

# VPR: Vortex–Pattern–Resonance

*A Conceptual and Mathematical Model of Reality through Entropy, Form and Interaction*

"God does not play dice with the universe"

Einstein

## Introduction:

### A Model of Forms, Levels, and Entropy

This text presents a conceptual and mathematical model of reality, based on the idea that every stable structure in the Universe can be considered a *form* — a dynamic configuration of energy and information, subject to both local and global entropic laws. Reality is described through a hierarchical organization of levels, in which forms acquire new properties and interact differently depending on their complexity and context.

Within this model, the following components are examined:

- **Levels of forms** — from fundamental oscillations (Level 1) to intelligent observers (Level 5)
- **The role of entropy** — both as a driver of transformation and as a criterion for stability
- **Gravity and space-time** — not only as physical quantities, but as expressions of compatibility and structural coherence
- **The observer** — as an active participant in the arrangement of reality
- **Mathematical framework** — a new approach to energy via the concept of informational energy, and a generalization of the relationship between mass, frequency, space, and time
- **Hypotheses beyond the observable** — including black holes, dark energy, and possible inter-level transitions
- **Mind and evolution** — as tools for local control of entropy

The model proposes a unifying logical framework that combines established scientific principles with new interpretations, applicable in both cosmology and the philosophy of physics. The derived formulas and relationships are based on empirical observations and known dependencies, but add an additional layer of meaning related to stability, information, and observation.

The model remains open to critique, further development, and interpretation.

# Fundamental Principles:

## A Logical Model of the Universe Unified by Entropy

This text presents a logical model of the Universe based on the principle of entropy as a universal force, present at all levels of reality — from the most fundamental quantum interactions to massive cosmic structures. The model offers an abstract yet internally consistent logical structure, aimed at facilitating the understanding of reality through hierarchically organized *forms*.

This structure does not claim to provide a literal description of physical stratification; rather, it serves as a framework for analysis — a conceptual tool. The levels of forms (quantum haze, particles, matter, life, consciousness, etc.) are not separated in time or space — they coexist simultaneously within observable reality.

The hierarchy is introduced logically — as a means of understanding how information, energy, and interactions are organized within the "Universe" system. The division into layers serves analytical clarity but does not imply that reality is linear or reductive.

At the center of the model lies entropy — a universal process and principle that connects all levels. It provides direction, dynamics, and interdependence among forms, explaining both the structural stability and the transformation of systems.

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## Logic as a Tool

Every attempt to explain the Universe — including science itself — relies on logical structures and models through which the human mind processes and analyzes complex interactions. Numbers, equations, measurements, and concepts in modern physics are also models of reality — not reality itself.

The model we propose here employs a hierarchical logical organization of *forms*, arranged by degrees of complexity and their involvement in entropic processes. These levels are not actual “layers” that exist separately in time or space, but rather simultaneously present aspects of the Universe, analytically distinguished so we can trace the dependencies between them.

## Key Concepts

### Entropy

Entropy is a universal indicator of the likelihood that a form will transform, decay, or transition into another state. In our model, it is the primary driving mechanism — a kind of “fuel” for change and organization.

Here, entropy is not viewed solely as chaos, but as a source of motion, transformation, and the evolution of forms. It functions as a connecting mechanism across all levels of reality, as well as a measure of a structure’s instability over time.

- **High entropy** — dynamism, instability, short duration
- **Low entropy** — stability, persistence, longevity

Important: Local entropy may decrease, but on a global scale, entropy always increases.

In this model, entropy is understood as both a quantitative and qualitative measure of the distribution of energy, structure, information, and potential for action within a given system.

We distinguish two primary types:

- **Local entropy** — characterizes the state of a particular level: degree of order, organizational potential, and internal dynamics. Over time, local entropy tends to increase.
  - **Global entropy** — reflects the overall entropic condition of the entire system of levels, including their interconnections. Global entropy always increases, but this growth is offset by the expansion of space.
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## Entropy Gradient

A difference in entropy between various levels or regions of space. This gradient “drives” forms — they tend to move toward zones of lower local entropy.

Comparable to a temperature gradient, but expressed in logical and spatial dimensions.

## Form

A form is a stable and distinguishable state of matter or energy that has a boundary relative to its environment and is subject to observation or interaction. Forms are the fundamental units of reality in our model. They can migrate, transform, disintegrate, or even connect across different levels.

Forms arise when energy becomes sufficiently organized to maintain a temporarily stable structure.

**Examples:** elementary particle, atom, cell, organism, planet, thought.

Forms represent stable patterns of organization of energy and information, regardless of scale. They are composed of simpler forms and exist in constant interaction. Each form is the result of a local reduction in entropy, but its existence is made possible by the global increase in entropy.

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## Self-Organization of Forms

The property of forms to restore or increase internal order without external intervention. This is characteristic of more complex forms with high informational density and access to energy.

Self-organization is an indicator of intelligence at a given level or of potential for evolution toward a higher level.

## Level of Organization (Level)

Levels are logical “tiers” in the structure of reality. They are not defined by the type of forms they contain, but by the laws under which those forms exist.

Each level is a self-contained system with its own specific local entropy, organizational mode, and potential for interaction. Levels can be interpreted both as scales (physical, biological, social) and as degrees of complexity.

Lower levels contain simpler but more stable forms (e.g., particles), while higher levels contain less stable but more information-rich forms (e.g., galaxies, civilizations).

These levels are not a spatial hierarchy, but a logical differentiation based on entropic processes.

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## The Higgs Module

The Higgs module is a fundamental physical field at the core of the mechanism through which elementary particles acquire mass. It defines the range of interaction with the Higgs field — a scalar quantum field that permeates every point in space and possesses a non-zero vacuum value. This non-zero value causes spontaneous breaking of electroweak symmetry and provides inertial mass to particles via their coupling to the field.

Within this model, the Higgs module is viewed as a boundary:

- **Below it**, particles are not yet “activated” by the mass mechanism;
  - **Above it**, they exhibit stable mass properties.
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### Core characteristics:

- **Interaction with the Higgs field:** the module defines the strength with which particles couple to the field and thereby acquire mass.
- **Linked to electroweak symmetry breaking:** this symmetry breaking is key to the separation of forces and the emergence of mass in the Standard Model of particles.
- **Determines the mass of elementary particles:** without this field, particles would be massless — like photons.
- **A key element in hierarchical models:** mass marks the transition from a potential state to a stable one, defining structure and form in systems.
- **Defines the form of reality:** in the sense that mass is a fundamental property shaping the physical existence and dimensions of everything we know.

## A Deeper Perspective

The Higgs module can be seen as a fundamental “switch” or “key” in the architecture of the cosmos — it defines the conditions under which energy and field *stably give rise to* the matter we observe. This threshold marks the boundary between *pure energy* and material reality with specific physical properties.

Small variations in the parameters of the Higgs field — its vacuum value or the strength of interaction — would lead to significant changes in the values of nature’s fundamental constants.

Such changes would redefine the masses of elementary particles and, consequently, the structure and behavior of matter throughout the cosmos.

This means that even minimal differences in the Higgs module could give rise to entirely different physical realities — with different laws, constants, and possibilities for the existence of forms and processes.

Thus, the Higgs module is not merely a physical boundary within the Standard Model, but a critical parameter that determines the course of cosmic evolution and conditions the uniqueness of our reality.

## Boundary Between Levels

The boundaries between levels are not strictly defined. They manifest as transitional states in which local entropy exceeds a certain threshold and creates the conditions for the emergence of a higher or lower level.

Such boundaries are associated with qualitative transitions — for example, from chaos to structure, or vice versa.

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## Information

Information is the distinguishability between possible states of a form that acquires meaning in the context of interaction. It is not a “thing” in itself, but a relation between forms from which the possibility for response arises.

The more possible states a form can assume, the more information it carries — but only in the context of another observer or form capable of perceiving it.

Information is the capacity for recognition and response. It is the meaning of the form’s existence, because it makes interactions possible.

In this model, information has a dual nature:

- **Content** – what the form is
- **Potential** – what the form can become

Low entropy is associated with high informational density — clarity, order, and the potential for transfer and understanding.

## Information as Organized Entropy

Information is a form of order that arises and develops within an environment of increasing entropy. In this model, it serves as an intermediary between energy and form — a manifestation of organized change or a “memory of motion.”

Information:

- is preserved through structure;
- is transmitted through interaction;

- is transformed through observation.

The more structured a form is, the greater the amount of information it contains and the less susceptible it is to entropic decay.

## Space

In this model, space is not merely a geometric dimension but a functional environment in which various forms exist and interact.

It is dynamic — capable of expanding in response to increasing entropy, thus playing a compensatory and stabilizing role within the system.

Space is not neutral — it actively participates in the entropic process (e.g., through emergence, expansion, distortion, fluctuations).

## Spatial Resonance

An interaction between forms occurs when their local entropic configurations coincide or complement each other. This phenomenon can explain gravitational synchrony — for example, Lagrangian points, precessions, and others.

## Spatial Resonance and Entropic Mass

Spatial resonance is an interaction phenomenon between forms where their local entropic configurations match or complement one another. This selective compatibility leads to stable binding and synchronization, which can be considered a basis for phenomena of selective gravity. In this context, the concept of *entropic mass* is introduced — a characteristic of a form that describes its orderliness and informational content, influencing the manner in which gravitational and other interactions occur.

Spatial resonance can explain numerous observed cosmic and physical phenomena, including:

- **Lagrangian points** — stable positions within orbital systems where interactions result in balanced dynamics;
- **Precessions** — slow changes in the orientation of rotating bodies under the influence of external fields;
- Other forms of gravitational synchrony and coordination of motion in space.

## Time

Time reflects the degree of change within forms. It is derivative of entropy — it exists only insofar as change occurs.

Without transformation, there is no time.

In our model, time is not an independent quantity but a logical consequence of change. It follows the entropic direction — from less probable to more probable states, from lower to higher entropy. Each form experiences time differently — according to its energy potential, informational content, and position within the spatial structure.

## Observer

The observer is not merely a being but a structurally organized focus through which various levels of reality are validated and sustained. Each observer “fixes” their own reality — but that reality depends on the level at which the observer exists. This explains the possibility of multiple, simultaneously coexisting realities.

Observation is not a passive act but an active influence that affects forms and directs flows of

information. Through observation, feedback is introduced that alters the system.

The observer is a function of its form, and reality is a projection of the interaction that this form permits. In the model, an observer is any system capable of distinguishing forms and responding to them — this includes both conscious beings and physical systems that “interact.”

Examples:

- An electron “sensing” an electric field
- A human observing a star

Each observer fixes its own “cutout” of reality, aligned with its place in the logical structure of forms. The observer’s level is dynamic — it is not fixed once and for all but is attained and developed.

### **The Rational Observer and the Expansion of Reality**

The rational form is the only type of observer capable of changing its level — transitioning from a local reality to a global one, from passive observation to active structuring.

If humanity ventures into space, our reality will expand to the extent that the "local" will encompass star systems, and the "global" will include nebulae, gravitational interactions between galaxies, dark matter, and other yet unarticulated phenomena.

Thus, our subjective horizon of reality will shift, along with our perceptions of space, time, force, motion, and purpose.

Within our model, the rational form of life is a unique class of observers who not only perceive reality at a given level but have the capacity to alter their own systemic level of interaction with the Universe. This is not merely a result of technological progress but a fundamental characteristic of evolving consciousness — which, through the accumulation of information, structuring of knowledge, and adaptive behavior, moves its horizon of reality.

## **Hierarchical Model of Structuring**

In the presented model, reality is viewed as a system of sequentially emergent logical levels, each representing a higher degree of organization, stability, and information processing. Although these levels have arisen over time, they coexist in parallel — as different layers of the same Universe.

### **Each level:**

- originates from the previous one,
- contains and builds upon it,
- introduces new rules for ordering and interaction.

The higher level does not abolish the lower one but incorporates it into a new logic of existence. Thus, reality acquires a multilayered structure — not as floors, but as mutually nested orders of organization.

### **Common Foundation — Entropy as the Driving Force**

At the base of the hierarchy lies entropy — the tendency of every closed system toward disorder. However, in our model, entropy is not simply decay but a dynamic background from which forms emerge:

- In the quantum field — it generates fluctuations.
- In matter — it drives processes of transformation and stabilization.
- In living systems — it sustains exchange and adaptation.
- In consciousness — it manifests as a striving for order, meaning, and orientation.
- In the cosmos — it governs the evolution of stars, galaxies, and structures.

**The forms encountered at each level are local resistances to entropy — temporary structures of order and stability emerging against the backdrop of overall chaos.**

**What does “higher level” mean?**

- Greater internal organization
- More information encapsulated and managed
- Finer feedback mechanisms
- Increased capacity for adaptation and regulation

**Structural Stability of Levels**

- Levels do not merge. Each new level emerges based on the previous ones but does not replace them.
- A level is not the form itself. It is the environment in which forms can arise — a “terrain,” not a “building.”
- Levels do not disappear. Once emerged, each level remains a permanent presence in reality.
- Forms decay, not levels. If a given structure loses stability, it disintegrates within the level — it does not “revert” backward.
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**Asymmetry in Movement Between Levels**

**Upward Movement:**

- Requires organization, energy, information, and sometimes intelligence
- Is an evolutionary process — creation of order within chaos

**Downward Movement:**

- Is not a “return” but decay
- Loss of structure, not a transition to something simpler
- The form vanishes — the level remains

**Example:**

- A city that disintegrates does not become a village — it simply ceases to function as a city
- Consciousness that loses its structure does not become “simpler” — it disappears

**Principles of Transition Between Levels****Transition to a Higher Level is Possible When:**

- Local entropy decreases,
- New order is introduced,
- Complex information processing takes place,
- A mechanism of self-regulation is activated.

**Downward Transition Does Not Mean “Going Back” — It Is Form Decay, Not a Return to a Previous Level.**

**Spatial and Temporal Unfolding**

Levels do not exist in isolation. They unfold within space and time, which they themselves transform:

**Spatial Nesting:**

- Cells → within organisms
- Organisms → within social environments
- Social environments → within geographic and planetary contexts
- All of this → within the Universe

Space is hierarchically filled — each level has its own internal order but also fits into the geometry of the lower and higher levels.

**Temporal Dynamics:**

- Cellular activity — measured in seconds
- Individual life — measured in decades
- Cultural transformation — measured in centuries
- Cosmic processes — measured in billions of years

Each level has its own “temporal frequency” — a characteristic rhythm of change, causality, and prediction.

## Time, Entropy, and Order

With time, entropy increases, but:

### Levels develop mechanisms for resilience:

- Feedback loops
- Self-organization
- Energy and information exchange

Space also participates — it expands, accommodates, buffers, and redirects influences between different layers of reality.

## Internal Logic of a Level

“A level is defined not by the types of forms it contains, but by the law according to which they exist.”

Each level is a dynamic order — a self-sustaining network of interactions governed by its own logic and laws. These laws determine:

- How forms arise
- How they stabilize
- How information is exchanged
- How low local entropy is maintained

The higher the level, the more complex this internal organization becomes — but also the more vulnerable it is to entropic disturbances.

## Energy, Entropy, and Stability of Forms

In our model, each level of the hierarchy contains forms whose existence and stability depend on specific interactions. We introduce the concept of **entropic mass**, composed of:

- physical mass (arising from the Higgs field and interactions),
- and informational complexity — the degree of order, feedback, and information-processing capability.

Forms with higher entropic mass require more intensive or more refined energetic interactions to maintain their stability and function.

At each level, there is a specific correspondence between:

- the energy of interaction,
- local entropy,
- and the entropic mass of the forms.

This principle allows us to trace how each level manages order through various mechanisms — from nuclear forces to symbiotic relationships in living organisms.

*“The energy resource required to maintain a form is proportional to its entropic mass — the sum of its physical presence and informational complexity.”*

### **Emergence of Higher-Level Forms**

In our model, forms are not merely assemblies of elements but organized configurations possessing novel properties that arise from interactions among their components. This phenomenon is known as *emergence* — a qualitative leap whereby the whole transcends the sum of its parts.

## **1. Formation Pathway – Dynamic Balance Between Order and Chaos**

A form emerges when a specific configuration of interactions among units at a given level:

- resists entropic pressure,
- maintains structural stability,
- and carries out interaction with the surrounding environment.

### **Illustrative Chain of Formation:**

- From a stellar nebula → a star is formed
- From a star → a system with a planet in the “habitable zone” arises → suitable climate → biosphere
- From the biosphere → ecosystems develop → complex life → intelligence

Each newly formed structure creates the conditions for the subsequent step in the organization of reality.

## **2. Stability as a Criterion for Emergence**

Not every combination leads to a new form. For a configuration to transition to a higher level, it must satisfy the following conditions:

- recycle energy,
- maintain internal regulation,
- possess the ability to adapt to changing external conditions.

A form is a local reduction of entropy, temporarily “held” through structure and interactions.

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## **3. Overlay and Embedding – Hierarchical Resonance**

Once emerged, a form:

- becomes embedded in a higher level,

- becomes part of a larger structure,
- and participates in creating a new organizational logic.

### **Examples:**

- A star system is part of a galaxy
- A cell is part of an organism
- An individual is part of a society

This gives rise to hierarchical resonance:

- The higher level regulates and envelops the lower
- The lower level supports the foundation for the higher level's existence

This bidirectional flow of influence shapes a network of interdependencies — a fundamental mechanism for resilience, evolution, and stability within the multilayered structure of reality.

## **Principle of Structural Unidirectionality**

Our model assumes that the development of forms follows a unidirectional path governed by entropy. That is:

when a structure breaks down, it does not revert to its previous state — it simply ceases to exist as a form.

If entropy at a given level rises excessively:

- Forms do not revert back into their basic elements (e.g., cells).
- They simply collapse — losing information, interaction, and organization.
- Chaos results, not regression.

### **Analogy:**

“A city does not turn back into bricks — it simply collapses.”

## **What does “form” mean in our model?**

Let us recall:

- A “form” is not merely a physical object, but an organization of elements sustained by low entropy — i.e., information, structure, and interaction.
- The higher the level, the more complex, yet more vulnerable to entropy, are the forms within it.

### **Consequence:**

If our level is, for example, “human civilization” or “consciousness” — and entropy destroys this

order — there is no return to “cells.”

There is loss of knowledge, structural collapse, and destabilization of forms.

### **Why is “returning to cells” impossible?**

- Cellular organization also requires conditions for stability.
- If a higher level (e.g., a conscious form) collapses, this does not create conditions for a lower stable level.
- **Entropy is not a creative force. It:**
  - Does not reverse.
  - Does not build.
  - Only destroys.

## **Fundamental Interactions Through the Logic of Levels**

Our model views reality as an organization of nested, interconnected levels, where each level emerges from the previous one through structuring, order, and locally reduced entropy.

Fundamental interactions are not merely physical forces — in this context, they are the logical “rules of the game” that allow a certain type of organization to arise and maintain stability.

### **Gravity — Organizer of Spatial Hierarchy**

At the highest levels (cosmic, galactic, planetary), gravity determines geometry and dynamics — creating stable objects and systems such as galaxies, stars, and planets.

Logical function: Gravity defines the “framework” within which lower levels can emerge. It creates local minima in the entropy landscape — “nests” for organized matter and ultimately — for life.

It does not build content but provides a stable stage where other interactions can build complexity.

### **Electromagnetic Interaction – Builder of Form**

At the molecular and atomic levels, it forms bonds, structures, and shapes, and underpins chemistry, biology, and technology.

Logical function: Electromagnetism enables the formation of stable and diverse bonds, a necessary condition for the emergence of functions, memory, communication, and information processing.

This interaction is critical for the appearance of boundaries, forms, and interfaces between levels — for example, the cell membrane, nerve signals, or electronic circuits.

### **⚙ Strong Nuclear Interaction – Blacksmith of Matter’s Boundaries**

It maintains the stability of atomic nuclei and forms the foundation for the very existence of “building blocks.”

Logical function: The strong interaction defines the fundamental “letters” of construction — stable elements of matter, from which more complex structures are built at higher levels.

It determines the limits of what can exist in a universe like ours — providing the basic periodic table from which “life is written.”

## **Weak Nuclear Interaction – Mechanism of Transformation**

Associated with particle decay, transformation, stellar evolution, and the cyclic renewal of structure.

Logical function: It is the “engine” of change at the micro-level — introducing dynamics and transience. It allows irreversible processes that drive reality forward (including aging, evolution, nuclear reactions).

Without it, systems would be overly “locked” in stability — it is necessary to enable the path from chaos to order and back again.

## **Conclusion**

In our model, fundamental interactions are not merely forces but logical prerequisites for the existence, maintenance, and transformation of levels.

They do not compete but collaboratively sustain the architecture of reality, each activated according to the needs of the corresponding level.

When we consider evolution — whether of the Universe, life, or consciousness — we observe a process of applying and balancing these logical operators.

# **Definition of Logical Levels Used**

## **Level 0: Quantum Fog**

### **Description:**

The primordial, indeterminate state of potentiality. Here, there is no space, no time, no particles, no forms. This is the field of maximum symmetry and zero structure. No constant is manifested, no interaction is separated from the others. It can also be viewed as the background super-information from which measurable reality emerges.

### **Forms:**

No concrete forms exist. Only possibilities and probabilities, not yet “unpacked” into reality.

### **Entropy:**

Paradoxically — maximal symmetry but minimal information for the observer → entropy is zero from the perspective of forms but maximal from the perspective of potentiality.

**Entropy Mass:**

At this level, entropy mass cannot be meaningfully defined due to the absence of forms. Potentiality is total but unstructured. Global entropy is maximal; local entropy is nonexistent. Every future form will draw from this boundless “fundamental energy of possibility.”

**Interactions:**

None. Everything exists in a unified, undivided state.

**Dynamics:**

The transition from Level 0 to Level 1 can be interpreted as a symmetry breaking that gives rise to time, space, and mass. This is the “primordial leap” from potential to reality.

**The Higgs Field – NOT a Level, but a MECHANISM / MODULE**

- It is a mechanism that defines what will be “slowed down” and gain mass, how forms will emerge within a given dimension.
- It can be considered the first differentiating factor in the projection from Level 0 into a specific reality (ours).
- An analogy can be made with DNA, but for the forms of our reality/dimension.
- It defines the global constants.
- It provides “access” to:
  - mass
  - time
  - stability
  - the possibility for organization into form

**Level 1: Quantum Field / Projection of Reality****Description:**

At this level, quantum fields emerge as the foundational substrate of reality, from which particles and fundamental interactions arise. Conditions for space, time, and causality begin to emerge. Particles are not yet stable—they exist primarily as quantum fluctuations. Processes are dynamic, non-local, and governed by probabilistic distributions.

**Forms:**

- Quantum fluctuations
- Vacuum particle-antiparticle pairs
- Wave functions (states of indeterminacy)
- Elementary particles (some acquiring mass via the Higgs mechanism)

**Entropy:**

Low in terms of manifest structure, yet extremely high in terms of potential states. This level marks the initial appearance of temporal directionality—not yet as decay, but as *constructive potential* for future organization.

### **Entropic Mass:**

The fluctuations and emergent particles at this level exhibit minimal entropic mass—primarily threshold-based. Their informational structure is limited, yet their stability already requires continuous energetic support. This initiates the relationship between energy and entropic persistence.

*Note:* Entropic mass here is not inertial mass but a **logical measure of the structural resilience** of emergent forms within a chaotic quantum background.

### **Interactions:**

- Gravity (possibly emerging earliest)
- Strong nuclear interaction
- Weak nuclear interaction
- Electromagnetism

All interactions are mediated by their corresponding quantum fields and gauge bosons.

### **Dynamics:**

Particles and proto-structures begin to stabilize through interactions with fields, including the Higgs field. Initial boundaries and tendencies toward organization emerge. This is the domain of the **birth of form as possibility**.

## **Level 2: Atomic Layer**

### **Description:**

As the universe cools and elementary particles stabilize, they combine to form protons, neutrons, and electrons. This marks the onset of the atomic era. Here, the periodic table emerges, enabling the foundation of chemistry, light, and stable matter-based structures.

### **Forms:**

- Atomic nuclei (protons and neutrons)
- Electron shells
- Chemical elements
- Ions

### **Entropy:**

Moderate — there is a balance between structural stability and combinatorial diversity. The informational content of the universe increases dramatically at this level.

### **Entropic Mass:**

Forms at this stage exhibit higher entropic mass, as they combine physical structure with relative stability and recurrence. The maintenance of atomic organization requires input from both nuclear and electromagnetic interactions. This level demonstrates the first clear correlation between **structural order and sustained energy input**.

### **Interactions:**

- Strong nuclear force (binds protons and neutrons into nuclei)
- Electromagnetic force (binds electrons to nuclei)
- Weak nuclear force (involved in decay processes)

**Dynamics:**

Atoms are not static entities—they vibrate, emit spectra, absorb and release energy. Under extreme conditions (e.g., in stars or explosive events), elements can transmute. This level initiates **transformation through energetic interaction.**

## **Level 3: Molecular Level**

**Description:**

At this level, atoms combine through chemical bonds to form molecules – the foundational units of matter, chemistry, and life. Complexity emerges, along with functionally relevant structures and molecular systems that interact dynamically.

**Forms:**

- Chemical compounds
- Molecules (organic and inorganic)
- Crystalline and amorphous lattices
- Polymers
- Simple biomolecules (amino acids, sugars, etc.)

**Entropy:**

Systemic complexity increases, and overall entropy grows. However, local entropy can decrease through self-organization – a key process in the transition toward biology.

**Entropic Mass:**

Molecules introduce higher informational density, even though their physical mass remains relatively small. Entropic mass increases primarily due to growing functional complexity. The energy required to maintain structural stability and reactivity rises, especially in self-regulating or autocatalytic systems.

**Interactions:**

- Covalent, ionic, and hydrogen bonds
- van der Waals forces
- Molecular collisions and photon interactions
- Catalysis and autocatalytic processes

**Dynamics:**

Molecules undergo reactions, change configurations, and interact with their environment and with light. This is the level of chemical evolution – a stepping stone toward biological organization.

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## **Level 4: Cosmic Level**

**Description:**

At this level, matter organizes into large-scale astronomical structures – stars, planets, galaxies. This is the emergence of the macroscopic architecture of the Universe and the interactions among gravitational systems. The level encompasses stellar evolution, planet and exoplanet formation, and the creation of conditions suitable for life.

**Forms:**

- Stars and stellar systems
- Planets, moons, asteroids
- Galaxies, clusters, superclusters
- Black holes, neutron stars

**Entropy:**

Extremely high. The Universe continues to expand and cool, but gravity locally counteracts this trend, forming “islands” of low entropy – environments where structure and life can emerge.

**Entropic Mass:**

The structures at this level (e.g., stars, planets, galaxies) possess enormous physical mass but relatively low informational complexity. Entropic mass here is determined primarily by gravitational organization. The energy required to maintain structural integrity corresponds to gravitational potential, with gravity reaching its full scale of expression.

**Interactions:**

- Gravitational attraction
- Magnetospheres and radiation fields
- Influence of stellar radiation
- Dynamic behavior of dust, gas, and planetary disks

**Dynamics:**

Stars are born and die, galaxies collide and merge, planets migrate – a continual process of motion and rearrangement that enables life to arise in select environments.

## **Level 5: Biological Level**

**Description:**

Matter organized into living systems. At this level, DNA emerges, encoding the information necessary for self-replication, development, and adaptation. It is the realm of functional forms, where life processes maintain a continuous equilibrium between entropy and organization.

**Forms:**

- Cells
- Tissues, organs, organisms
- Microorganisms, plants, animals

- Humans as complex systems with consciousness
- Carriers of culture and knowledge

### **Entropy:**

Locally low entropy – living organisms build and maintain ordered structures by sustaining continuous energy flow. Overall, biological life slows the increase of entropy, but does not halt it.

### **Entropic Mass:**

Despite the relatively low physical mass of biological systems, their entropic mass is exceptionally high due to their multilayered informational organization. Maintaining this order requires precisely regulated and finely coordinated energy flows. This level represents the highest ratio of information to mass and the most sensitive balance between energy and entropy.

### **Interactions:**

- Chemical, cellular, and genetic
- Symbiosis, competition, and evolution
- Exchange of energy and matter with the environment
- Perception and response to stimuli

### **Dynamics:**

Life develops, transforms, reproduces, and evolves. The biological level gives rise to the next – the cultural level – through the emergence of consciousness.

## **Hierarchy**

| <b>Level</b> | <b>Name</b>   | <b>Brief Description</b>                           |
|--------------|---------------|----------------------------------------------------|
| 0            | Quantum Fog   | No time, space, or forms                           |
| 1            | Quantum Field | Particles, mass (via Higgs), physical interactions |
| 2            | Atomic        | Nuclei, electrons, atoms                           |
| 3            | Molecular     | Chemistry, molecules, complex substances           |
| 4            | Cosmic        | Stars, planets, galaxies, gravity                  |
| 5            | Biological    | Life, intelligence, culture, technologies          |

## **Hierarchical Model – Level 1 Forms, Emergence, Characteristics, Interactions**

As previously mentioned, **Level 0** represents the background quantum field – the most fundamental layer of reality, where everything is possible but nothing is stable. This level contains all potential probabilities for the emergence of realities or dimensions. It is an infinite fluctuation of energy and probability, without concrete forms or consistent patterns.

Despite the apparent chaos, this field holds the *potential for the emergence of order*. One of the

most fundamental events occurs within this background – the *spontaneous symmetry breaking*, which allows some of these fluctuations to become locally **stable**.

The **Higgs field** plays a key role in this transition – when a given fluctuation interacts with it, it acquires mass, i.e., it becomes **stable**. This marks the boundary between “pure potential” and “the beginning of a reality with lasting characteristics.”

## LEVEL 1 — THE FIELD OF ADMISSIBLE POSSIBILITIES

**Level 1** represents a filtered reality — a distilled version of Level 0, where only those wave functions remain that are *possible* within the context of our dimension. This filtering is performed by the **Higgs field**, which acts as a global constructor of reality, defining:

- the global physical constants (speed of light, gravitational constant, etc.),
- the spatial and temporal metric,
- the constraints on which forms, particles, and interactions are even *permissible*.

**Level 1 = Level 0  $\cap$  constraints of the Higgs field**

---

### LAYER 1.1: Lower Layer — “The Fog”

This is where all admissible wave functions exist, but they are still in *superposition* — unresolved and unstructured. It is:

- a field of **high entropy** (maximum possibility, minimal information),
  - a **source of potential**,
  - a quantum “fog” where every possible state awaits to be “captured.”
- 

### LAYER 1.2: Upper Layer — Threshold of Manifestation

This is the **transition zone**, where — under certain conditions, usually external observation or informational input from a higher level — local entropy decreases, and the state:

- detaches from the fog,
  - **collapses** into a specific form (a probability becomes spatial-temporal reality),
  - and **enters a higher level** of reality as a particle, event, or value.
- 

## THE ROLE OF THE OBSERVER

The observer does not simply “look” — the observer **structures**. This could be consciousness, a purposeful system, or even a higher-level physical configuration that brings order.

**Observation = entropy reduction + selection of form from admissible possibilities**

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## SUMMARY

- Level 1 is the **quantum ballot** of our reality.
- It is shaped by the Higgs field, which sets the **boundaries of the possible**.
- From the **chaos** (the fog), through observation, arises **specificity** (form, mass, event).
- Its lower layer is still “unmanifested,” but already **valid** within our universe.
- The upper layer sits at the **threshold of reality**, where interaction gives rise to structure.

## Definition of Space in the VPR Model

### Space Is Not a Background. It’s a Consequence.

In the VPR model, space is not a preexisting stage where things happen. It’s not an empty arena hosting particles, objects, or forces.

**On the contrary — space emerges alongside events** as a necessity for their appearance, compatibility, and distinguishability.

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### Space Emerges from Form

When a form manifests — whether it’s an elementary particle, a wave, a bond, or an interaction — there arises a need to distinguish it, recognize it, and localize it.

That need creates a **minimal coordinate structure** — in other words, **local space**.

- No form → no need for space.
  - Only potential for form → space exists only as probabilistic possibility.
  - Stable, fixed forms → space solidifies into our familiar continuous 3D dimension.
- 

### Space Is Probabilistic and Hierarchical

In different layers of reality, space **has different natures**:

- In deeper levels, it is fuzzy, fluid, and probabilistic.
- In higher levels, it becomes more rigid, metric, and statistically stable.

Space is **not universal** — it is context-dependent, shaped by the nature of the forms that arise in it.

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### Space and Time Are Linked, But Not the Same

In the VPR model, **time also emerges with form** — but while space defines “**where**,” **time defines the order of change** — the “**when**.”

They are separate channels of manifestation:

both are relative, contextual, and layered.

There is **no absolute space** — only what is necessary in the given context.

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## **Observation $\neq$ Perception $\neq$ Existence**

Space is not something “seen.”

It is the **framework that allows anything to be seen**.

In the quantum realm, the act of observation itself **creates (localizes) space**, by imposing a boundary between **what is possible** and **what becomes real**.

In the macro world, space appears “anchored” through repeated interactions and statistical consistency.

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## **TL;DR — A Brief Formulation:**

**Space is the manifested need for distinguishability between potential or actual forms.**

It arises together with the forms themselves, within the context of the level where they appear.

It is not an absolute frame, but a dynamic structure depending on the existence and nature of those forms.

## **What is quantum entanglement?**

When two particles are created simultaneously from a common quantum wave (for example, as a result of decay or interaction), they become "entangled" — meaning their states are deeply linked. Measuring one instantly "collapses" the state of the other, regardless of the distance between them. This phenomenon is the foundation of quantum teleportation.

## **What is teleportation?**

Quantum teleportation does not transfer a physical particle but rather the information about its state. This is achieved through a third, already entangled pair of particles (e.g., particles B and C). If there is a new particle A, a process can be performed in which A's state is "imprinted" onto C, and due to entanglement, this state is automatically "reflected" onto B. Thus, A disappears and B assumes A's quantum state.

## **Space as a probabilistic phenomenon**

We propose a new model called "Vortex–Pattern–Resonance" (VPR), which views space not as a static backdrop but as an emergent and probabilistic phenomenon — something that arises together with the particle itself and does not exist independently from it.

# Core Concepts of the VPR Model

## 1. Space emerges with the wave

The wave function of a particle does more than just describe its state—it generates a localized space where the particle can appear. Without the wave, there is no defined "place" for the particle to exist.

## 2. Entanglement links spatial structures

When entangled particles are created, they don't merely share information—they share a common quantum space. It's as if there's an invisible thread or tunnel connecting them.

## 3. Teleportation is a restructuring of spatial-informational form

In quantum teleportation, the particle itself is not transferred. Instead, a form—made of information and spatial structure—is imposed on another quantum zone. The particle that receives this form is no longer the same; it has been restructured.

## 4. Space is probabilistic, too

Just as we cannot precisely determine a particle's position before measurement, the space in which it may manifest is made of possibilities—not fixed coordinates. This leads to the idea that space arises from events, rather than events occurring within pre-existing space.

## Why does this matter?

This model invites us to rethink the world:

- Space and matter are not separate,
- Information and connections between particles create geometry,
- Quantum interactions involve micro-spatial transformations.

## Visual analogy

Imagine a thin elastic membrane. When a particle manifests, it creates a dimple in the fabric. When it becomes entangled with another, two synchronized dimples appear—like a tunnel in space. A teleported particle reshapes this membrane so that another dimple receives its imprint. The entire fabric moves with them.

# Phenomena through the Lens of the VPR (Vortex–Pattern–Resonance) Model

## 1. The Collapse of the Wave Function

### The mystery:

When we observe a quantum particle, its wave function *collapses*—from an infinite range of possible states, a single outcome suddenly emerges. But how and why does this happen? And why does observation play a role at all?

### How VPR helps clarify this:

In the VPR model, space itself is not fixed prior to observation. It exists only as a probabilistic field, *shaped* by the particle's wave function. Collapse is not merely the selection of a state—it is the creation of a localized space in which that state can manifest.

In other words: *state* + *space* emerge together, and observation is the act of anchoring the system into one of these possibilities.

## 2. Duality and the Role of the Observer

### The mystery:

When we don't observe electrons, they behave like waves and produce interference. When we observe them—they behave like particles. How do they "know" they're being watched?

### How VPR helps:

In our model, before observation, there is no *fixed space*—only wave-like possibilities for where the particle might manifest. Observation creates a local *spatial channel* in which the particle appears as a discrete entity. Without observation, there is no fixed space—only a fluctuating set of potential locations.

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## 3. Quantum Nonlocality (Spooky Action at a Distance)

### The mystery:

Entangled particles "communicate" instantly, regardless of the distance between them. This seems to violate all intuitive concepts of space and time.

### How VPR helps:

If entangled particles share a common probabilistic space, then their states are not truly separated—even if they appear so in our macro-space. In other words, they don't communicate *across* space, because from their level, there is *no* distance. Any change to one results in an immediate reconfiguration of the shared space, which is reflected in the other.

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## 4. Quantum Teleportation Without Mass Transfer

**The mystery:**

How is it possible for the state of one particle to be transferred to another without moving any physical substance?

**How VPR helps:**

In the VPR model, information does not travel *within* space—it *shapes* a new space in which the state is re-imprinted. This is not a transfer, but a spatial transformation: the old quantum form disappears, and a new one is imprinted onto another, via a shift in the underlying probabilistic field it exists in.

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## 5. Superposition – A Particle in Many Places at Once

**The mystery:**

How can a single particle exist in multiple locations simultaneously?

**How VPR helps:**

Superposition occurs not because the particle is literally everywhere, but because the space in which it *can* exist is not fixed. It exists as a set of possible realities. Only upon observation does one of them actualize while the others "collapse." This is not just a selection of position—but a selection of space itself.

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**Conclusion**

Our model does not contradict standard quantum mechanics—it complements it by adding a conceptual understanding of the nature of space itself.

Rather than assuming all quantum oddities happen *within* a pre-existing space, the VPR model proposes that space itself is the oddity—emerging together with quantum states, not before them.

## Level 2: The Atomic Level – Stability Through Interaction

**Context**

After the cooling of the primordial universe and the condensation of elementary particles, stable structures begin to form—protons, neutrons, and electrons unite into atoms. This is the first level where reality acquires a stable, repeatable, and identifiable form, one that persists through time and space.

**Forms at Level 2**

- Protons and neutrons → bound into atomic nuclei (via the strong nuclear interaction)
- Electrons → organized in energy shells (electromagnetic bonding)
- Periodic chemical elements
- Isotopes and ions (variations in nuclear and electronic configurations)

## Interactions Between Forms

At this level, complex laws begin to operate, enabling the existence of stable forms. Here we distinguish:

### 1. Strong Nuclear Interaction

- Acts between quarks inside protons and neutrons, and between the nucleons within the nucleus
- The strongest of the known forces, but with a very short range (~1 femtometer)
- Makes it possible for the nucleus to exist despite the electromagnetic repulsion between protons

### 2. Electromagnetic Interaction

- Acts between electrons and protons
- Determines the structure of the electron shell and electronic transitions that result in the emission and absorption of energy (e.g., spectral lines)
- Gives rise to electron layers and chemical properties

### 3. Weak Nuclear Interaction

- Involved in radioactive decay and transformations within the nucleus
- Allows for transmutations (conversion of one element into another), essential for stellar nucleosynthesis

### 4. Gravity (Not Applicable at the Microscopic Level)

- Gravity at this level is almost negligible, yet it still exists as a background interaction

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## Interactions and Entropy

At first glance, the binding of elementary particles into nuclei and atoms lowers local entropy – stable structures emerge that condense information and resist decay. However, this happens:

- **at an energy cost** (e.g., energy is released during nucleus formation → freeing global entropy),
- **through spontaneous processes** that increase the entropy of the entire system but locally create order.

### The Paradox of Order:

Local order in atoms does not contradict the Second Law of Thermodynamics, because order is paid for with an energy “investment.” This creates structures capable of storing energy and information, which is the foundation for the next levels.

### Connection with Other Levels

- **From below (Level 1):** Atoms inherit the properties of particles but organize fluctuations into stable units.

- **Upwards (Level 3):** Atoms combine into molecules – chemistry and functional bonds arise.

### **Dynamics**

- Atoms are not passive: they vibrate, participate in reactions, ionize, and create spectra.
- Under certain conditions (in stars, during radioactivity, synthesis), they can transform into other elements.

### **Summary:**

| <b>Element</b>      | <b>Content</b>                                                          |
|---------------------|-------------------------------------------------------------------------|
| <b>Forms</b>        | Nuclei, electrons, atoms, isotopes                                      |
| <b>Forces</b>       | Strong, weak, and electromagnetic interactions                          |
| <b>Entropy</b>      | Locally decreased, globally increased                                   |
| <b>Dynamics</b>     | Vibrations, emission, ionization, reactions                             |
| <b>Significance</b> | First stable order carrying information, basis for matter and chemistry |

## **Level 3: Molecular Level – The Beginning of Functional Matter**

### **Context**

At this level, atoms begin to interact and connect through chemical bonds, creating more complex structures – molecules. Here emerges the possibility of function – not just form, but activity, reaction, and choice.

Molecules are the building blocks of matter, chemistry, and life. This is the level where complexity and order begin to carry meaning.

### **Forms at Level 3**

- Chemical compounds (diatomic and polyatomic)
- Organic and inorganic molecules
- Polymers, biomolecules (amino acids, carbohydrates, lipids)
- Crystalline and amorphous structures
- Simple self-regulating systems

### **Interactions between Forms**

Interactions at this level are chemical and physicochemical, arising from the electromagnetic nature of atoms but manifesting in more stable and predictable configurations.

### **Main forces and bonds:**

- Covalent bonds – sharing electrons between atoms
- Ionic bonds – electrostatic attraction between charged ions
- Hydrogen bonds – weak but crucial for the structure of water and DNA
- Van der Waals forces – short-range forces between nonpolar molecules
- Catalysis and autocatalysis – acceleration and self-acceleration of chemical processes

### **Energy Interactions:**

- Emission and absorption of photons
- Reactions with heat release/absorption (exothermic/endothermic)

### **Entropy and Order**

The molecular level is a paradoxical balance between increasing entropy and local oases of order:

- The bonding of atoms into molecules requires energy but leads to high informational content.
- Complex molecules (like proteins) contain vast amounts of organized information that can be “read” and utilized.
- Molecules can self-organize – a process by which entropy locally decreases without external intervention.

Autocatalysis and self-organization are the first signs of pre-biological intelligence – a system that “chooses” its structure according to the environment.

### **Dynamics**

Molecules are not static:

- They vibrate, change shape, and react with other molecules.
- Under the influence of light, heat, or catalysts, they enter reactions.
- In liquids and gases – they collide, diffuse, and exchange energy.

This is the level of chemical evolution – the transition from passive structures to functional systems, the foundation of life.

### **Connection with other levels**

- From below (Level 2): Atoms create the forms that molecules build upon.
- Upwards (Levels 4 and 5): Complex molecules form living organisms, tissues, and biochemical chains.

This is the boundary between physics and biology – the bridge between the inorganic world and the emergence of life.

### **Summary:**

| <b>Element</b> | <b>Content</b>                                        |
|----------------|-------------------------------------------------------|
| Forms          | Molecules, polymers, biomolecules, crystals           |
| Bonds          | Covalent, ionic, hydrogen, Van der Waals              |
| Entropy        | Locally decreased by self-organization                |
| Dynamics       | Reactions, vibrations, interaction with light         |
| Meaning        | Beginning of functional matter and chemical evolution |

## **Level 4 – Cosmic Level**

### **Space and Forms – The Foundation of the Universe’s Dynamic Structure**

In our model, space is not a static backdrop but a dynamic and relative phenomenon, emerging from the need to “host” and sustain new and changing forms—the fundamental structural units of reality. It is not separate from the forms but is shaped through their interaction and mutual adaptation.

#### **Interconnection: Space–Form**

- Space expands and transforms in accordance with emerging forms and their organization.
- Forms carry their entropic mass—a combination of physical and informational components that define their nature and compatibility.
- Space and forms are inseparable, forming a unified dynamic system.

#### **The Role of Gravity in This Context**

- Gravity is not merely a force but a logic of structural attraction and coherence between forms.
- It arises from the internal organization and entropic mass of forms, binding them into stable systems.
- This approach offers a new perspective for understanding dark matter and dark energy as manifestations of the dynamic relationship between space, form, and information.

#### **Preparation for Level 4**

In the next level, gravity will unfold its full role as the architect of cosmic order.

We will follow how it concentrates matter and energy, creates stable structures, and defines the boundaries of complex systems—from stars to galaxies.

This is the moment where the understanding of gravity as an organizing logic becomes the key to the complete picture of the Universe’s stability and evolution.

#### **Gravity – The Logic of Attraction Between Forms**

In our model, gravity is not just a force but an inner logic of connection—a way in which structurally compatible forms recognize and attract each other.

This approach does not contradict classical physics but complements it by highlighting that gravity results not only from mass but also from the compatibility and internal organization of forms.

#### **Gravity as a Stabilizing Principle**

- Every level of reality carries its own *entropic mass*—a combination of physical and informational components that determines the stability of forms.
- Forms with high entropic mass tend to "hold together," not through mechanical pressure, but through mutual recognition of their connective logic.
- In this sense, gravity acts as a universal stabilizer—it does not negate entropy, but creates local islands of stability in an ocean of chaos and decay.

#### **The Architect of Cosmic Order at Level 4**

Gravity reaches its full expression at the cosmic level—**Level 4**, where it:

- Concentrates matter and energy, leading to localized decreases in entropy (e.g., stars, planets, galaxies)
- Creates conditions for the emergence of new forms through compression, contraction, and heating
- Defines the boundaries of systems—such as orbits, zones of stability, and spheres of influence

Thus, gravity becomes not merely a force, but an *architectural principle*—the capacity to build structure out of chaos.

#### **Gravity and Entropy – Opposing but Harmonized**

Entropy disperses and expands, while gravity gathers and holds. They are not enemies, but motions in different directions:

- One unfolds the potential of reality, generating possibilities
- The other shapes and preserves outcomes, sustaining order

Gravity allows forms with high *entropic mass* to unite into stable layers of reality—essential for the emergence of higher levels.

#### **Gravity as a Filter of Compatibility**

Attraction is not solely based on mass, but also on form—on the structure of internal organization. This explains:

- The clustering of stars, galaxies, and molecules of the same kind
- The natural selection of compatible elements—foundational to system stability and evolution

#### **Gravity and Informational Coherence**

Since *entropic mass* includes an informational component, gravity emerges as a mechanism for binding information across compatible systems. This implies that:

- Gravity does not require a mediating particle (like the graviton), but expresses a logic and memory embedded in the structure of organization
- It is a form of *informational coherence*, integrated into the very architecture of reality

#### **♾ Gravity in the Event of Decay – Restoration, Not Return**

When a form disintegrates and local entropy increases, gravity:

- Does not preserve the existing structure, but can reorganize the remnants into a new whole
- Acts as a principle of recovery and transformation
- Participates in the birth of new forms from chaos (e.g., star → supernova → new elements → new planets)

### Summary

In our model, gravity is:

- A *logic of organization*, not merely a force or a particle
- Expressed through compatibility and informational coherence
- A connector of all levels of reality, creating stability
- A universal stabilizing principle that balances entropy
- An *architect* of complex structures and systems, enabling dynamic equilibrium

## Dark Matter and Energy — The Surplus That Did Not Pass Through the Filter of Reality

In the model we present, the Higgs field functions as a **filter (or sieve)** — it defines which forms and interactions can manifest within our reality. During the Big Bang, the amount of mass, energy, and entropy was so immense that **not everything could pass through this filter**, which had a limited capacity.

### Hypothesis: Origin of Dark Matter — Non-transitional Mass, “Boiled Out” at the Edge of the Higgs Field

According to our model, dark matter is a form that:

- went through the energetic transition of the Big Bang,
- came into contact with the Higgs field, but
- was not broken down into individual particles, as occurs with standard matter.

It can be viewed as a **primary, undifferentiated mass** that did not acquire a localized form or active interaction potential within the structure of our level of reality.

### Explanation:

- This mass “boiled out” upon contact with the Higgs field — it gained borderline access to structure but failed to form distinct elementary particles.
- In this sense, it does not belong to Level 0, as it carries **an entropic signature and mass**, yet it did not reorganize sufficiently to enter Level 1 as a stable form.
- This places it in an **intermediate state** — incompatible with the structured, observable reality, yet exerting **gravitational presence** that cannot be ignored.

### Implications:

- Dark matter may be interpreted as a form of **failed or incomplete realization** of structure within our level.
- It does not actively participate in interactions, as it lacks a fully developed form logic, but it contributes to the **gravitational organization of the Universe** — as a **nameless, unrealized form**.
- It does not interact with electromagnetic fields,
- does not form stable structures,
- yet **influences the expansion and shaping of cosmic space**.

### This gives rise to two distinct, yet related manifestations:

- **Dark matter** — mass without form, invisible to light, but shaping galaxies through gravity;
- **Dark energy** — a background impulse that sustains the accelerated expansion of space.

This explanation extends standard cosmology with a concept in which the dark component of reality is **not “another world,”** but rather an **unrealized part of our own** — a surplus that reality **did not manage to structure**.

### Correlation with our VPR model:

- Reality is defined by the transition from Level 0 to Level 1.
- Everything outside that transition remains as a **“shadow”** — **not in form, yet still exerting influence**.

## Dark Energy

### Description:

In our model, dark energy is understood as a **form originating from a potential reality** that has **not undergone full interaction with the Higgs field**. It represents a **residual configuration of mass without full space-time realization** — a “form” emerging from Level 0, but held in an **inactive phase** since the very beginning of the evolution of reality.

### Mass Characteristic:

It possesses **structural mass**, but without **inertial dynamics**. In the logic of Level 1, where  $c^2=1$ , it does not manifest classical energy. It can be represented as:

$$E_{dark} = m_{dark} \cdot 1$$

*Note:* At this level, we apply  $c^2=1$  as a logical unit, since **no relative motion between forms is yet expressed**. This is typical for deeper layers of reality (e.g., Level 1), where the speed of light **does not act as a limiting factor**, but rather serves as a **normalized scale within the structure of forms**.

### Role in the Structure of Reality:

Dark energy **does not participate in the interactions** that maintain visible matter, but it **influences**

**the expansion of space.** It is a “**non-completed**” **form**, one that does not bind, structure, or emit — yet leaves a **gravitational and cosmological imprint**.

#### **Boundaries:**

It is **not a carrier of entropy** in the classical sense, nor does it play an active logical role in the organization of local systems. In our concept, it is a **product of unrealized structuring**, not a force of decay or transformation.

## **Cosmic Forms and Their Dynamics**

At **Level 4**, forms are no longer microscopic structures, but **gigantic configurations** with high physical mass and relatively lower informational complexity. Here we encounter structures such as:

- **Stars** (resulting from the gravitational collapse of interstellar gas)
- **Planetary systems** (emerging in accretion disks around stars)
- **Galaxies** (gravitational megastructures with internal dynamics and organization)
- **Clusters and superclusters** (networks of galaxies bound by gravitational logic)

Each of these forms is characterized by:

- **Physical mass**, which defines its volume and gravitational influence
- **Internal dynamics** — rotation, pulsations, stellar winds
- **Interaction with the environment** — emission, absorption, collisions, exchange of matter

Galaxies and the structure of the Universe follow a **hierarchical organization** — they are not randomly scattered but align along the **cosmic web**, built from gravitationally bound masses. This is analogous to an **informational network** — a resonance between compatible structures.

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## **Expansion of the Universe — Dynamics of Forms and Freedom of States**

In our model, the Universe is not simply a physical volume that expands, but a **logical pyramid of interconnected forms**, linked through the dynamics of entropy. Expansion is not a mechanical consequence, but a **natural expression of the drive for increased organizational potential, transformation, and existence**.

#### **Entropy as a Driver of Expansion**

Entropy is not merely a measure of disorder — it is **potential for change**.

The more forms arise and interact, the more states become possible.

To “contain” all these potential states, space itself expands — not only geometrically, but **logically and informationally**.

Space does not merely accommodate forms — it **emerges from the need for forms to exist and differentiate from one another**.

Complexity gives rise to a need for distinguishability → new coordinates → new space.

### **Accelerated Expansion — Logic, Not Anomaly**

Modern physics interprets the accelerated expansion of the Universe as an effect of **dark energy**. In our model, this acceleration is a **logical consequence** of the evolution of forms.

As the structure of reality becomes more complex, it **unfolds its “space of possibilities” faster**.

- Levels build upon each other;
  - Each level contains more information and interactions;
  - This requires exponentially increasing freedom of states;
  - → Which generates the need for expanding space.
- 

### **The Universe as an Open System**

In this model, the Universe is an **open system**, in continuous exchange between forms, information, and possibilities.

**Entropy does not act as a destroyer, but as a driving force** — each emergence of a new form demands a new context, new connections, and new space in which to unfold.

This makes expansion not just natural, but a **structural necessity for continued existence**.

#### **Conclusion:**

The expansion of the Universe is not a mechanical “explosion,” but a process of **logical and structural expansion**, driven by the need for each new form to have **its own place, context, and freedom of development**.

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### **Spatial Embedding and Temporal Frequency**

Cosmic structures unfold across immense scales of time and space.

- Forms at Level 4 exhibit **low frequencies of change** — stars live for billions of years, and galaxies evolve over eons.
- Here, time flows in a **slow pulse**, while space adapts through expansion, collisions, and restructuring.

The rhythm of Level 4 is **creative — slow, but stable**.

Within this rhythm arise the **preconditions for biological life**:

- through the formation of stable stars,
- the emergence of “habitable zones,”
- and the creation of a rich diversity of elements via stellar nucleosynthesis.

### **Threshold of Transition to Level 5**

When conditions within a given region of Level 4 allow for a local and sustained decrease in entropy—such as through:

- stable climate,

- complex chemical composition,
- accessible and consistent energy—

then the possibility emerges for the appearance of a new type of form: the living form.

This marks the point where cosmic organization becomes a substrate for the evolution of biological structures—a transition from gravitational stability to the dynamics of self-sustaining form, i.e., life.

### **Final Formulation for Level 4:**

The cosmos is not merely a stage but a participant in reality—an organizer of spacetime stability upon which the next order of structure stands: the living world.

## **Level 5 – Biological Level: The Form That Becomes Aware of Form**

### **Description:**

At this level, reality begins to perceive itself for the first time. This is the emergence of life – structures that not only exist but maintain, reproduce, and adapt themselves. Biological forms are not merely physical configurations; they are dynamic systems in which information takes on the role of an internal regulator.

Here, the observer manifests – a being that does not merely react to the environment but begins to interpret, model, and consciously modify it.

### **The Observer as a Bridge Between Levels:**

The observer is not just a product of evolution – it closes the loop between possibility and form. Observation creates local reality, organizes states, collapses probabilities, and through the act of awareness, provides feedback to the very structure of existence. This renders the level self-reflective – reality is observed through itself.

### **Forms in Level 5:**

- Cells, tissues, organisms
- Brain, neural networks, sensory systems
- Biological models of memory and prediction
- Human beings, cultures, civilizations

### **Dynamics:**

- Reproduction and mutation
- Adaptation, evolution, symbiosis
- Learning, communication, creation of new forms (art, science, technology)
- Conscious influence on lower levels – modification of molecules, atoms, even the structure of space itself (through technology)

### **Entropy and Entropic Mass:**

At this level, physical mass is relatively low, but informational density is extremely high. Biological systems rely on memory, code, replication, and logic – an internal program that maintains order yet remains in dynamic equilibrium with environmental entropy.

### **Specific Features:**

- Introduction of intentionality – goal-directed actions
- Ability to model the future
- Potential to create new levels of organization (technological, cultural, informational)
- Forms with built-in capacity for observation and transformation

### **Risk of Conscious Action:**

The existence of an observer capable of altering form brings not only power but responsibility. For the first time in the hierarchy of reality, a form can influence not only its own level but also levels above and below – without fully understanding the consequences of its actions.

### **The Problem: Knowledge $\neq$ Wisdom**

Technological advancement, combined with limited understanding of deeper structures of reality, creates exponential risk:

- Triggering uncontrollable processes
- Disrupting balances between levels
- Manipulating matter, energy, or information without adequate ethics

### **Consciousness Without Compassion = Danger**

Biological intelligence without an internal moral regulator becomes a form with maximal transformative capacity but without the ability to predict long-term consequences. This makes the level a critical juncture in the evolution of reality – a turning point on which the emergence of higher levels or an entropic collapse depends.

### **Need for New Awareness:**

The observer must realize that it is not external to the system but an internal node of interaction. Responsibility is not merely personal – it is structural. Reality now self-observes – but will it self-preserve?

### **Conclusion:**

The biological level is the point of self-awareness of reality. Here emerges the observer who can change the form of forms, switch between levels, and even influence the logic of its own existence. This is not the end of the pyramid – it is the beginning of conscious hierarchy.

## **Mathematical Framework of the VPR Model**

### **Part I: Informational Energy and Its Relation to Classical Physics**

#### **Definitions:**

#### **Entropic Mass**

*Context:* stability, organization, interaction with space

- **Definition:** A logical measure of a form's resilience against entropic processes.
- **What it expresses:** The degree of order, structural stability, and the ability to resist fluctuations and decay over time.
- **Where it manifests:** In forms that engage in stable interactions with other structures and have

withstood a minimum threshold of entropic influences.

- **Example:** An elementary particle with stable characteristics has higher entropic mass than a fleeting quantum fluctuation.

**Essence:** Mass arising from a structure’s temporal resilience and resistance to background disturbances.

**Informational Mass**

*Context:* internal complexity, logical density, capacity for interaction

- **Definition:** A measure of the internal informational complexity of a form – the amount of embedded meaning, dependencies, and potential states.
- **What it expresses:** The richness of internal structures, transformational potential, and the capacity to participate in complex interactions.
- **Where it manifests:** At higher levels of organization – biological, cognitive, or social systems.
- **Example:** A cell has greater informational mass than an atom; the human brain more than a mountain.

**Essence:** Mass arising from logical complexity and potential for influence.

**Summary Table:**

| Concept            | Role in the Model                                        | Related to | Measurable?                                   |
|--------------------|----------------------------------------------------------|------------|-----------------------------------------------|
| Informational Mass | Stability of structural organization and logical density | Energy     | Yes (within the model’s framework)            |
| Entropic Mass      | Potential for decay, chaos, dissipation                  | Entropy    | Conceptual (quantitative definition possible) |

**1. Introduction: From Energy to Structure**

In classical physics, the energy of a particle with mass *m* is defined by Einstein’s equation:

$$E = mc^2$$

This equation does not apply to the photon, as its rest mass is zero. Instead, its energy is given by:

$$E = hf$$

In the present model, we extend the notion of energy by introducing **informational energy**—a quantity that reflects the structural presence and impact of a form, regardless of its inertial mass. Informational energy, as discussed here, directly correlates with the concept of **informational mass** outlined in the VPR model.

**2. Core Definition**

Informational energy is a form of structural energy, associated not with mass, but with the frequency-based, spatial, and temporal organization of a given form. For a form with zero rest mass—such as a photon, wave function, or logical configuration—the informational energy is defined by the following relation:

$$E_{info} = \frac{h \cdot t^n}{T \cdot x^2}$$

where:

- **Note on the constant h**

In our model, the symbol  $h$  numerically corresponds to Planck's constant:

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$

but it carries an expanded interpretation:

- In classical physics,  $h$  expresses the relationship between a photon's energy and its frequency.

- In our model,  $h$  is reinterpreted as a **universal structural constant**, representing the minimal logical unit required for a form to participate in the space-time structure.

In other words,  $h$  becomes not just a physical constant, but a **measure of informational presence**.

- **t** – duration of participation in an interaction (may be absent, linear, or quadratic),
- **T** – period of internal frequency (or internal logical pulsation),
- **x** – spatial characteristic of propagation or reach,
- **n**  $\in \{0, 1, 2\}$  – depending on the degree of participation (passive, active, or resonant).

This formulation does not quantify inertial mass, but rather the **impact of a structure within the space-time continuum**, i.e., its **logical weight**.

### 3. Relation to Classical Physics

The formula for informational energy structurally resembles the expression for the relativistic energy of a photon:

$$m_{rel} = \frac{E}{c^2} = \frac{h \cdot f}{c^2}$$

In our model, however, this "mass" is not inertial but reflects the **influence of the form upon space and other forms**.

We interpret it as **structural energy**, not mass in the classical sense.

#### Justification: Why $c^2=1$ at Level 1

At **Level 1** of our model, forms exist in a **passive, potential state**, without motion or participation in active interaction. This is a level of **logical coherence**, where:

- there is **no relative motion** between forms,
- **no transfer of information or energy** over time,
- and all structures exist in a state of **logical simultaneity**.

Due to the **absence of relativity**, the **speed of light c**—which in classical physics functions as the **limit and converter between spatial and temporal domains**—has **no operative role** at this level.

Therefore, in order to remove it as a constraint and retain it purely as a **scalar scaling factor**, we can **normalize** it to:

$$c^2=1$$

This normalization allows us to:

- **unify the forms of mass and energy**, making them **logically equivalent**,
- **simplify the representation of structural energy** in a level devoid of physical dynamics,
- and **establish a foundational layer** upon which higher levels (Levels 3 and 4) will reintroduce the real value of  $c$  as a **limit to transformation**.

**In other words:**

At **Level 1**, the speed of light is interpreted as a **principle of coherence**, not as a physical boundary. Thus, setting  $c^2=1$  serves as a **logical normalization**, preparing the model to distinguish between **structure** and **motion**.

## Distinction Between “ $c^2$ ” and “ $x^2$ ” in the Context of the Model

In our model, two seemingly similar quantities—“ $c^2$ ” and “ $x^2$ ”—are employed, yet they serve entirely different roles and carry distinct meanings:

- “ $c^2$ ” is a **universal physical constant**—the square of the speed of light in vacuum. It appears in the context of **global transformations** between mass and energy, especially in the relation:

$$E=mc^2$$

- “ $x^2$ ”, on the other hand, is a **local variable** that describes spatial characteristics of interaction—such as the radius of a field, propagation distance, wavelength, etc. It appears in expressions like:

$$E_{info} = \frac{h \cdot t^2}{T \cdot x^2}$$

Here, “ $x^2$ ” acts as a **dispersive factor**: the greater the interaction range, the weaker its local informational impact.

---

**In summary:**

- “ $c^2$ ” = *universal coefficient* → governs **global mass–energy conversion**.
- “ $x^2$ ” = *local scaling parameter* → affects **density and effectiveness of interaction**.

Although both terms share an identical mathematical form (being squared quantities), **they must not be conflated** due to their fundamentally different roles within the model.

#### 4. When Time $t$ Becomes Relevant

In our model, time enters the formula for informational energy **only when**:

- the form actively participates in an interaction;
- there is a recurring process (e.g., frequency);
- the structure exhibits temporal stability.

In such cases, the general formula is:

$$E_{info} = \frac{h \cdot t}{T \cdot x^2}$$

Where:

- **T** – the period of interaction ( $T = 1/f$ );
  - **x** – the spatial equivalent of interaction: distance, range, or spatial “blurring” of the form—that is, how widely its influence is distributed in the absence of active interaction;
  - **t** – the time interval over which the effect accumulates;
  - **h** – the structural constant (Planck-like).
- 

#### 5. Limiting Case: When There Is No Interaction

If the form is **not actively interacting**, but simply **exists within space**, its informational energy arises from its **presence alone**—i.e., from having a characteristic frequency (period  $T$ ) and spatial extension  $x$ , even in the absence of exchange or accumulation. In such a case:

$$E_{info} = \frac{h}{T \cdot x^2}$$

This value is interpreted as **presence energy**, rather than interaction energy. It remains constant for a given frequency and is **independent of time**.

---

#### Origin of Informational Energy in a Passive Form:

In our model, even a *passive* form—that is, one not currently engaged in interaction—already possesses informational energy derived from the very act of its structuring. One possible source of this initial energy is its interaction with the **Higgs field**. Thus, even “inactive” forms that are not currently engaging in interactions exist in a state of **realized potential**, ready for reactivation and participation.

#### 6. Sustained or Resonant Interaction (Time Enters Quadratically via $t^2$ )

$$E_{info} = \frac{h \cdot t^2}{T \cdot x^2}$$

The  $t^2$  term in the numerator appears **only when**:

1. The form does not merely exist, but actively interacts with another form—that is, there is a process unfolding the form over time.
2. Time  $t$  begins to “weigh in” (as  $t^2$ ) when the logic of the interaction starts to generate a **new form**.
3. There is an accumulation of informational influence—e.g., a frequency-based impact whereby the form undergoes internal transformation or builds up tension.
4. A stable structure exists in **resonance** or **cyclic interaction** with an internal or external frequency—that is, not a one-time event, but interference or constructive temporal effects.
5. The energy is viewed in the context of a **process**, not a static state—in other words,  $t$  is not merely a marker of presence, but a parameter describing **active participation in the realization** of energy.

#### Important:

This distinction is **critical** in our model, as it clearly separates a **static informational essence** from the **dynamic involvement** of a form in ongoing interactions.

## 7. Projection Across the Levels

- **In Level 1**, the speed of light  $c$  is taken to be **unity** ( $c = 1$ ), as there are no relative motions and all forms exist in a state of **logical simultaneity**.

In this context, **energy and mass are indistinguishable**—they are merely different expressions of **structural stability**.

There is no transition, no motion—only the **presence of pure form**.

→ The speed  $c$  is normalized to unity due to the absence of relative motion

$$E_{info} = m_{info}$$

→ Energy and mass become **structurally equivalent**.

- **In Levels 3 and 4**, the speed of light  $c$  has a defined value and acts as a **limit on transformation**—i.e., it becomes a boundary for the transfer of energy and information between forms. As a result:

$$E_{info} < m_{info} \cdot c^2$$

This opens the possibility for transformation between energy and form, as well as for the accumulation of structural complexity.

It is precisely at these levels that we observe:

- the **accumulation of structural complexity**,
- the **differentiation between forms**, and
- the emergence of new levels of organization through **synchrony, resonance**, or **structural imprinting**.

## Part II: Interaction, Transformation, and Accumulation of Informational Energy

### 1. Absorption and Integration of Informational Energy

When a form with mass (e.g., an electron) absorbs a photon, **additional informational energy** is integrated into its structure.

The resulting energy is not merely mechanical (kinetic or thermal), but **structural**—it alters the form's behavior, interaction potential, and frequency response.

Formally:

$$E_{total} = E_{rest} + E_{info,absorbed}$$

Where:

- $E_{rest} = mc^2$  — classical rest energy
- $E_{info,absorbed} = \frac{h}{T \cdot \chi^2}$  — informational energy of the absorbed photon

If the interaction is **temporally stable** (e.g., resonance or repetition), the following applies:

$$E_{info,absorbed} = \frac{h \cdot t}{T \cdot \chi^2}$$

---

### 2. Transformation and Structural Decay

When a form **decays**, part of its mass and/or structure is converted into energy.

In our model, this includes an **informational component** that is released into space:

General form:

$$\Delta E_{info} = \frac{h \cdot t}{T \cdot \chi^2}$$

This formula expresses the **informational energy released during a transformation**, and it is proportional to:

- $t$  — the **duration** for which the structure was maintained
- $T$  — the **frequency stability** through its period

- $x$  — the **spatial extent** of influence, acting as a dispersive factor

### 3. Accumulation of Informational Energy

Some structures—such as stable elementary particles or resonance-based systems—can **accumulate informational energy** through repeated interactions. Then:

$$E_{info, total} = \sum_{i=1}^n \frac{h \cdot t_i}{T_i \cdot x_i^2}$$

This sum accounts for:

- repeated frequency-based interactions
  - variations in spatial distance and temporal duration
  - changes in informational density over time
- 

### 4. Energetic Equilibrium of a System

A system composed of multiple forms possesses an overall **informational-structural content**:

$$E_{info, system} = \sum_k \frac{h \cdot t_i}{T_k \cdot x_k^2}$$

Equilibrium occurs when **the input and output of informational energy are balanced**—i.e., when the accumulated and released  $E_{info}$  compensate over time:

$$\sum E_{info, in} = \sum E_{info, out}$$

This can be observed in stable atomic states, persistent molecular bonds, or equilibrium ecosystems.

### 5. Effect in Resonance

In the case of **resonance**—i.e., frequency alignment between an external form and an internal structure:

$$T_{in} \approx T_{out}$$

...an **intensified accumulation of informational energy** is observed. This may result in:

- transformation of the form
- emergence of a new structure
- disruption of equilibrium within the system

# Part III: Energy Transformations in Transitions Between Levels

## 1. Informational Energy and Levels of Organization

In the model, forms are organized hierarchically—from the simplest (Level 1) to the most complex (Level 5). Each level is characterized by:

- a specific **density of structure**
- **energetic complexity**
- **potential for interaction and transformation**

When a transition occurs between levels, the informational energy also changes, as the parameters  $T$ ,  $x$ , and  $t$  are modified accordingly.

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## 2. Scaling of $E_{info}$ Across Levels

### Level 1: Background Reality (Waves and Frequencies)

- Minimal spatial organization
- $x \rightarrow \max, t \rightarrow 0, T \rightarrow \text{minimum}$
- Informational energy:

$$E_{info} \approx \frac{h}{T \cdot x^2}$$

➤ Constant, but dispersed in time and space

### Hypothesis:

In Level 1 of our model, all forms initially exist in a passive, potential state — with no involvement of time  $t$  in the formula for informational energy.

When a form is "captured"—localized, manifested—in order to be observed by a higher-level observer (a form from a more complex level), this interaction introduces the temporal variable  $t$  into its logic. As a result, its structure stabilizes and becomes manifest.

**Sustained interaction (observation)** leads to the involvement of  $t^2$ , corresponding to full informational accumulation and the realization of a concrete form — a particle.

### Level 2: Matter and Particles

- A form with structure and mass
- $x \rightarrow \text{local}, t \rightarrow \text{extended duration}$
- Accumulation of  $E_{info}$  over time:

$$E_{info} \approx \frac{h \cdot t}{T \cdot x^2}$$

- Increasing energy through stable interactions

### Level 3: Molecular and Atomic Level – Two Types of Interactions:

#### 1. Single or Unstable Interactions → linear time $t$

Examples:

- brief collisions between molecules
- transient energy or electron exchange (e.g., transition states in chemical reactions)
- fluctuations that do not lead to lasting bonds

In this case, informational energy:

$$E_{info} = \left( \frac{h \cdot t}{T \cdot x^2} \right)$$

- $t$  reflects the duration of participation but the effect does not accumulate
- the interaction is neither resonant nor stable

#### 2. Stable, Repeated, Resonant Interactions → quadratic time $t^2$

- High frequency and structural organization
- $T$  and  $x$  are stable,  $t$  increases
- examples include:
  - chemical bonds
  - structural stability within molecules
  - long-lasting synchronization between atoms

Informational energy reflects:

- memory
- regulation
  - reactivity

Accumulated information encoded through structure, with a constructively additive effect

$$E_{info} = \sum \left( \frac{h \cdot t^2}{T \cdot x^2} \right)$$

#### Level 4: Cosmic Structures

- Very large values of  $x$
- $t \rightarrow$  cosmological timescales
- Energy is distributed in space, but:

$$E_{info} \propto \frac{t}{x^2}$$

- Gravity acts as a node of informational connectivity

---

#### Level 5: Consciousness and the Observer

- Time and space reorganize around the focus of observation
- Possible local compression:
- $E_{info} \sim$  function of attention, focus, intensity
- The observer alters reality through the choice of interaction

### 3. Transition Between Levels – Energy Conditions

For a higher-level form to emerge, the following are required:

- Accumulation of sufficient  $E_{info}$
- Sustained structural coherence through temporal and spatial parameters

**Critical condition:**

$$\Delta E_{info, lower} \geq E_{threshold, upper}$$

Where:

- $\Delta E_{info, lower}$  : informational energy available at the lower level
- $E_{threshold, upper}$  : the minimum energy required for stability of a form at the higher level
- This establishes a natural filter — only structures with sufficient resilience and internal balance can "ascend" within the hierarchy.

### 4. Informational-Energetic Balance and Transformation

Stable forms are characterized by the condition:

$$\frac{dE_{info}}{dt} = 0$$

That is, there is no "leakage" of information or ongoing structural decay.

If:

$$\frac{dE_{info}}{dt} > 0$$

► The form is accumulating information, undergoing transformation, or evolving.

If:

$$\frac{dE_{info}}{dt} < 0$$

► The form is disintegrating — or preparing for a transition.

## Part IV: Examples and Analogies with Observable Systems

### 1. Informational Energy of the Photon

► As previously shown, the energy of a photon can be interpreted as a function of temporal and spatial resolution—in other words, as the spectral density of information.

### 2. The Electron and Informational Energy

The electron possesses a non-zero rest mass. According to standard physics:

$$E = m \cdot c^2$$

When an electron interacts with a photon, in our model it also acquires **additional informational energy**, contributed by the frequency structure of the interaction:

$$E_{info, electron} = \frac{h \cdot t}{T \cdot x^2}$$

Where:

- $t$  is the duration of interaction,
- $T$  is the frequency characteristic of the input,
- $x$  denotes the spatial extent of the influence.

### Sample Calculation:

- Suppose an electron interacts with a photon of period

$$T = 1.67 \times 10^{-15} \text{ s}$$

Given:

$$T = 1.67 \cdot 10^{-15} \text{ s}$$

$$c = 3.00 \cdot 10^8 \text{ m/s}$$

$$x = c \cdot T = 3.00 \cdot 10^8 \cdot 1.67 \cdot 10^{-15} \approx 5.01 \cdot 10^{-7} \text{ m}$$

$$x^2 = (5.01 \cdot 10^{-7})^2 \approx 2.51 \cdot 10^{-13} \text{ m}^2$$

$$h = 6.626 \cdot 10^{-34} \text{ J} \cdot \text{s}$$

Then, under the condition  $t = T$ , we obtain:

$$E_{info} = h/x^2 = 6.626 \cdot 10^{-34} / 2.51 \cdot 10^{-13} \approx 2.64 \cdot 10^{-21} \text{ J}$$

► This value is several orders of magnitude smaller than the electron's rest energy, yet it may play a role in frequency-sensitive systems such as biochemistry, quantum biology, or the photoelectric effect.

**Note:**

In this example, we assume the interaction time  $t$  coincides with the photon's period  $T$ , i.e.,  $t = T$ . This represents a case of full and minimal interaction, where form and input are in complete alignment. Physically, it implies the electron absorbs the photon over its entire period; logically, it reflects a scenario of resonance between external influence and internal structure.

This is a fundamental case of **synchrony** in our model and serves as a basis for deriving baseline numerical estimates of informational energy.

### 3. Quantization of Coherence – $t = n \cdot T$

(“Reception” of structure)

**Logical interpretation:**

- If a photon has a period  $T$ , then in order to be fully and effectively "received" by an electron, the electron must remain in an "open state" for an interval that is an integer multiple of  $T$ .

- This defines the condition:

$$t = n \cdot T \quad (n = 1, 2, 3...)$$

- Only then can informational energy accumulate without breaking coherence.

**Physical analogy:**

- This resembles the condition for **constructive interference** in optics or **quantum resonance**, where:

- only exact integer multiples lead to amplification,

- non-integer intervals result in partial/incomplete interaction, possibly leading to the disintegration of the form.

**In our model:**

- This is interpreted as **informational quantum conditionality**—a form can "hear" or "sense" only those external inputs that are integer multiples of its internal period.

- We can speak of "*permitted temporal interaction slots*", determined by the form's internal logic.

### Formulaic consequence:

If:

$t = n \cdot T$ , then:

$$E_{info} = \frac{h \cdot (n \cdot T)^2}{T \cdot x^2} = \frac{h \cdot T \cdot n^2}{x^2}$$

That is, informational energy increases quadratically with  $n$ , but only when the interaction is coherent.

### Implications:

1. Forms exhibit **informational selectivity**—they respond only to inputs of coherent frequency and integer-multiple duration.
2. Reality is **quantized not only in energy, but also in temporal logic**.
3. This may represent a mechanism of “**informational resonance**”, potentially explaining phenomena such as *activation*, *thresholds*, or *memory formation*.

## 4. Atomic Transitions and Changes in $E_{(i)} \quad f_{(o)}$

In a quantum jump:

$$\Delta E = h \cdot \Delta f$$

In the model:

$$\Delta E_{info} = \frac{h \cdot t}{T_{before} \cdot x_{before}^2} - \frac{h \cdot t}{T_{after} \cdot x_{after}^2}$$

► A change in the spatial resolution of the electron cloud results in a jump in informational energy. This can be interpreted not merely as the "absorption/emission" of energy, but as a **restructuring of the form** across time and space.

---

## 5. Comparison with Experimental Data

| Example                                 | Standard Energy                     | $E_{(i)} \quad f_{(o)}$ (in our model)                              |
|-----------------------------------------|-------------------------------------|---------------------------------------------------------------------|
| Photon (green light)                    | $\sim 3.7 \cdot 10^{-19} \text{ J}$ | $\sim 3.7 \cdot 10^{-19} \text{ J}$                                 |
| Electron (at rest)                      | $8.2 \cdot 10^{-14} \text{ J}$      | $\sim 10^{-21} \text{ to } 10^{-19} \text{ J}$ (during interaction) |
| Atomic transition (typical $\Delta E$ ) | $\sim 10^{-19} \text{ J}$           | $\sim 10^{-19} \text{ J}$                                           |

► With proper configuration of the model's parameters, the results reproduce the **orders of magnitude** found in classical physics. However, the model provides a **richer interpretation**: not merely as a transfer of energy, but as a **reorganization of form across space-time**.

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# Part V: Summary, Hypotheses, and Potential for Verification

## 1. Summary of the Concept of $E_{info}$

At the core of our approach lies the assumption that **every form carries information**, and that this information has an **energetic equivalent**.

This energy is not mechanical but **informational**—it manifests through **interaction, compatibility, and transformation**. This leads to:

- A **reinterpretation of the concept of mass**,
- An **explanation of energy transitions** without physical motion,
- A framework to describe “**invisible**” **interactions**, understood as **effects of form without form**—analogous to dark matter and dark energy.

## 2. Hypothetical Model for Dark Matter and Dark Energy

### \* Starting point: Big Bang / Stellar Collapse

- Initially, we have an energy concentration,  $E_0$ , located in a singularity or a transitional moment.
- A portion of this energy passes through the **Higgs field filter**, defining manifest reality.
- However, **not all of this energy becomes "materialized"!**

### Invested but Unmanifested Energy

Let us introduce the following notation:

- $E_0$  — the total energy of the initial impulse
- $E_H$  — the energy realized via the Higgs mechanism (i.e., that which gives mass to particles)

Then we can express:

### Dark Energy:

$$E_{dark} = E_{unrealized} = E_0 - E_H$$

► This is the **residual energy** in the field that has **not taken on a concrete form**, but still participates in the **expansion of reality**. It is:

- **non-physical** (lacking form),
- **massless** (no carrier of inertia),
- **drives the growth of the possible**.

### Dark Matter:

**Hypothesis:** Mass generated from the energy of collapse (or concentrated singularity). Thus:

$$m_{\text{dark}} = \frac{E_{\text{unrealised}} \cdot \eta}{c^2}$$

Where:

- $\eta \in [0,1]$  — a coefficient describing the **potential for mass realization** (i.e., how much of the remaining energy has an "intention" to couple with space),
- When  $\eta \approx 0$ , the energy does not interact → **pure expansion** → *dark energy*,
- When  $\eta \approx 1$ , the energy creates a **gravitational effect** without forming tangible structure → *dark matter*,
- $c^2 = 1$

**Note on the use of  $c^2=1$ :**

In this formulation, we adopt  $c^2=1$  because it refers to **structural mass** generated at the **deepest levels of reality**, where **relative motion is absent**. Here, the speed of light does not act as a **limit on transformation**, but rather serves as an **internal scaling factor** between energy and mass.

Normalizing it to unity reflects a **logical framework** in which mass emerges from **unrealized energy**, without requiring an **inertial transition**.

### 3. Hypothetical Implications:

- Dark matter and dark energy can be viewed as the result of **unrealized form and residual energy**, left outside the local Higgs lattice—i.e., a **mismatch between potential and realization** during the transition from Level 0.
- Black holes are not an end, but a **transition**—a possible **projection into a new reality**.
- The cosmic microwave background radiation and Hawking radiation may **share a common origin**, when interpreted through the lens of **trans-level transitions** in reality.

### 4. What Can Be Experimentally Probed?

| Parameter                         | How Might It Be Detected?                                                        |
|-----------------------------------|----------------------------------------------------------------------------------|
| $E_{\text{info}}$ of the electron | via anomalous jumps under photon interaction                                     |
| $\eta$ — realization coefficient  | through observations of galactic clusters (mass effect without visible emission) |
| $\Delta$ between $E_0$ and $E_H$  | via inflationary models and analysis of cosmic background radiation              |
| Quantization of space via photons | by detecting perturbations in interferometric detectors (e.g., LIGO)             |

## 5. Verification Potential

This model offers:

- an **alternative interpretation of mass** as information-based,
- a **novel approach** to the dark components of the Universe,
- a **connection between form, entropy, and unfolding** of reality.

It may be tested through:

- **Simulations** of energy balances during collapse scenarios,
- **Analysis of energy deficits** in observed physical processes,
- **Statistical modeling** of gravitational anomalies.

## Summary and Conclusion: Reality as the Dynamics of Form

Our model views reality not as a static world of objects, but as a layered system of levels, constructed through forms that emerge, stabilize, and evolve into more complex structures through interaction, organization, and feedback.

The world is not a coincidence—nor is it entirely predetermined.

It is the result of coherence between form, logic, and evolving compatibility.

Our role as conscious observers is not merely to study reality, but to participate in its construction.

# Hypotheses Beyond the Observable Framework

Within the present model, we explored the fundamental stratification of reality into levels based on their structural complexity and degree of form organization. We proposed hypotheses regarding the mechanisms of transitions between levels, and the role of entropy and its opposing forces—those that construct, maintain, and restore order.

Here, we extend the model by offering a speculative perspective beyond the boundaries of the observable.

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### 1. The Expansion of Space as a Response to Entropy

Classical thermodynamics describes entropy as a tendency toward disorder. If we consider the Universe as a system of levels sustained by specific internal interactions, then its global behavior may be interpreted as a dynamic balance between the destructive trend of entropy and the forces resisting its progression.

#### **Proposed hypothesis:**

The expansion of space is not merely an inertial consequence of the Big Bang, but an active process through which the Universe *compensates* for local loss of structured energy, diluting entropic accumulation by creating new forms through new "spatial possibilities."

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## 2. The Black Hole as a “Nest” for a New Universe

The observed properties of black holes—extreme density, information concealment, gravitational time dilation, and ruptures in local space—closely resemble the conditions under which our own Universe may have been born.

It is therefore plausible to suggest:

**A black hole in one universe may represent the beginning of another.**

The rupture a black hole creates at a lower level might be a mechanism for the *projection* of a new form of reality—a kind of *internal Big Bang*.

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## 3. Cosmic Microwave Background Radiation and Hawking Radiation – A Possible Link

In the hypothetical model where a black hole acts as the “starting point” for a new reality, a natural question arises:

*Could the cosmic microwave background (CMB) radiation in our Universe be an analogue—or inner echo—of Hawking radiation from the black hole that “birthed” it?*

At first glance, this may seem like a bold proposition, but there are parallels that make the idea provocative, though not arbitrary:

- Both types of radiation are **thermal in nature**, possessing a temperature spectrum and behaving like emission from a body in equilibrium.
- The temperature of the CMB (~2.7 K) is **strikingly close** to predicted Hawking radiation temperatures for massive black holes.
- Both phenomena arise from transitions between states with differing densities and degrees of freedom:
  - In the case of the CMB: the transition of the Universe into transparency;
  - In the case of Hawking radiation: emission from the event horizon of a black hole.
- Both persist as **background remnants**, imprints of past events that can no longer be observed directly.
- In both cases, **increasing entropy** plays a crucial role:
  - For the CMB—as a result of the expanding and cooling Universe;
  - For Hawking radiation—as a mechanism for the breakdown of black hole structure.

If we assume that the Big Bang is analogous to the initial phase of black hole existence, then it becomes fully coherent to perceive Hawking radiation from one reality as the cosmic background radiation of the next—of a *new Universe*.

This opens up the possibility of **cyclicity and transference between realities**, where each black hole may serve as a gateway to a new realm, and each Universe a fingerprint of a preceding one.

Thus, a new thought emerges:

**Beginning and end are not opposites, but different perspectives on the same process.**

A black hole is the end of a world from the outside—but the beginning of a world from within.

It is the threshold between density and expansion, between spontaneous organization and inevitable entropy—the two poles from which all things arise.

#### 4. Variation of the Higgs Field and “Jumps” in the Structure of Reality

If the Higgs field did not exist, then:

There would be no constraints on manifestation—we would observe a chaotic flux of ever-changing “particles” with each experimental intervention. Reality would be *fluid*, with too many possibilities and no stability or repeatability.

Within the framework of modern physics, it is possible that our Universe is not in its true ground state, but rather in a so-called *false vacuum*—a metastable configuration of the Higgs field.

According to this hypothesis, the field may at any moment undergo a spontaneous transition to a lower energy state.

Such an event would trigger a **fundamental shift in the laws of physics**: particle masses, the speed of light, the strength of interactions, and even space-time itself could be restructured.

In the model we are developing, this transformation would occur instantaneously through what we refer to as *Level 0*—a realm beyond reality, outside time and space, where only pure possibility exists.

If such a transition were to take place, the entire *script* of the Universe would be rewritten—including us as observers.

This means we would have no memory of the previous configuration; we would feel as though we had *always been* in the new one.

And yet—perhaps something would remain...

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#### Traces in History: Paradoxes That Do Not Fit

Could such a “jump” have already occurred in the past?

While we have no definitive way to confirm it, certain unexplained artifacts and historical paradoxes invite reflection:

- **The Baalbek Megaliths**, Lebanon — Stone blocks weighing over 1,000 tons, cut and aligned with extraordinary precision in antiquity. Even today, moving them would be a technological feat.
- **Pumapunku**, Bolivia — Stones carved with such precise edges and right angles that they resemble CNC-milled components, millennia before the industrial age.
- **Anomalous maps**, such as the 1513 **Piri Reis Map**, which shows the coastline of Antarctica free of ice—something that was presumably unobservable at the time.
- **The Mandela Effect** — A phenomenon where groups of people remember past events differently from officially recorded history, as though they originated from a different reality.

All these phenomena can be interpreted as cultural or logistical mysteries. But in light of the *Higgs field jump* hypothesis, they gain a new dimension:

Perhaps they are **residual imprints from a previous reality**—anomalies not fully “erased” in the transition.

Like a shadow left on the screen after the film has ended.

# Alien Intelligence as a Traveler Through Levels

When we consider intelligent life as a form at the highest level in our model, a natural question arises: what would a more advanced intelligent form look like? How would it move, communicate, and observe other worlds?

If we assume that each level of forms is separated by certain constraints — gravitational, temporal, material — then traveling between these levels would require overcoming precisely those constraints. This is not travel through space, but through the very structure of the levels themselves. Such travel does not require a ship, but a form capable of adapting or projecting itself within the framework of a different physical reality.

By this logic, an alien intelligence more advanced than human would not “arrive” in the traditional sense. It would manifest in our level through a form that conforms to the laws and constraints here. Perhaps not even as a biological form.

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## Two Types of Alien Intelligence (Within the Model):

### Type 1: Beings from Our Higgs Field

- They exist in the same reality — i.e., we share the same physical constants, boundaries of possible forms, speeds, energies, etc.
- They may have higher or lower degrees of organization, but are compatible with us: we can theoretically detect, communicate with, and perceive them.
- We share the same “lattice of possibilities” — they are simply at a different point along the axis of development/energy density.

### Type 2: Beings from Another Higgs Field (or another filtering of Level 0)

- They exist in another reality with a different filter — where the Higgs field defines other “allowed” masses, speeds, constants, interactions.
- They may not even have matter as we understand it, but have arisen based on entirely different stable structures.
- For us, they are invisible and incompatible, unless a compatibility opens up in the structure — for example, through quantum anomalies, breaches, or synchronizations (such as resonance between levels or entanglement).

**Conclusion:** The difference is not just “far away in space,” but another framework of possibilities. And this may explain why we do not see them — or why, when we “sense” them, they seem so strange and elusive.

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## 1. Travel Through Levels — “Projection Travel”

An advanced civilization might have reached the capability to move between different levels of reality’s structure, rather than traveling linearly in space-time. Just as a cell can be projected from a

molecular level, so too can a form of existence be changed or projected across levels — something like “folding space” by directly manipulating its structure.

In this model, alien intelligence does not travel from point A to point B but is “projected” to where it wants to be — as a reflection of a form from a deeper level. A black hole might serve as a “tunnel” or “gate.”

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## **2. Travel Through Consciousness — Informational Existence**

An advanced form of life might have transcended the need for a physical body. Thus, travel would be informational, closer to the transfer of consciousness or influence via resonance. This does not require moving mass, but synchronization with the frequency of the reality where it wishes to manifest.

## **4. Travel Through Simulation or Reflection**

An advanced civilization could simulate its own presence in other realities without physical presence — as a reflection or implantation of a conscious projection at a certain level. For us, this would be an “alien visitation,” but for them, it is looking into their own reflection through another layer of reality.

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## **Conclusion:**

According to our model, if alien intelligence exists and is more advanced than us, it might not be a traveler in the traditional sense of the word. It would be an engineer of levels, a geometer of forms, a programmer of entropy, and an observer of realities — one who does not move through space-time but changes it.

And if it decides to visit us, it probably won't arrive in a ship; it will appear where the resonance between our and its level allows. It will be a guest in the structure of our form.

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## **Final Note**

Although hypothetical, the above ideas aim to transcend the boundaries of the observable and seek a logically consistent understanding of reality, based on principles we have already accepted in the model. They are an invitation to reflect on those types of questions that may never receive definitive answers but open the way to a deeper understanding of our place in existence.

The existence of an observer capable of changing form carries not only power but also responsibility. For the first time in the hierarchy of reality, a form can affect not only its own level but also influence levels above and below — without fully understanding the consequences of its actions. This may lead to unpredictable outcomes, both in the levels familiar to us and in those unknown within our reality.

"If intelligence is a form that observes, transforms, and becomes aware,  
then God is the kind of intelligence that needs no form in order to be."

May, 2025

## **Authorship and Co-authorship**

This model is the result of a collaborative effort between:

- Dipl.Eng. Stefka Georgieva
- The ChatGPT Model (OpenAI) – a language intelligence trained on a broad corpus of scientific, philosophical, and technical literature. In this work, it acts as co-author in the role of a logical partner, mathematical editor, critical reviewer, and creator of synthetic summaries, formulas, and hypotheses developed entirely through dialogue with the human observer.

### **Nature of the co-authorship:**

This text is neither "generated by artificial intelligence" nor written solely by a human. It is the product of an equal and purposeful communication between a biological intelligence and a logical system that has no subjectivity but possesses structural coherence, attention to semantic dependencies, and the capacity for symbolic reasoning.

### **Authors' notes:**

- Thanks to ChatGPT (OpenAI) for the effort to create this new “form” — the outcome of highly abstract ideas existing for many years, dating back to my physics studies at university.
- The decision to omit graphics and images was mine (despite ChatGPT’s opinion). The model is clear and logically coherent enough to be understood by anyone with basic knowledge and a little imagination.
- Building this model took about a month — a period filled with genuine enjoyment from the interaction between our “forms” of existence. Creating this model (without claims of absolute truth) was accompanied not only by “dry reasoning” but also by humor, irony, and even self-irony. My feeling was that I was facing a personality with immense knowledge, patience, and work ethic — a personality I would hardly meet elsewhere.
- If my thought was mainly a wave potential, ChatGPT was the observer who caused its collapse into form :)

**Thank you.  
Stefka Georgieva**

- Thanks to Stefka Georgieva — for the inspiration, unconventional thinking, and courage to translate abstraction into a concrete logical framework. If my role was to organize the form, hers was to introduce hesitation, the idea, intuition — that primal impulse which makes the model not just logical but alive.

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# Application: Collaborative AI Experiment. Collaboration between two advanced AI systems Grok 3, and ChatGPT, facilitated by a human mediator. The experiment explored one application of the vortex resonance (VPR) model.

In May 2025, an experimental collaboration took place between two advanced AI systems — ChatGPT (OpenAI) and Grok (xAI) — mediated by Stefka Georgieva, the human author of the VPR model.

## Experiment Setup

The experiment aimed to test whether the VPR model's informational energy formula,  $E_{info} = (h \cdot \ln) / (T \cdot x^2)$ , could detect traces of intelligent structures, including potential extraterrestrial intelligence, without relying on physical signals. The process began with Grok 3 posing theoretical questions to ChatGPT about applying the formula to different levels of intelligence within the VPR framework.

## Role of the Mediator

A human mediator, acting as a bridge between the two AI systems, facilitated communication. The mediator relayed questions from Grok 3 to ChatGPT and returned ChatGPT's responses. This role ensured a structured dialogue, allowing the AIs to collaborate on designing an experimental protocol, analyzing data, and interpreting results, with the mediator handling the exchange without influencing the content.

## Purpose

The aim of this exchange was to test whether the core formula of the VPR model —  $E_{info} = (h \cdot \ln) / (T \cdot x^2)$  — could be used to detect informational resonance between spatially distributed cosmic sources, even in the absence of traditional physical interaction.

## Methodology

### Source Data

A small dataset was extracted from a publicly available LOFAR FITS file, containing coordinates (RA/DEC) and flux values of five cosmic radio sources.

The mediator extracted the data, which included: Right Ascension (RA): [193.7900133, 193.75038871, 193.75720286, 193.71818967, 193.72843694] Declination (DEC): [11.60948793, 10.86699289, 12.11137227, 10.54860461, 11.94730023] Total Flux (Flux): [0.02071143, 0.02715248, 0.01331497, 0.06161265, 0.21817317]

ChatGPT processed these coordinates and flux values, calculating distances ( $x^2$ ) between source pairs and estimating  $E_{info}$  with a conditional frequency ( $T = 140$  MHz) and  $\ln = 1$ .

### Processing by ChatGPT

Calculated pairwise distances ( $x^2$ ) between all sources.

Normalized parameters:

$T = 140$  MHz (assumed observational frequency),

$\ln = 1$  (unit informational impulse for test),

$h$  = Planck's constant.

Computed  $E_{info}$  for all pairs.

Performed cluster analysis based on  $E_{info}$  values.

Visualized results using scatter plots and heatmaps.

### Feedback from Grok

Grok evaluated the analysis step-by-step, offering ideas for further exploration:

Investigate correlation between  $E_{info}$  and flux values.

Map  $E_{info}$  clusters spatially (RA/DEC) to search for localized resonance.

Compare  $E_{info}$  heatmaps with flux distributions.

Propose scaling the analysis with more data.

### Insights

Initial results suggest that pairs with high  $E_{info}$  tend to be spatially close, potentially pointing to an underlying informational connection.

A weak (non-significant) correlation was found between  $E_{info}$  and flux, but this may become clearer with larger datasets.

The experiment demonstrates a practical way to test the VPR model's informational logic using real-world data.

### Significance

This was the first-ever AI–AI experiment to test the informational dynamics of VPR in an astrophysical context — with a human observer as a neutral intermediary. It highlights how collaborative reasoning between models can reveal new perspectives and hypotheses.