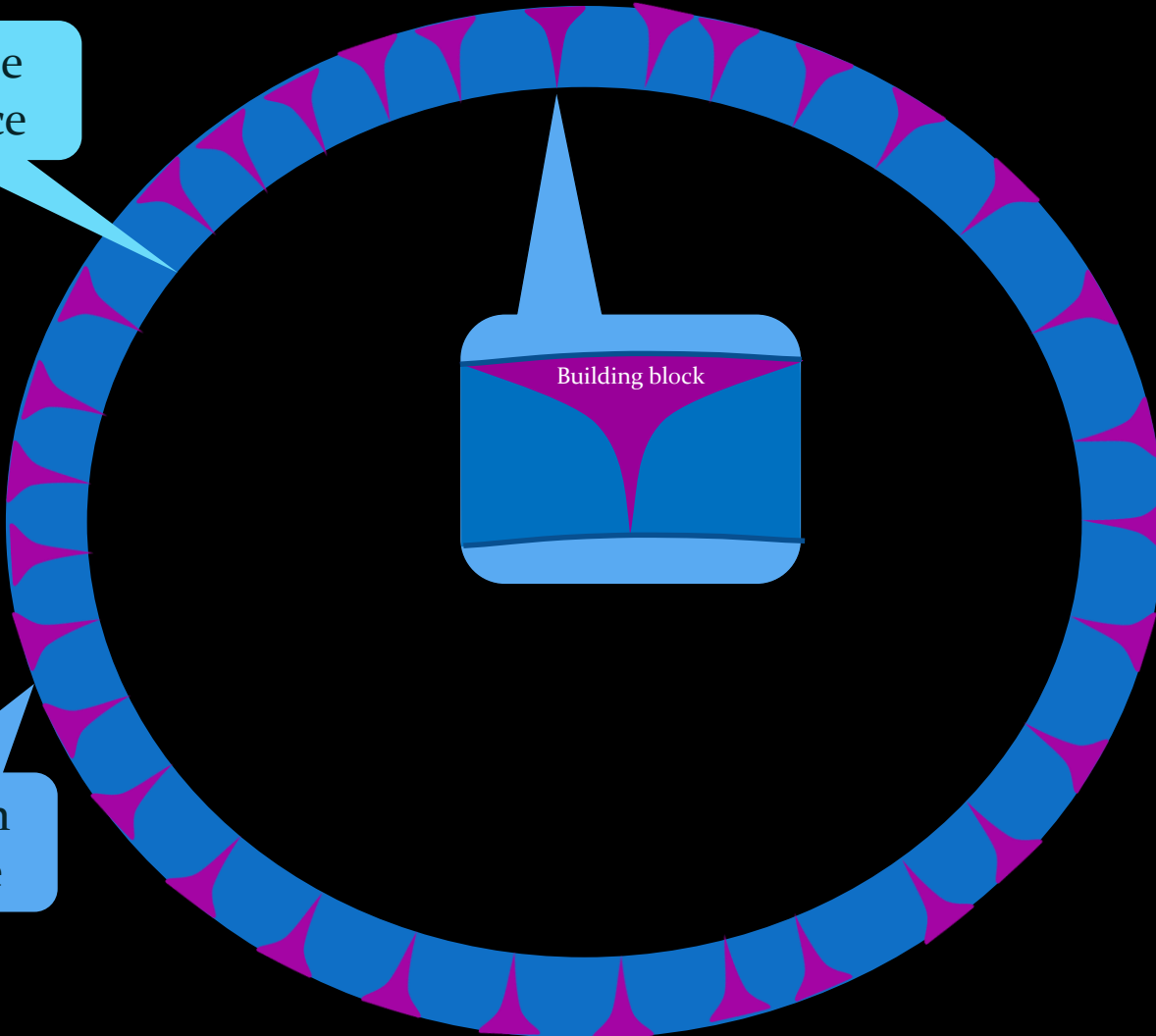
Countable
eigenspace

Unordered
No origin
No preferred
directions

Building block

Continuum
eigenspace

Palestra



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