

# **Generalised Entanglement - A Nonreductive Option for a Phenomenological Dualist and Ontologically Monist View**

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# Prevailing Mainstream View

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## ■ materialist:

- material entities are the only ones that are relevant
- material entities primary
- building blocks of more complex phenomena

## ■ reductionist:

- complex phenomena explained by lower level theories

## ■ mechanistic:

- only a network of local causes counts as explanation

## ...dictates what we see

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- We cannot see what we are not theoretically equipped to see
- Our basic presuppositions define our world
- Critique of these basic presuppositions

# Example from History: Harvey Discovers the Heartbeat

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gulae & deglutitionis principio, aut aenique in reliquis interioribus gulae partibus ad ventriculum usque, sed nunquam oppositi, sunt. in corde vero & arteriis iidem semper motus sunt, proximi, vicini, remoti, eandem semper harmoniam (benevalente corde) & rhythmum servantes; diastole nimirum, atque systole. In sacco quidem unus; sed non aequè, in principio, medio, & fine, ordinatus; sed velocior in fine; ut motus naturales, fluentium, cadentium, impulsorum-que, sunt. qui nihil ad rem: quandoquidem idem semper in capite, brachio, pede, ac corde, est motus diastoles systoles-que cordis & arteriarum. Sacculi & utris exempla reiecta ante, nunc & cum reliquis faceffant. In aqua ab equo deglutitione, & motum percipi, & aquae sonitum exaudiri, facile admittimus: at in sanguinis à venis in arterias translatione pulsus fieri in pectore, & exaudiri, nec nos quidem percipimus, nec imaginatione assequi possumus, nec etiam assequi nos unquam posse credimus, nisi ab Harveio suum aurium instrumentum acusticum mutuemur. Inprimis iam talem sanguinis translationem non admittimus. Sed esto, in eius gratiam; Ex corde in arteriam magnam, seu in saccum, (ut existimat & tradit,) transmittatur; sic non est ex venis, sed ex corde in arterias transductio. Quod si in pulmonibus, ex eorumdem venis, seu ex venae arterialis ramis & ramulis, in arteria venalis ramulos, peragitur; quomodo percipitur in pectore pulsus? quomodo sonitus? Innocens ego sum ab huius speculationis subtilitate. Adde praeterea, quod Harveio pulsus fit ex immisso à corde sanguine in aortam, seu in saccum & utrem; ut ita ex sanguine sequatur pulsus & (quod ulterius addit) sonitus; quem nos surdastri audire non possumus, nec Venetiis sunt qui audiant. si tantummodo Londini exauditur, faustum, felix, fortunatum esto. nos Venetiis scribimus.

*Contatius 80.*  
Motus itaque cordis & arteriarum non unus, sed quatuor sunt; utriusque duo; non ex impulsu accidenti ex sanguinis fluxu, sed

- When Harvey discovered the heartbeat, Europe was in turmoil
- Parisano: "we cannot hear the heartbeat, and nobody is in Venice, who can"

Parisano, E: **Recentiorum disceptationes de motu cordis, sanguinis et chyli, Leiden: Ioannis Maire, 1647, p. 107:**

In aquæ ab equo deglutione, & motum percipi, & aquæ sonitum exaudiri, facile admittimus: at in sanguinis è venis in arterias traductione pulsus fieri in pectore, & exaudiri, nec nos quidem percipimus, nec imaginatione allequi possumus, nec etiam allequi nos unquam posse credimus, nisi ab Harveio suum aurium instrumentum acusticum mutuemur. Inprimis iam talem sanguinis traductionem non admittimus. Sed esto, in eius gratiam; Ex corde in arteriam magnam, seu in saccum, (ut existimat & tradit,) transmittatur; sic non est ex venis, sed ex corde in arterias traductio. Quod si in pulmonibus, ex eorundem venis, seu ex venæ arterialis ramis & ramulis, in arteriæ venalis ramulos, peragitur; quomodo per sentitur in pectore pulsus? quomodo sonitus? Innocens ego sum ab huius speculationis subtilitate. Adde præterea, quòd Harveio pulsus fit ex immisso à corde sanguine in aortam, seu in saccum & utrem; ut ita ex sanguine sequatur pulsus & (quod ulterius addit) sonitus: quem nos surdissimi audire non possumus, nec Venetiis sunt qui audiant. si tantummodo Londini exauditur, faustum, felix, fortunatum esto. nos Venetiis scribimus.

If a horse swallows water, a sound can be heard; we admit that... but that the transport of the blood... should produce a sound that can be heard, this we do not perceive, nor do we think that it should ever be possible, except Harvey borrows us his hearing aid... how should a pulse be felt in the breast? How a sound?... Harvey says, a beat arises... from the motion of the blood, and (moreover!) a sound: we deaf people cannot hear that, neither can other people in Venice. If they can in London, they are utterly lucky. But we are writing in Venice.

# We Need a New Theoretical Model

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- that allows and accounts for
  - holism
  - non-mechanistic order
  - a non-reductionist view of mind and consciousness
- Weak Quantum Theory that predicts
- Generalised Entanglement

Atmanspacher, Römer & Walach (2002)  
Complementarity and entanglement in physics  
and beyond. *Foundations of Physics*, 32:  
379-406.

# Proposal of a New Model

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- "Entanglement" as known from Quantum Mechanics (QM) proper
- Extrapolated as a basic, complementary mode of relatedness
- In addition to causal-linear interactions
- Consequence of a Generalized version of QM, published as "Weak Quantum Theory"
- **Non-local interaction**
- Not "left-over" quantum correlations

# Weak Quantum Theory (WQT)

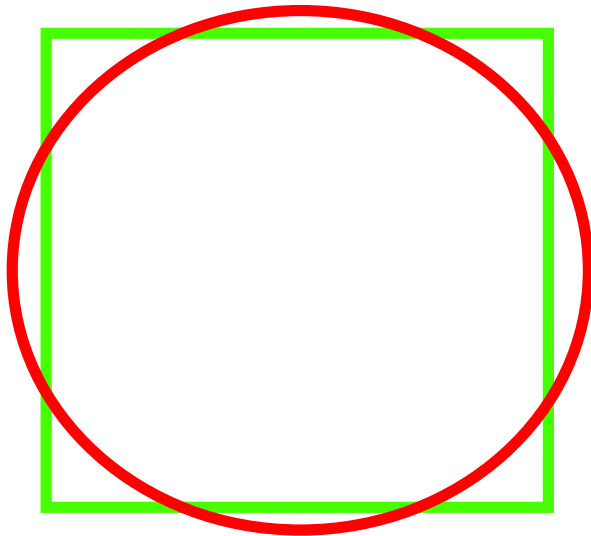
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- Algebraic treatment of systems in general
- Modelled according to QM proper
- Dropping of restrictions characteristic for QM treatment (e.g. Planck's constant)
- Algebra takes account of non-commuting observables
  - predicts entanglement in macroscopic systems
    - regardless of make-up
    - size
    - ontology
  - not identical with quantum correlations



# Complementarity

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Two descriptions

for **one** and the same object or  
situation

that are **maximally incompatible**,

yet need to be **applied conjointly**  
for a full understanding

# Complementarity

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- Well defined in QM
  - Loosely defined in WQT and real world
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- location \* momentum
  - time \* energy
  - individual \* community
  - structure \* freedom
  - form \* content
  - love \* justice

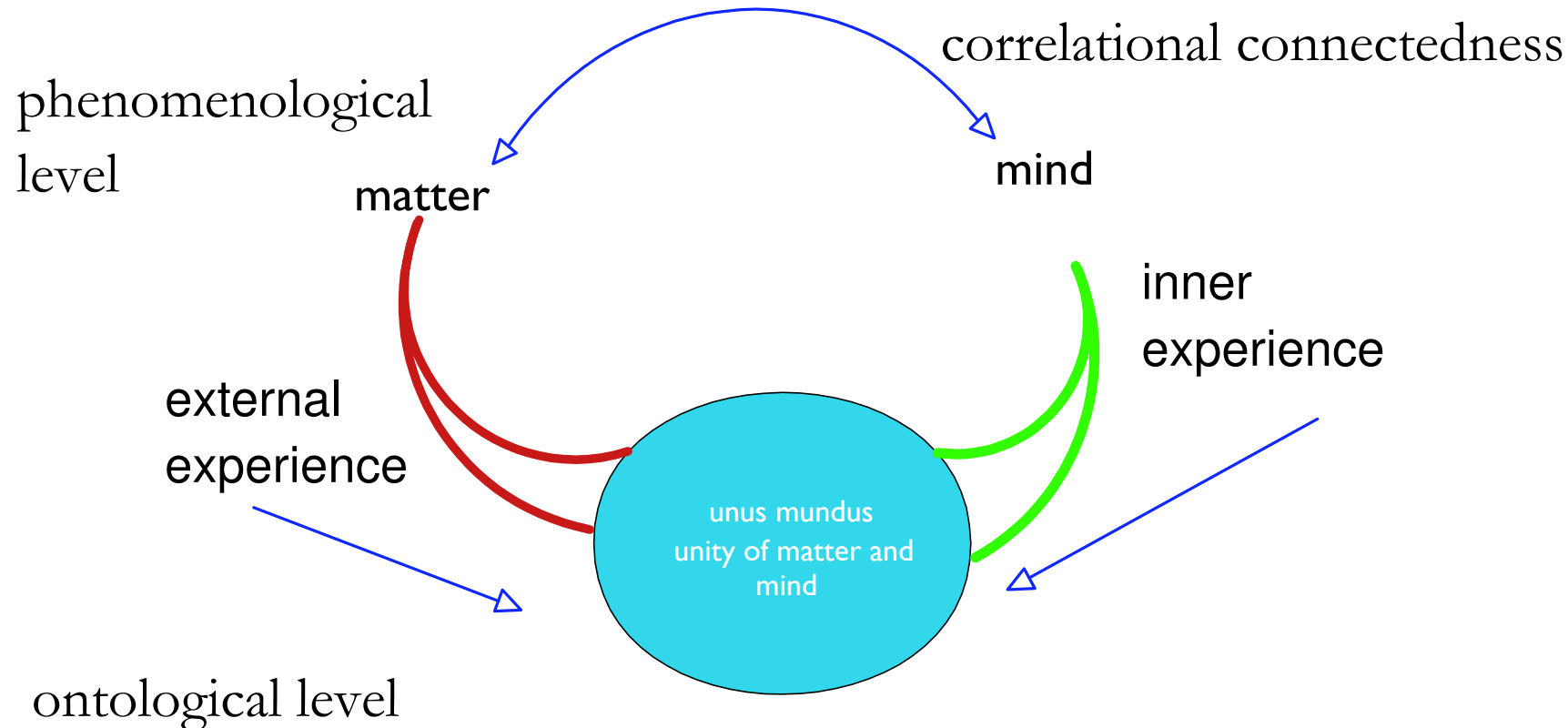


# Complementarity of Mind and Body

Walach & Römer (2000) Neuroendocrin Letters 21: 221

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- Examples: Spinoza, Leibniz, C.G. Jung



## Leibniz

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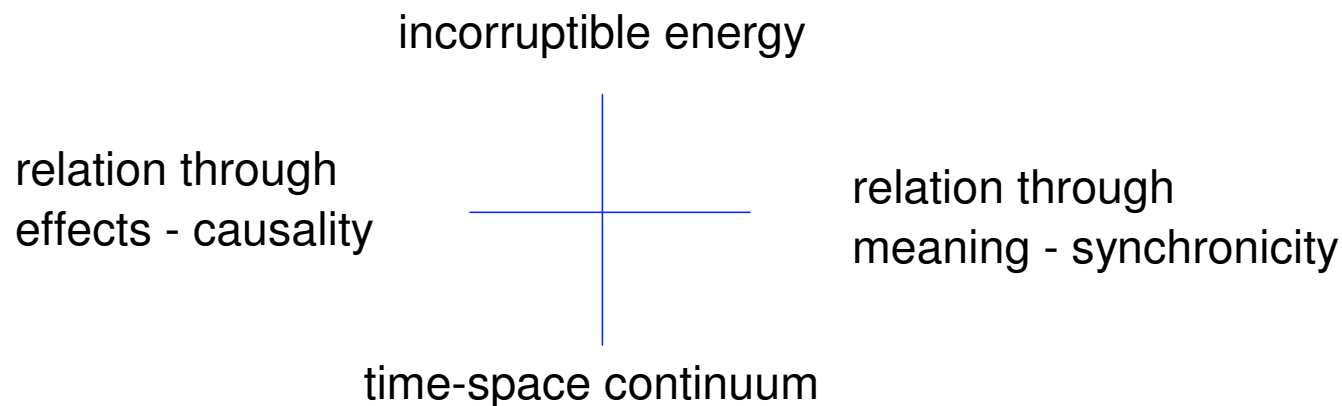
Souls follow their own laws,..., while bodies follow theirs, namely the rules of motion. Nevertheless, these two entities of completely different kind meet and are coordinated like two clocks, which have been perfectly set in the same way, although they may be of totally different making. It is exactly this which I call preestablished harmony.

Betrachtungen über die Lebensprinzipien und die plastischen Naturen, *Collect Works*, p. 65f.

# Predecessors: Jung & Pauli

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- Correspondence from 1930 to 1958
- Synchronicity
  - form of relatedness through meaning
  - a-causal

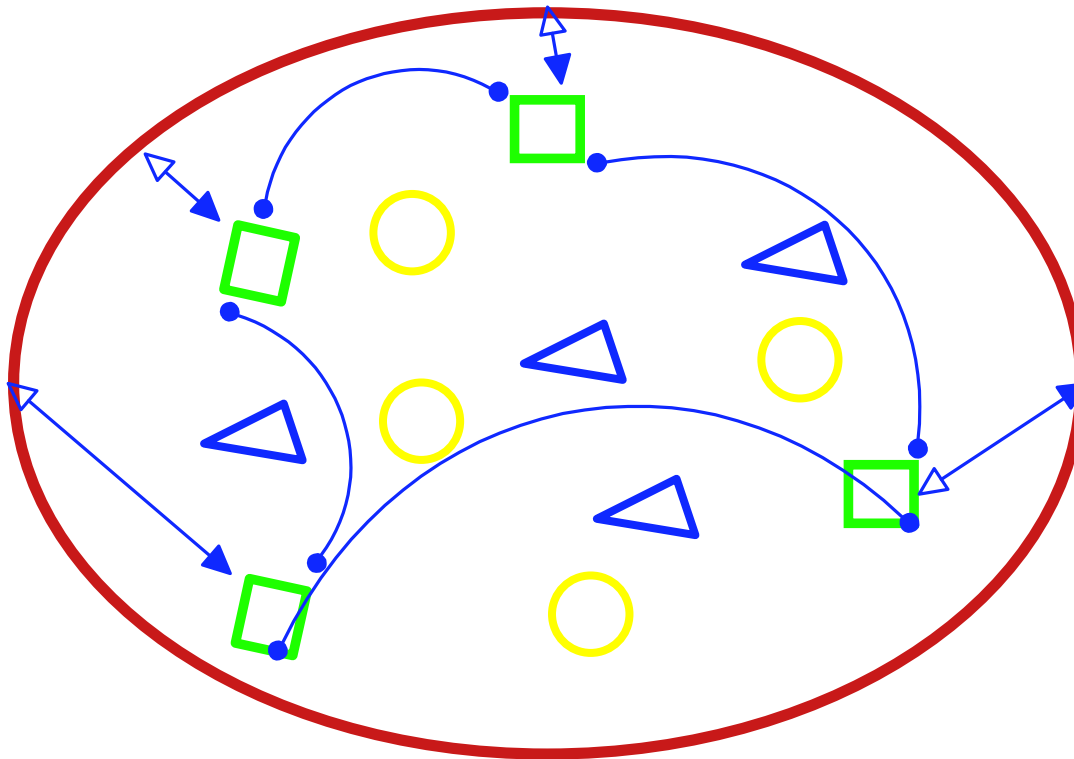


Jung in a letter to Pauli, 30/11/1950

Meier, AC (ed) Jung-Pauli Briefe, Springer, 1992, p 64

# Entanglement

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Complementarity

between

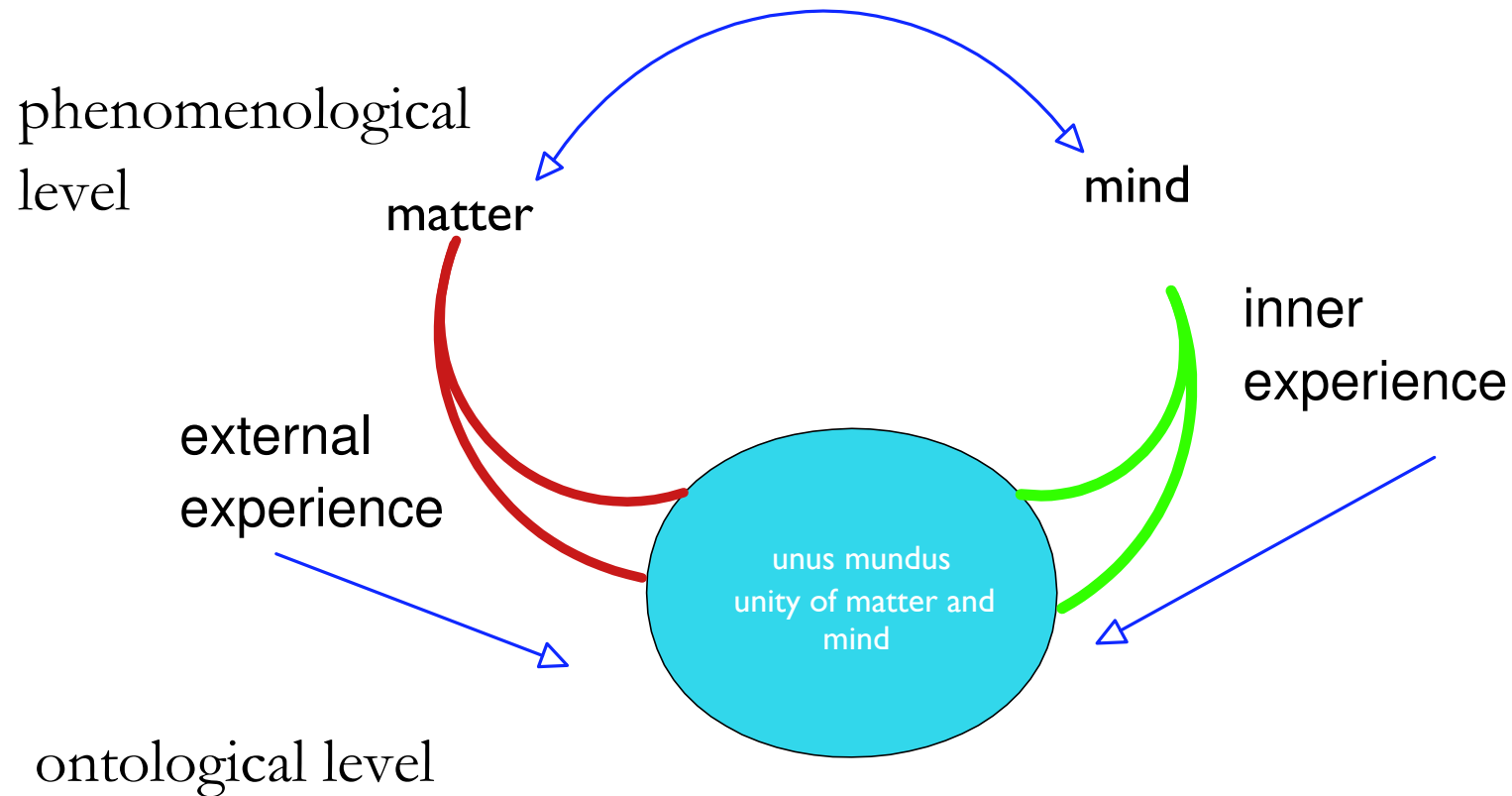
global and

local

observables

# Generalised Entanglement as a Coordinating Mechanism

correlational connectedness  
via Generalised Entanglement



# Distinction between Mental and Physical Systems

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- Step 1:
- Generic symmetry breaking - split between the distinction of mental and physical systems, as broken time-reversal symmetry
  - Atmanspacher (2003) Biosystems 8:19;
- Result: two distinct descriptions of the same reality emerge





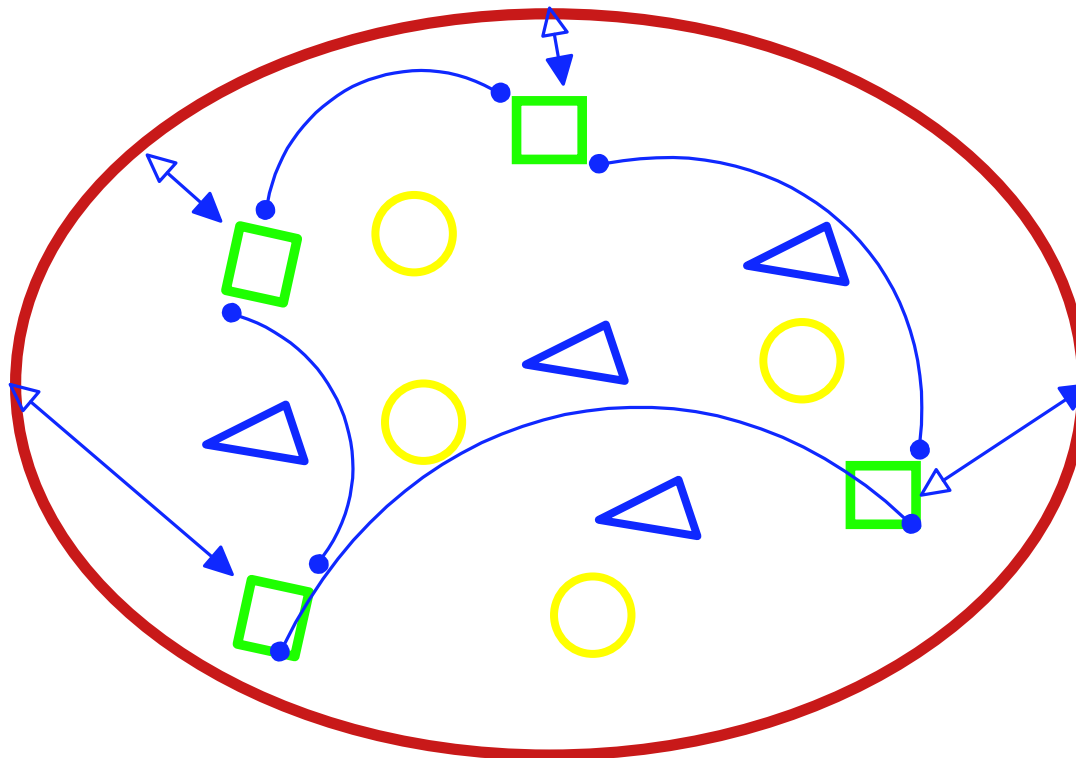
# Non-local Coordination of Systems by Generalised Entanglement

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- Step 2: Each system governed by generalised entanglement correlations as a non-locally correlated system
  - causal descriptions secondary and derivative

# Non-local Coordination of Systems by Generalised Entanglement: physical

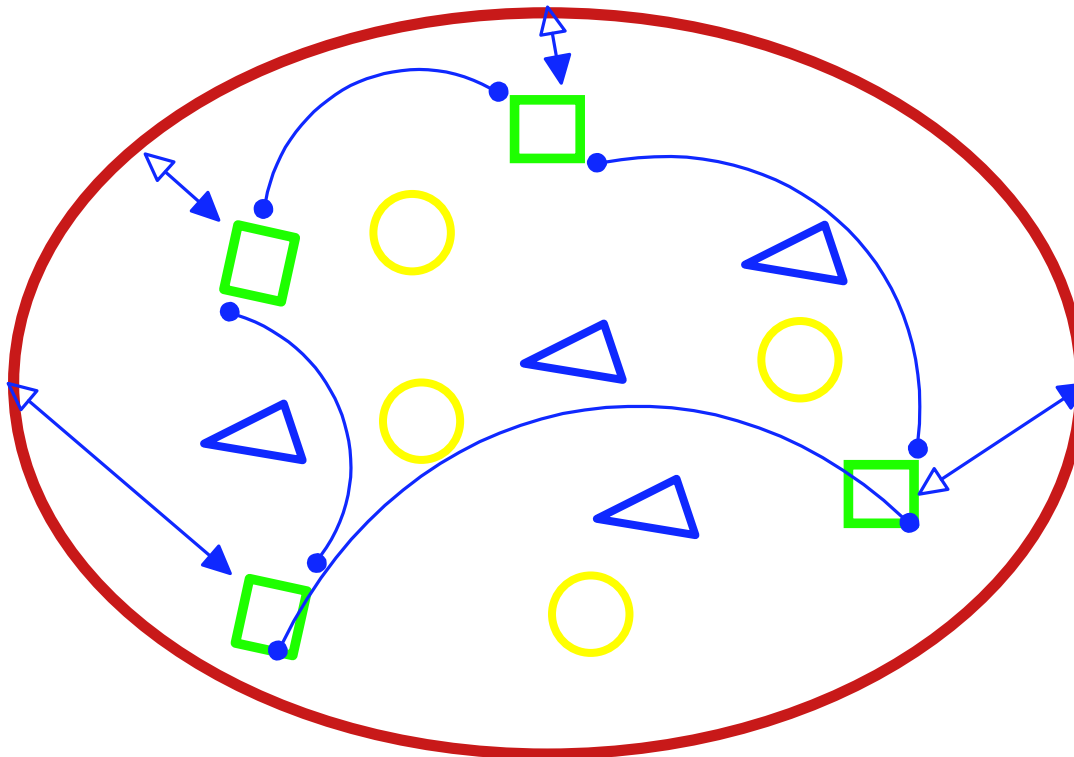
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Complementarity  
between  
**process** (global)  
and  
**structure** (local)  
or  
**individual**  
and  
**connectedness:**  
Physiological  
coordination

# Non-local Coordination of Systems by Generalised Entanglement: mental

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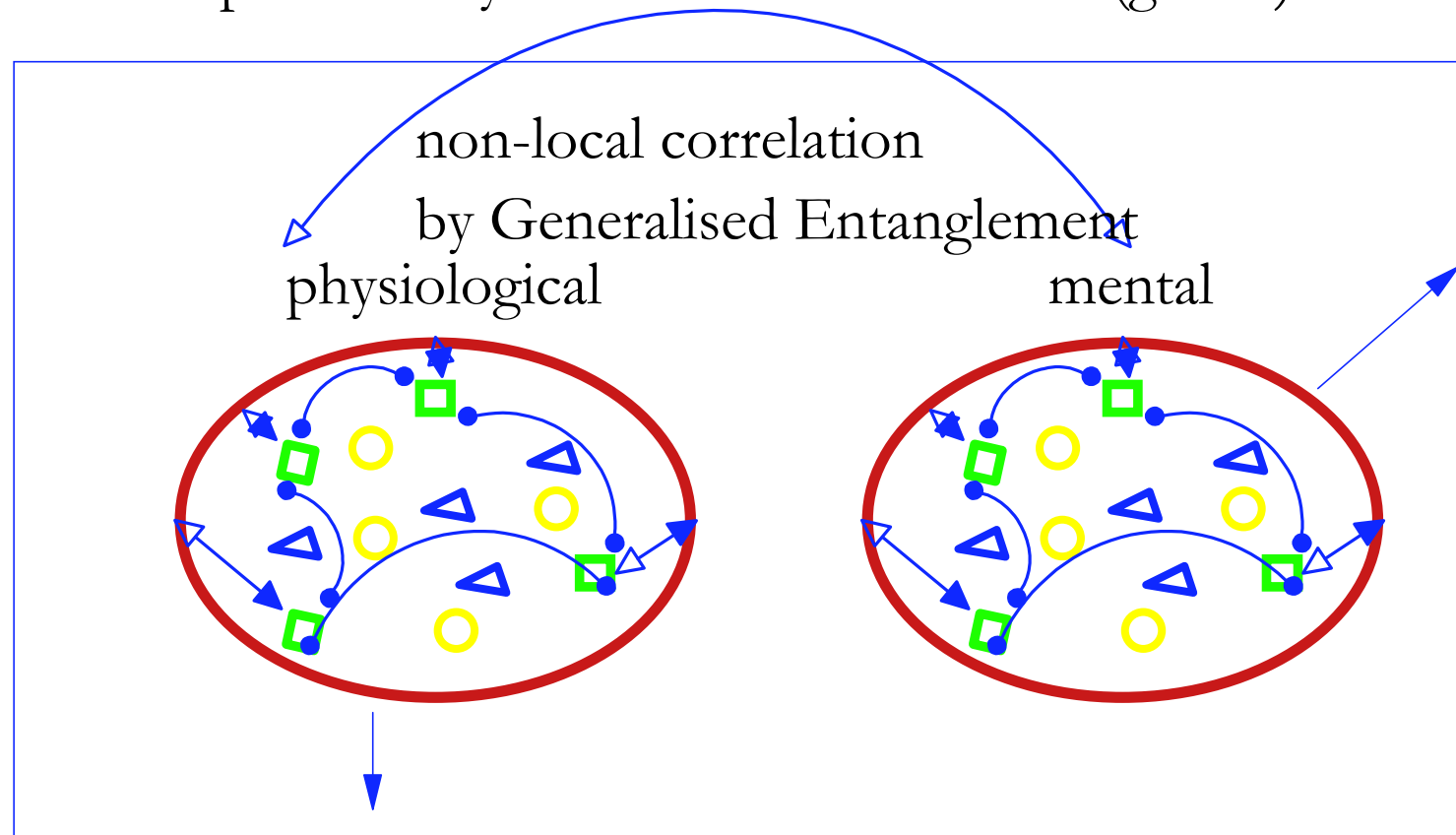


Complementarity  
between  
**process** (global)  
and  
**structure** (local)  
or  
**individual**  
and  
**connectedness**:  
Mental  
coordination

# Generalised Entanglement as a Coordination of the Physical and Mental System - 2: Mental

## Individual Person

complementarity between connectedness (global) and individual (local)  
observables



# Spirituality: Connection between Individuals and the Whole

