Time Without Time:

From Geometry to Energy Coherence

Alexey A. Nekludoff

AstraVerge Research

an@astraverge.org

ORCID: 0009-0002-7724-5762

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Abstract

This paper unifies the ontological, metamodel, and physical interpretations of the *Philosophy of Discrete Being (FDB)* into a single framework the **Coherence Field**. It replaces the geometric ontology of spacetime with a dynamic ontology of coherence between discrete acts of being. The **Global Tick Generator (GGT)** defines the universal rhythm of existence; localities differ in their synchronization with this rhythm, producing the phenomena known as energy, gravitation, and temporal flow. Two postulates of *ultimate* and *minimal* coherence define the ontological limits of being. Operational definitions relate these concepts to measurable quantities such as atomic-clock frequencies, local energy densities, and decoherence rates. A variational formalism, conservation laws, phenomenological predictions, and independent literature context are outlined. Time, in this interpretation, does not flow: it counts the persistence of coherence.

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1 From Geometry to Ontology

Geometry is an excellent language, but a poor metaphysics. Einsteins and Minkowskis constructions perfectly describe correlations of motion, yet they transform the descriptive surface of physics into its presumed substance. Curvature does not act; energy acts. Geometry records correlations between actsit cannot generate them.

In *Philosophy of Discrete Being*, physical reality is not a continuous manifold but a web of **acts of coherence**. What we call space-time is the trace of synchronization between these acts. Relativity remains empirically valid; only its ontological ground shiftsfrom geometry to coherence.

2 The Global Tick Generator (GGT)

Reality unfolds in discrete global actualizationsticks of beingproduced by the **Global Tick Generator (GGT)**. Each global tick represents a moment of universal coherence, aligning localities that each possess their own internal frequency ν_{loc}. The ratio

$$\omega(x) = \frac{\nu_{\text{loc}}(x)}{\nu_{\text{GGT}}}$$

measures local coherence. Perfect coherence ($\omega = 1$) yields the illusion of continuous space and time; deviations ($\omega \neq 1$) manifest as observable energy and temporal dilation. Energy, therefore, is not a stored quantity but a measure of desynchronizationthe degree to which a locality deviates from the universal rhythm.

Postulate 1 Principle of Ultimate Coherence (GGT)

Let ν_{GGT} denote the frequency of the Global Tick Generatorthe ultimate rate of acts of coherence.

$$\nu_L < \nu_{\text{GGT}} \quad \text{for all structured localities } L.$$

As $\nu_L \to \nu_{\text{GGT}}$, locality dissolves into the pure act of coherence. The GGT is finite but unobservableit makes observation possible.

3 The Coherence Field

Let the scalar field $\omega(x, t)$ represent local coherence relative to the GGT. Empirically, gravitation and time dilation correlate with spatial and energetic gradients of ω.

3.1 Operational Definitions

Global Tick Frequency. $\nu_{\mathrm{GGT}} \approx \sqrt{c^5/(\hbar G)} \sim 10^{43}$ Hz. **Minimal Coherence Frequency.** $\nu_{\min} \sim k_{\mathrm{B}} T/h$. **Local Coherence.**

$$\omega(x) = \frac{d\tau(x)}{dt_{\mathrm{GGT}}} = \sqrt{1 - \frac{v^2}{c^2} - \frac{2GM(x)}{rc^2}} \approx 1 - \frac{E(x)}{E_{\mathrm{GGT}}}.$$

3.2 Relation to Metric Description

$$ds^2 = \omega^2(x) c^2 dt^2 - \frac{1}{\omega^2(x)}\, d\mathbf{x}^2.$$

In weak fields, $\omega^2 \approx 1 + 2\Phi/c^2$, so $g_{00} \approx 1 + 2\Phi/c^2$.

$$\nabla_\mu \nabla_\nu \omega - g_{\mu\nu} \Box \omega \;\longleftrightarrow\; \frac{8\pi G}{c^4} T_{\mu\nu}.$$

$T_{\mu\nu}$ quantifies localized desynchronization within the coherence field.

3.3 Variational Formalism

$$\mathcal{L}_\omega = \frac{1}{2\kappa}(\nabla_\mu \omega)(\nabla^\mu \omega) - V(\omega) - \omega T, \qquad \Box\omega + \frac{dV}{d\omega} = \kappa T.$$

For weak fields, $V(\omega) \approx \frac{1}{2} m_\omega^2 (\omega - 1)^2$.

3.4 Symmetries and Conservation

Local phase shifts $\omega \to e^{i\alpha(x)}\omega$ preserve $|\omega|^2$ and yield current $J^\mu = \omega^* \nabla^\mu \omega - \omega \nabla^\mu \omega^*$. Lorentz invariance reappears in the high-coherence limit.

$$\nabla_\mu T_\omega^{\mu\nu} = 0, \quad T_\omega^{\mu\nu} = (\nabla^\mu \omega)(\nabla^\nu \omega) - g^{\mu\nu} \mathcal{L}_\omega.$$

3.5 Phenomenology and Experimental Signatures

Weak-field corrections:

$$g_{00} = 1 + \frac{2\Phi}{c^2} + \beta_\omega (\nabla\omega)^2, \quad g_{ij} = -\delta_{ij}\left(1 - \gamma_\omega \frac{2\Phi}{c^2}\right),$$

$\beta_\omega, \gamma_\omega \approx 1 + \mathcal{O}(|\nabla\omega|^2)$. Clock tests constrain $|\nabla\omega| < 10^{-15}$ near Earth. Predictions: nonlinear coherence gradients, gravitational dependence of decoherence, and stochastic phase noise in timing arrays.

3.6 Relation to Existing Frameworks and Predictive Outlook

Aligns with: teleparallel gravity (energy source), thermodynamic gravity (entropy balance), causal-set discreteness, and information-theoretic bounds (MargolusLevitin). Predictive signatures include redshift anomalies $\Delta z/z \sim |\nabla\omega|^2$, coherence-lifetime dependence on potential, and phase-delay effects in gravitational waves.

3.7 Independent Literature Context

Causal Set Theory (Bombelli et al. 1987; Sorkin 2005); Teleparallel Gravity (Aldrovandi & Pereira 2013; Krák et al. 2019); Thermodynamic Gravity (Jacobson 1995); Double Special Relativity (Amelino-Camelia 2002; Magueijo & Smolin 2002); Information Thermodynamics and Physical Limits (Landauer 1961; Bekenstein 1981; Margolus & Levitin 1998). The Coherence Field synthesizes these approaches, treating coherence modulation as the energetic substrate of spacetime structure.

3.8 Measurement Protocols and Target Sensitivities

Differential Optical Clocks. Compare clocks at heights Δh; goal 10^{-18} stability; constrain $|\nabla\omega| \lesssim 10^{-16}$.

Atom Interferometry. Phase shift $\Delta\phi \simeq (k_{\text{eff}} g T^2) + \phi_\omega$; target $< 10^{-3}$ rad precision; detect path-dependent coherence phase.

Moving Clock Campaigns. Compare flying/LEO clocks with ground; fractional precision $< 10^{-17}$; search for nonlinear $\delta_\omega(v)$.

Gravitational-Wave Tracking. Look for coherence-phase modulation $\phi_\omega(f)$; target $< 10^{-2}$ rad residuals in 1001000 Hz band.

Pulsar Timing Arrays. Analyse residuals $r_\omega \propto \int \omega(x(t))dt$; sensitivity $\sigma_r \lesssim 50$ ns.

Quantum-Platform Decoherence. Measure $T_2(\Phi)$ vs potential difference $\Delta\Phi$; expect $T_2^{-1} = T_{2,0}^{-1} + \alpha\Delta\Phi/c^2$.

These protocols bound $|\nabla\omega|$ and constrain variational parameters m_ω, κ; null results tighten limits on Coherence-Field dynamics.

4 Energy and the Origin of Time

Time is not a dimension but a coherence measure. Each localitys internal tick rate defines its proper time:

$$d\tau = dN\,\omega(x).$$

Increased energy or gravitation lowers coherence ($\omega < 1$), slowing local time. The arrow of time follows the direction of coherence decay, linking thermodynamic irreversibility to ontological desynchronization.

5 Postulate 2 Principle of Minimal Coherence

Let $\nu_{\min}$ be the minimal frequency of coherence:

$$\nu_L > \nu_{\min} \quad \text{for all localities } L.$$

As $\nu_L \to \nu_{\min}$, locality dissolves into incoherent ensemble R. All being unfolds within $\nu_{\min} < \nu_L < \nu_{\text{GGT}}$.

6 Conclusion

The Coherence Field unifies ontology and physics. Geometry describes; energy acts. The Global Tick Generator defines the universal rhythm of being; its local deviations yield motion, time, and gravitation. Relativity remains intact, but its foundation deepens: the universe is not curvedit **beats.**

References

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