

Fundamental Language: From Meta-Law to Quantization

1 Is All the Energy Fixed After the Big Bang?

User question: *After the Big Bang, is it possible to add energy to the system, or is that all the energy we have in the universe?*

Answer: The prevailing view in modern cosmology is that the universe is a closed system: the total energy—whether it includes visible matter, radiation, dark matter, or dark energy—was fixed at the moment of the Big Bang. No new energy can be added from outside the system. In FL Field Theory, this implies that the total capacity for information instantiation is also fixed. Information can only be *extracted* from the primordial matter-energy structure and transformed; it cannot be created ex nihilo.

This gives rise to an important analogy:

$$\sum_{\text{states}} P_i = 1 \quad \Longleftrightarrow \quad \sum_{\text{instantiated information}} I_i = \text{constant}$$

Just as the sum of all probabilities in a complete distribution must equal one, the total amount of instantiated information in the universe—constrained by energy—remains conserved.

2 Particles as Nodes, Energy as Edges

User question: *Let's say that the particles are objects and energy has something to do with edges connecting these objects. Let's discuss this.*

Answer: Yes, we can formalize this in the language of graph theory. The particles or entities at a given moment form the vertex set $V(t)$, and energy interactions between them—gravitational, electromagnetic, nuclear—constitute the edges $E(t)$ of the graph. An edge e_{ij} between two particles v_i and v_j carries a weight w_{ij} corresponding to the magnitude of interaction energy:

$$G(t) = (V(t), E(t)), \quad \text{with } w_{ij} = E_{ij}$$

This framework supports FL's notion that information is instantiated through interaction. The presence and magnitude of each edge are not only physical interactions but also the creation of describable structure—information—in the FL Field.

3 FL as a Series of Instantiations

User note: *FL is the instantiation of an observation... a series of instantiations, starting from the moment that possibly infinite entropy yields to division of particles and energy.*

Answer: That is precisely the operational interpretation of FL. Each instantiation is a boundary condition imposed by observation, carving structured states out of entropy. From an infinite entropy backdrop—characterized by maximum uncertainty—the first act of instantiation produces a finite configuration of nodes and edges:

$$\text{FL: } \Omega_{\max} \xrightarrow{\text{instantiation}} G(t_0)$$

where Ω_{\max} is the total set of possible states (entropy) and $G(t_0)$ is the first instantiated graph of objects and interactions. Each subsequent moment t_k is a recursive application:

$$G(t_{k+1}) = \hat{F}_{\text{FL}}(G(t_k), \text{Observation}_k)$$

4 Quantization in FL Field Theory

User question: *Let's try to derive the quantum units for Fundamental Language and its fields.*

Answer: To analogize quantum mechanics, we define FL's fundamental units:

- **Quantum of Information:** \mathcal{I}_0 — the smallest resolvable unit of information in FL, akin to a bit but defined over continuous fields.
- **Observation Rate:** τ_0 — the minimum time interval between two instantiations.
- **Max Information Velocity:** c_F — the highest speed at which information (in the FL sense) can propagate through the FL Field.
- **Information Action:** $\mathcal{Q}_F = \mathcal{I}_0 \cdot \tau_0$ — analogous to Planck's constant.

From these, we define:

$$E_F = \mathcal{Q}_F \cdot \omega_F, \quad p_F = \mathcal{Q}_F \cdot k_F$$

which represent FL analogues to energy and momentum, driven by rates of change in informational state.

5 Conservation and Distribution of Information

User question: *If no new energy can be created, can we model the information like probabilities summing to one?*

Answer: Yes, we can. Define each state i as having information I_i . Then:

$$\sum_i I_i = I_{\text{total}}$$

and defining $p_i = \frac{I_i}{I_{\text{total}}}$, we obtain:

$$\sum_i p_i = 1$$

This structure provides a probabilistic (Shannon-like) view over an ontologically fixed information budget, echoing quantum amplitudes and thermodynamic ensembles.

6 Improved Summary

Combining the revised sections, the FL Field emerges as a meta-physical layer that:

- Instantiates observations as structured configurations of information.
- Evolves as a dynamic graph constrained by observer-dependent operators.
- Contains quantized units of information, action, and velocity analogous to quantum physics.
- Obeys conservation rules where total information is distributed but not created anew.
- Allows communication to be reinterpreted as internal reconfiguration of the observer-field interface.