

# Seamless Hourglass Model (SHG)

---

## Abstract

The Seamless Hourglass Model (SHG) describes reality as the emergent behavior of a single evolving informational substrate: the **Infostream**. At each moment, a minimal-loss, maximum-coherence trajectory is chosen from a cloud of possible states, producing the compressed projections we perceive as space, time, and matter.

---

## Core Definition

### **Foundational Premise (Infostream):**

Reality is the real-time, emergent product of the Infostream — an evolving informational continuum. All structures and processes are embedded within this continuum, arising through ongoing coherence-driven compression.

### **Seamless Hourglass (SHG):**

Each moment is a discrete compression event in a cycle of perception and update, driven by *coherence pressure* — forces favoring stable, internally consistent states.

---

## SHG as a New Physics Framework

SHG provides an ontologically economical reinterpretation of physical law. Where mainstream physics invokes multiple ontic layers, SHG grounds both quantum behavior and gravitational geometry in one compression principle. Its implications extend into quantum theory, relativity, and cosmology.

\*\*Advantages over other frameworks:

**Unified view (QM + GR):** Quantum behavior reflects pre-compression optimization; gravitational curvature reflects post-compression stability. Both are regimes of the same coherence-minimization function.

**Determinism beneath statistical behavior:** Measurement outcomes arise from globally constrained compression. Statistical patterns reflect local opacity to the underlying state, not intrinsic randomness.

**No fundamental locality:** The Infostream lacks a native metric; locality and distance arise only in projection. Entanglement appears nonlocal because two projected sites refer back to one underlying structure.

- **Over quantum interpretations:** Replaces randomness and ontological overload with deterministic, coherence-driven selection.
  - **Over General Relativity:** Reinterprets spacetime as an emergent projection of compression geometry within the Infostream, simplifying ontology.
  - **Over mainstream cosmology:** Removes the need for inflaton fields and dark energy.
- 

## SHG as an Interpretation of Quantum Mechanics

SHG offers a compression-based reinterpretation:

- **Wavefunction:** Possibility cloud before compression.
- **Collapse:** Measurement finalizes compression, selecting one coherent state.
- **Superposition:** Pre-compression buffer of candidates.
- **Entanglement:** Grouped encoding of correlated variables to minimize loss.
- **Quantum eraser:** Rollback of constraints, triggering recompression.
- **No parallel worlds:** Discarded states vanish.
- **Motive for collapse:** Coherence pressure eliminates instability.
- **Continuous optimization:** Between measurements, states are refined.

**Contrast with Mainstream:**

- **Copenhagen:** Wavefunction is abstract; outcomes are random. SHG replaces randomness with deterministic but opaque selection from informationally real pre-collapse states.
  - **Many Worlds:** All possibilities realized in infinite branches. SHG selects one optimized path, avoiding ontological overload.
- 

## SHG and General Relativity

In General Relativity (GR), spacetime is not a substance but a relational geometry shaped by mass-energy. SHG offers a compatible view: space and time are not fundamental substrates but emergent coordinates arising directly from compression dynamics in the Infostream.

- **Projection basis:** Space and time function as semi-dependent coordinate constructs derived from constraints on coherence optimization.
- **Metric as compression geometry:** The spacetime metric corresponds to distances in the compression landscape—shorter descriptive codes align with stable trajectories.
- **Curvature as coherence bias:** What GR describes as curvature is reframed as local adjustments in coherence optimization.
- **Gravity as emergent order:** Apparent gravitational attraction reflects the system's bias toward globally consistent, compressible states.

This perspective aligns SHG with GR while simplifying its ontology: instead of spacetime as an independent manifold, it becomes a practical coordinate system for expressing compression-consistent relations within the Infostream.

---

## SHG and Cosmology

Mainstream cosmology requires both an **inflaton field** (to drive exponential expansion) and **dark energy** (to account for late-time accelerated expansion). SHG provides a single mechanism that renders both unnecessary:

- **Variable effective speed of light:** The speed of light reflects the maximum rate of coherence propagation within the Infostream. Locally constant today, it may have differed under early low-complexity conditions.
- **Early phase:** In the initial low-correlation regime, space–time separation has not yet meaningfully emerged. Describing coherence update rates as a “speed” is misleading: apparent inflation is a projection artifact of sampling an undifferentiated substrate.
- **Late phase (dark energy analogue):** Apparent accelerated expansion corresponds to continued shifts in effective coherence-propagation rates as global constraints increase.

Thus SHG unifies inflation and dark energy under one explanatory principle: the evolution of coherence propagation speed in an informational substrate.

**Note on mainstream context:** Proposals for varying speed of light (VSL) cosmologies exist in peer-reviewed physics (e.g. João Magueijo & Andreas Albrecht, 1999). SHG generalizes this intuition within its compression framework, showing that questioning c's constancy on cosmological scales is not scientific heresy but an exploratory alternative.

## Underlying Interpretation: the Velocity Pixel ( $c_0$ )

In SHG, the “speed of light” is not a velocity but the projection of a deeper invariant — the Infostream’s fundamental coherence-update rate  $c_0$ . Space and time arise as two complementary shadows of this single substrate: - time = sequential projection of coherence updates, - space = relational projection between coherent loci.

Thus the observed constancy of  $c$  in CTO is not a property of spacetime itself but a consequence of both projections sharing the same underlying invariant  $c_0$ . Variations in effective  $c$  at cosmological scales reflect changes in informational complexity rather than alterations of a fundamental constant.

---

## SHG and Evolution

In biology, natural selection compresses uncertainty into efficient codes — DNA, brains, science, AGI. SHG generalizes this principle: local coherence choices accumulate into a global trend toward ever more compressible structures. Laws, planets, life, and mind emerge not by miracle but by the statistics of compression.

---

## Limitations of SHG

### Note on Potential Empirical Probes

A separate technical document outlines a laboratory protocol — an adaptive interference experiment — designed to test whether closed-loop, compression-minimizing control produces statistical deviations beyond standard quantum predictions. SHG does not require such an effect; however, a positive result would be compatible with its compression-driven dynamics. The experiment is optional, falsifiable, and independent of SHG's core ontology.

- Does not explain the Infostream's ultimate substrate.
  - Lacks exact predictive formulas without further formalization.
  - Leaves physical implementation open.
- 

## Conclusion

SHG frames reality as a compression-driven selection process, avoiding speculative excess while addressing physical paradoxes. Meaning, time, and identity arise from continual adaptive stabilization — not fixed laws or absolutes.

---

## Relevant References

- **Jürgen Schmidhuber:** Advocates the principle that compression is a fundamental optimization driver in complex systems. While his work focuses on artificial intelligence, the concept parallels SHG's view of compression as the mechanism shaping the most coherent possible trajectory of physical reality.
  - **Nick Bostrom:** Originator of the modern simulation argument, which frames reality as potentially generated by computational processes. While Bostrom's model does not specify the internal mechanics, SHG can be seen as a concrete mechanism that could underlie such a simulation.
  - **João Magueijo & Andreas Albrecht (1999):** Early proponents of varying speed of light (VSL) cosmologies, suggesting  $c$  may have been higher in the early universe as an alternative to inflationary models.
  - **Stephen Wolfram (2020):** Proposed a physics framework based on fundamental information updates, with spacetime and particles emerging from underlying graph-rewrite rules — conceptually parallel to SHG's Infostream substrate.
  - **Carlo Rovelli:** Founder of Relational Quantum Mechanics, emphasizing that physical states arise only in interactions and do not preexist as absolute quantities — consistent with SHG's compression-based emergence of definite outcomes.
- 

*Cohere. Compress. Realize.*

---