Emergence -
A process-ontological approach

Talk at PhenCoco, August, 23rd, 2025

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An overview of this talk:

1. The origin

1.1   The beginning of everything: pure logical and physical possibility, not reality

1.2   Primary, minimal difference as the 'starting point' for structural development

1.3   The term 'pandynamis' as the name for a 'tendency toward reality' in the sense of a fixed but evolving structure

1.4   Nomological openness

2. Structural stratification

2.1   The concept of the ontological layer: mutually compatible bundles of types of objects, processes, and states

2.2   The concept of internal differentiation (in German: 'Binnendifferenzierung')

2.3   Determinism as a level-specific restriction, not as an absolute set of rules

2.4   Downward compatibility of all layers, upward freedom for further internal differentiation

2.5   A possible stratification: (1) proto-physical, (2) quantum mechanical, (3) chemical/mechanical, (4) biochemical/biological, (5) symbolic/abstract

2.5   The upward transition problem from one layer to the next

3. The internal worlds of each level of emergence

3.1   What characterizes a type of object and process?

3.2   What is new at each level of emergence: its internal structure of conditions and thus both its qualities, i.e., its stock of possible states, and its information content

3.3   The different manifestations of energy, time, and space at different levels of emergence: materiality, forms of energy, uniqueness of states, separation of entities, spatial and temporal continuity, difference between latency and instance.

3.4   Is artificial intelligence an indication of the emergence of a new level of emergence?

A new model
demands new concepts:

The core concepts of a cosmological model based on emergence assumes the structural openness of the cosmos. From this arises the meaning of the term 'emergence'.

These concepts are:

Essential terms of the emergence model developed here:

1. (Relatively encapsulated **entities**:) **fields**, **objects**, and **systems** (as functional object populations), and furthermore all state changes at these entities and individual processes between the entities.

2. The **structure of conditions** (instead of laws of nature)

3. The **layering of levels** of existence or emergence

4. The **typification** of the emergent layers

5. Different **spaces of possibilities**
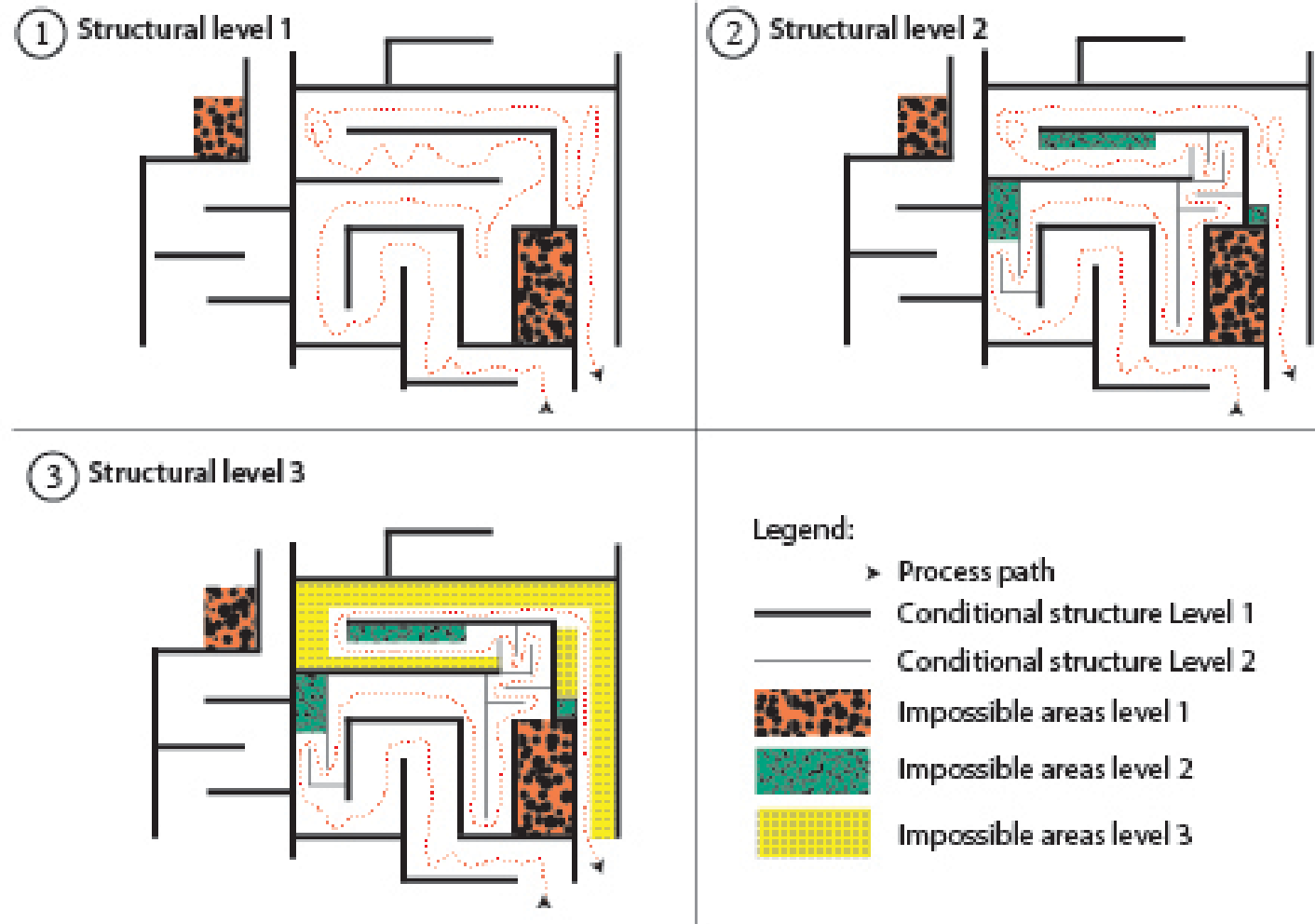
Example 1 of a conditional structure:

A widely known German board game as an example of an evolving structure of conditions

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Phase 1   Phase 2   Phase 3

Phase 4   Phase 5 ⟶   Phase x (today) ⤑   Phase y (future)
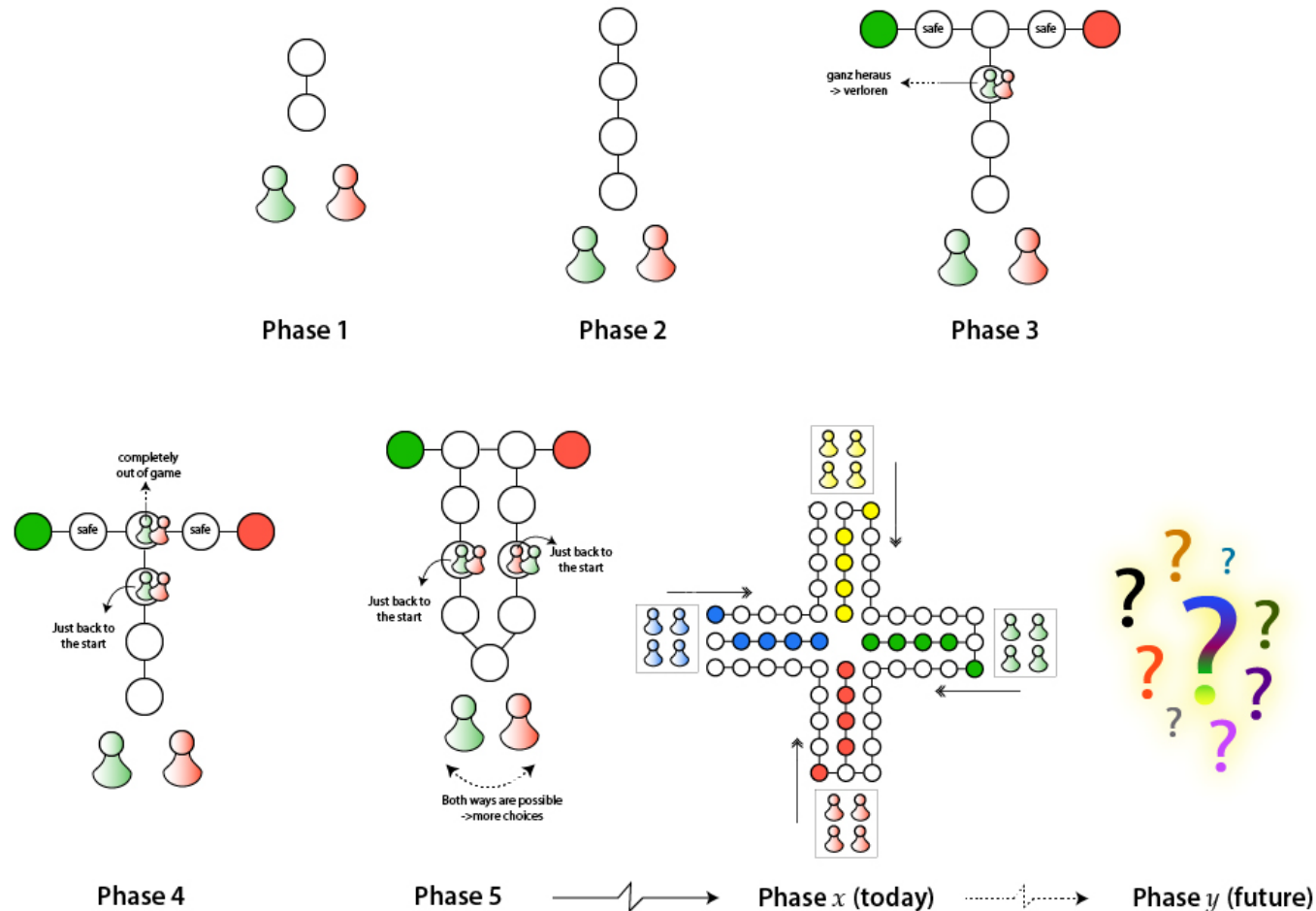
Example 2 of a conditional structure:

Structural development using the example of a labyrinth

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The typification of layer elements:

Each emergent level is constituted by a variety of **entity, state, and process types** (for entities: as fields, objects, and systems).
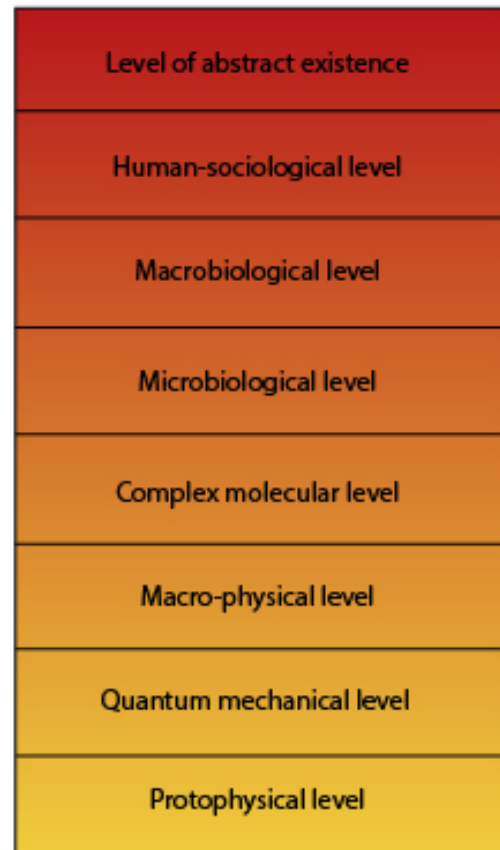
Stabilization of emergent levels requires the elicitation of **compatible** entity, state, and process **types**. A stable **possibility space** is formed within the variance space.

(More on the concept of possibility space in a moment).
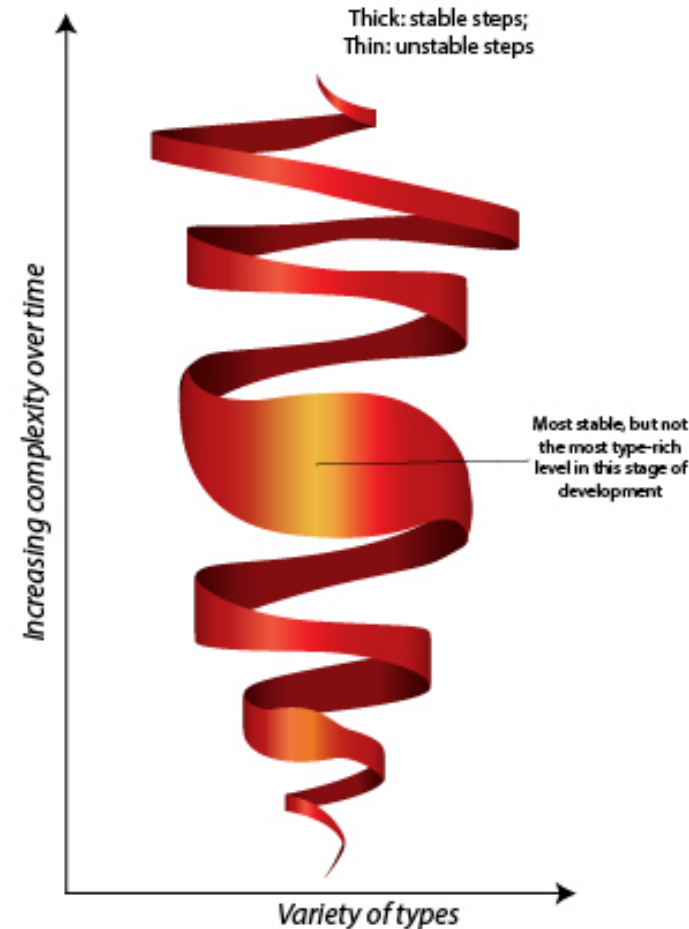
How are the levels of emergence related:

Two models of transition between emergent levels

Too rigid: Simple tier layering

| Level of abstract existence |
| Human-sociological level |
| Macrobiological level |
| Microbiological level |
| Complex molecular level |
| Macro-physical level |
| Quantum mechanical level |
| Protophysical level |

(no variety of types, no transitions)

Better: The spiral of development

Thick: stable steps;
Thin: unstable steps

Most stable, but not
the most type-rich
level in this stage of
development

Increasing complexity over time

Variety of types

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The level-stacked chain of events:

(Example:) Stepping on another person's foot: Chronologically stacked individual events: downwards through finer control of the process conditions and upwards through effect-typological transformation.