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 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: $C_{omplexity}(a \cap b)$	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***
  - Contents not important
  - Set is unordered
  - Many sets possible
- ***Base vector***
  - Set is unordered
  - Many sets possible
  - Can be ***eigenvector***
    - Eigenvalue
      - Real
      - Complex
      - Quaternionic
- ***Logic***
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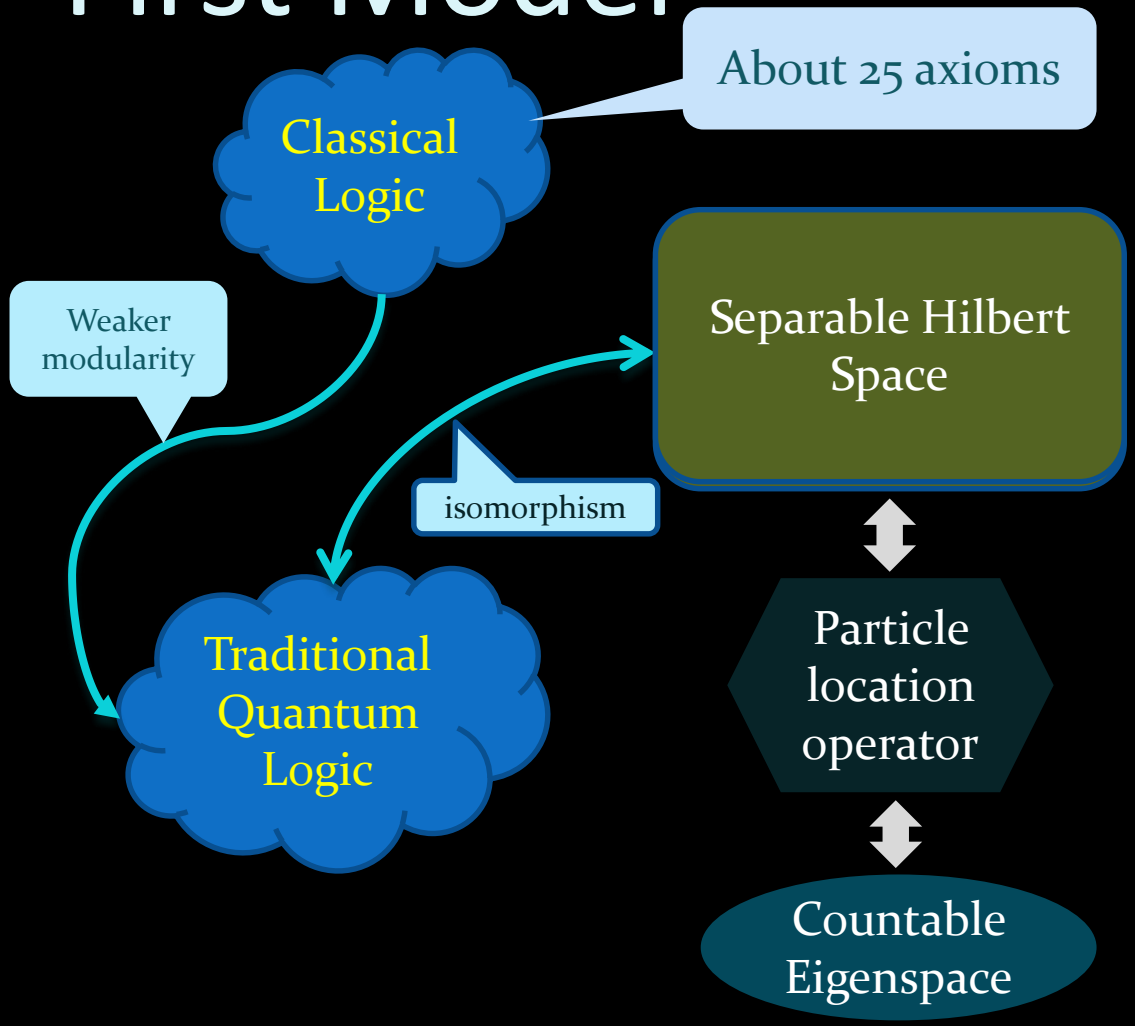
- ***Hilbert space***
  - Inner product
    - Real
    - Complex
    - Quaternionic

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

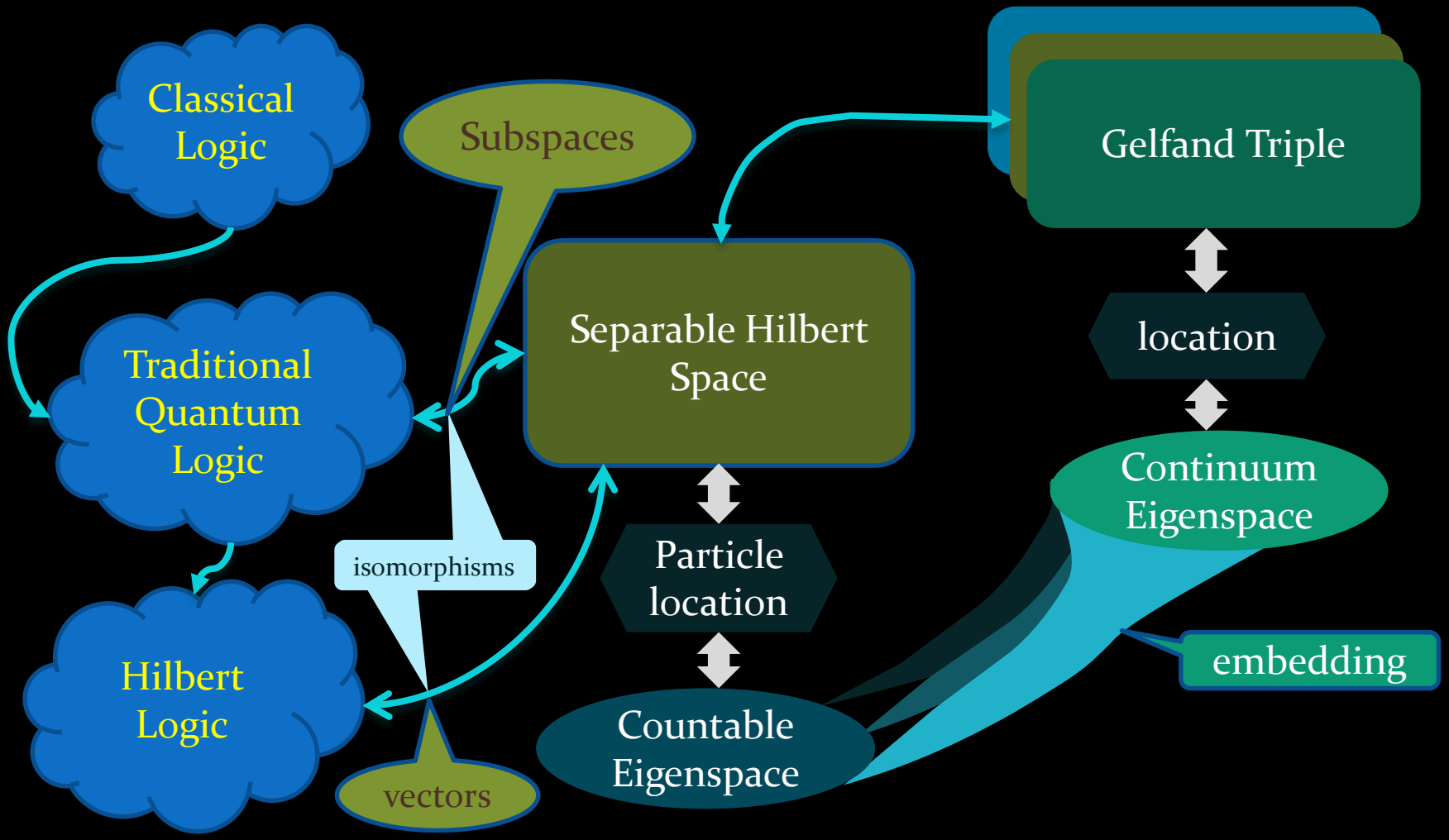
}

- 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

}

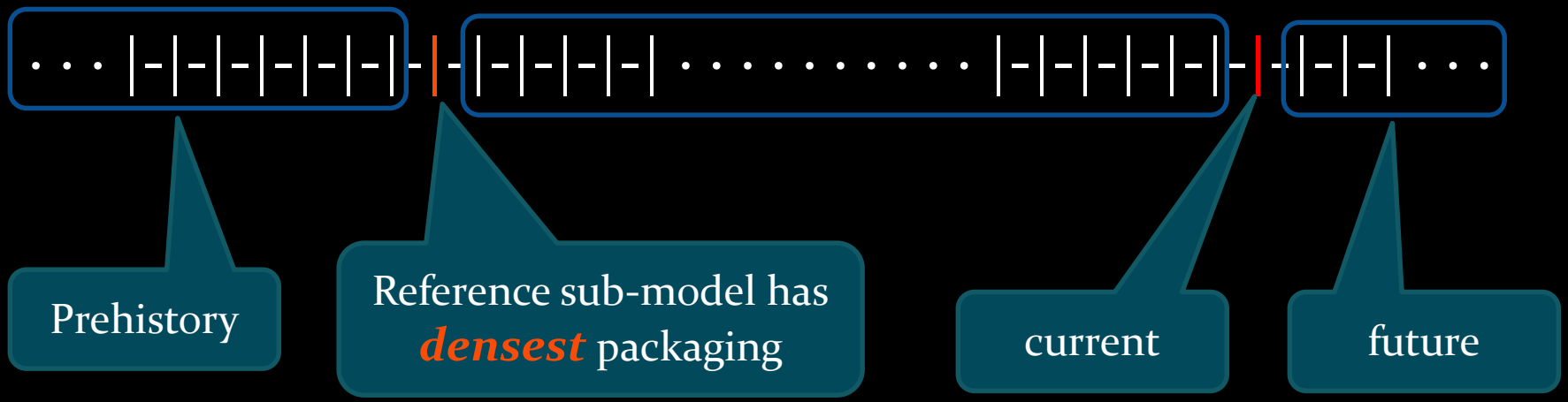
- Cannot represent dynamics
- Can only implement a ***static status quo***

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" **R**ational **Q**uaternionic **E**numerators

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

HBM has no Big Bang!

The Hilbert book model

- Sequence ⇔ book ⇔ HBM
- Sub-models ⇔ sequence members ⇔ pages
- Sequence number ⇔page number
  ⇔ 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 ⇒ rational quaternions ⇒ enumerators
  - Enumeration function
    - Maps parameter enumerators onto ***reference continuum***

RQE = **R**ational
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***
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    - Eigenvalues
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  - ***Model***
    - Enumeration function $\mathcal{P}$
      - Parameters
        - RQE's
      - Image
        - Qtargets

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

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Blurred allocation function $\mathcal{P}$

Convolution

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

- **QPAD**
  - **Q**uaternionic **P**robability **A**mplitude **D**istribution

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Curved space

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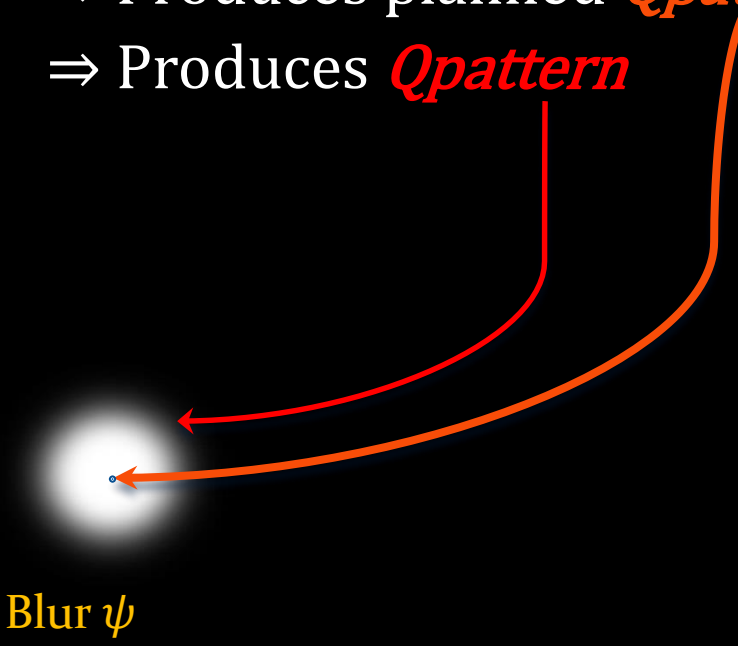
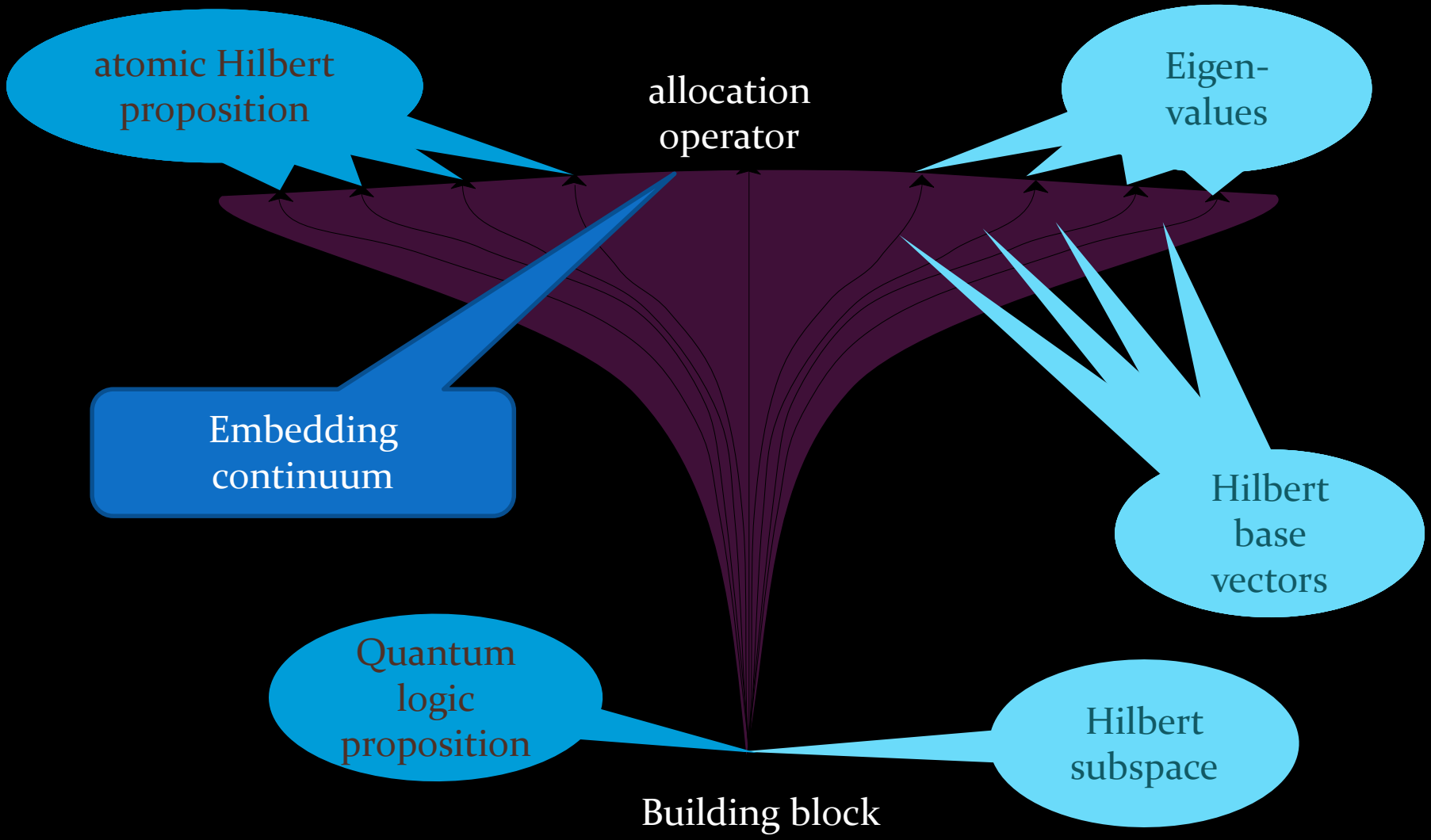
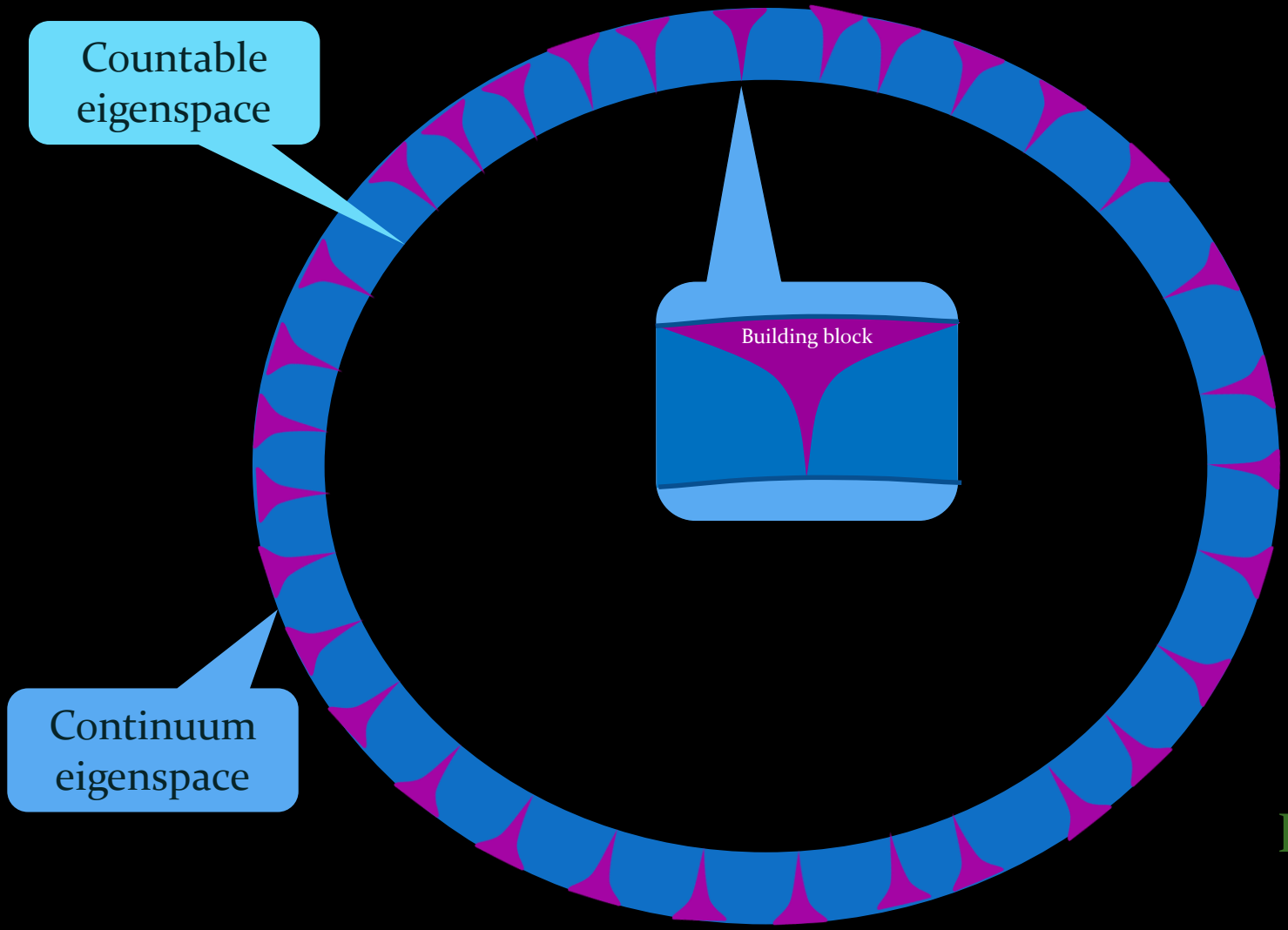


Building block & allocation



Affine-like configuration space



Unordered
No origin
No preferred directions

Palestra

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