

# ETHON-SPACE (SOURCE)

## *Compressible structure of space and physical consequences*

Author : Jean-Pierre Laine projet: Genesis-1 <https://genesis1.net> DOI : 10.5281/zenodo.18572293 date: 01/16/2026

### 1. Introduction

Current descriptions of space rely on a continuous and globally rigid metric, modulated by gravitational curvature.

This approach is remarkably effective at large scales, but it reaches its limits when one attempts to coherently link:

- mass,
- inertia,
- internal dimensions of particles,
- transitions between radiative and massive states.

**Ethon-Space** proposes a minimal hypothesis:

**space itself possesses an elementary structure, capable of compression and torsion**, and this structure directly conditions observable physical properties.

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### 2. Fundamental Postulate: A Compressible Minimal Spatial Brick

We postulate the existence of a fundamental spatial unit, called an **ethon**, satisfying three essential properties:

- **Indivisibility**: an ethon cannot be fragmented without loss of physical coherence,
- **Non-rigidity**: an ethon is not an absolutely fixed length,
- **Bounded stability**: its effective dimension lies within a narrow, universal window.

This hypothesis breaks with the implicit assumption that a fundamental entity must be perfectly rigid.

Absolute rigidity would prohibit torsion, compression, and therefore the emergence of complex physical structures.

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### 3. Dimensional Window of the Ethon

The effective length of an ethon is not constant, but bounded between two physical limits:

- **lower bound**: on the order of the Planck length,

- **upper bound:** approximately twice that value.

Within this interval, the ethon remains indivisible, coherent, and fundamental.

This minimal variability is not a technical detail — it is a **necessary condition for the existence of matter**.

If the ethon were rigidly fixed at the Planck length:

- no torsion could occur,
  - no compression could arise,
  - no local densification of space could exist,
  - no mass could emerge.
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## 4. Compression, Torsion, and Emergent Physical Properties

Compression in Ethon-Space does not correspond to the disappearance of space, but to a **local increase in its structural density**.

Three regimes arise naturally:

- **Weakly constrained regime**  
Quasi-linear space structure, associated with massless radiative phenomena.
- **Stable torsioned regime**  
Moderate compression and closed geometric torsion, associated with stable massive particles.
- **Extreme compression regime**  
Maximal spatial density, leading to confinement and gravitational limits.

In this view, **mass is not an added property**, but the geometric manifestation of torsion and compression of space itself.

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## 5. Apparent Dimensions vs Internal Dimensions

A direct consequence of the model is the distinction between:

- **apparent dimensions**, measured by an external observer in weakly compressed space,
- **real internal dimensions**, proper to regions of high spatial density.

Thus:

- a particle is not point-like, but a highly contracted spatial structure,
- an atom does not have a single size, but a superposition of internal metrics,
- measured interatomic distances correspond to already dilated space.

From the perspective of a local observer situated in a highly compressed region (for example near a black hole), electronic structures appear extremely distant, while they seem tightly packed to an external observer.

Distance therefore becomes **relative to the local state of spatial compression**.

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## 6. Uncounted Compressed Spaces and Cosmological Implications

At large scales, Ethon-Space implies that the **real volume of the universe is not equal to its apparent metric volume**.

Highly compressed regions — stellar cores, galactic nuclei, extreme-density zones — contain real space in contracted form that escapes standard cosmological measurements.

This leads to several major consequences:

- the universe may contain far more space than it appears to,
- certain regions can store large amounts of spatial structure without apparent volume,
- measured cosmic age and size reflect an averaged metric, not the total existing space.

This approach offers an alternative reading of phenomena usually attributed to additional entities, **without introducing ad-hoc fields**.

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## 7. Current Framework, Limits, and Perspectives

Ethon-Space does not claim to replace existing theories within their domains of validity.

It proposes an underlying geometric framework capable of:

- linking mass, inertia, and spatial structure,
- explaining variability of internal dimensions,
- unifying atomic, subatomic, and cosmological phenomena through a single compression mechanism.

Future developments must:

- formalize the mathematical relations between torsion and spatial density,
  - identify indirect experimental signatures,
  - clarify limiting conditions of extreme regimes.
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## Conclusion

Ethon-Space rests on a simple but structuring idea:

**Space is not a passive support, but a structured, compressible, and malleable entity capable of carrying fundamental physical properties.**

This hypothesis complicates classical geometric intuition, but in return provides strong coherence between domains previously treated as disconnected.

What we measure is not total space,  
but **space as it is locally relaxed.**

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## Correspondence Boxes with Established Physics

### General Relativity

Local compression of space ↔ metric curvature  
Compatibility: no Einstein equation is violated.  
Gain: curvature becomes a consequence, not a primitive.

### Planck Length

Lower bound respected, no sub-Planckian assumption.  
Gain: minimal length does not imply rigidity.

### Photons and Mass

Massless states ↔ weakly constrained geometry.  
Gain: photon nature remains purely electromagnetic.

### Inertia

Inertia ↔ resistance of a compressed spatial configuration to reorganization.  
Compatibility:  $F = ma$  remains locally valid.

### Atomic Dimensions

Measured radii ↔ relaxed metric; internal dimensions ↔ compressed metric.  
Gain: resolution of the “empty atom” paradox.

### Cosmology

Observed volume ↔ average relaxed space.  
Gain: alternative reading of global balances without extra fields.

## Parsimony Principle

No new fields, no new constants.

Unification by structure, not accumulation.

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### Document 4 complete

Dis-moi simplement :

- **OK, continue** → *Document 5: Physics Equations Lexicon*
- ou **ajustement ponctuel** avant le dernier.

On termine proprement.

**Vous avez dit :**

OK, continue → Document 5: Physics Equations Lexicon

**ChatGPT a dit :**

Parfait. On termine la série.

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