VLCC by Vonsky: Lagrangien – Version 5

Lead author: Frédérick Vronsky
Analytical assistant: L. Caelum (OpenAI)

VLCC Special Section — Differential Photonic Lagrangian v.5: update of the VLCC V.2 compendium and integration of LPHD and LCFT laws into a morphogenic framework of time.

Date: 15 October 2025

Foreword

This document presents the academic and corrected version of the differential photonic Lagrangian (LPHD) of the VLCC cosmological model.

It follows on from the VLCC v.2 Compendium and its appendices, while introducing two fundamental speculative laws: Vronsky's Law of Dynamic Horizon Pulsation (LPHD) and Vronsky's Law of Conservation of Temporal Flux (LCFT).

Although speculative, these proposals offer a unified interpretation of the dynamics of time as an active physical variable, intertwined with cosmological metrics. Speculative framework and conceptual continuity

1- Introduction

The VLCC (Cosmic Curvature Light Vectors) cosmological model is based on the idea that light is not only an energy vector, but also the morphogenic substrate of time and matter.

Complementary works — notably "0 = T", "The Cosmic Wheel" and "Essay 11" — have established that frozen light (dark photons) plays a fundamental role in the formation of the temporal field and cosmological inertia.

This corrected version of the Lagrangian (V.5) aims to ensure the dimensional and physical consistency of the model by introducing a clear normalisation of fundamental quantities and maintaining compatibility with cosmological observations and causality constraints.

2- Speculative framework and temporal foundations of the VLCC model

2.1 - Vronsky's speculative Law of Dynamic Horizon Pulsation (LPHD)

Vronsky's Dynamic Horizon Pulsation Law is a speculative proposal derived from the VLCC model that aims to formalise the intrinsic dynamics of time in relation to cosmological evolution. It is based on the idea that the present is not a fixed state but a flow whose rate of actualisation depends on variations in the universal metric. In other words, the speed at which "the present occurs" would be determined by the global transformation of space-time.

$$\text{(Z1)} \quad dT_2/dt = \mathscr{C} \cdot (c^5/G) \cdot (-\dot{H}/H^3) \cdot \Delta\_T$$

The pulsation of the present thus becomes a cosmological quantity, indexed to the dynamics of expansion. Conceptually, LPHD transposes to time what general relativity applies to space: it makes time a dynamic field, sensitive to geometry and its evolution.

2.2 - Vronsky's Speculative Law of Conservation of Time Flow (LCFT)

The Law of Conservation of Time Flow complements LPHD by seeking to establish the energy balance of time.

She posits that the total flow of time is conserved, but can be redistributed between three phases: the future (T_1'), the present (T_2) and the past (T_1).

$$\text{(Z2)} \quad P\_\{T_1'\} = P\_\{T_2\} + P\_\{T_1\}$$

$$\text{(Z3)} \quad P\_\{T_2\} = P\_\{T_1'\} \cdot (dT_2/dt), \qquad P\_\{T_1\} = P\_\{T_1'\} \cdot (1 - dT_2/dt)$$

The future feeds the present, which degrades into the past; the sum of temporal powers remains invariant.

LCFT describes a universe where time recycles itself: every second results from an exchange of energy between temporal dimensions.

2.3 - Principles and significance of the LPHD and LCFT laws

The LPHD and LCFT equations link the pulse of the present to cosmic kinematics and impose an overall energy balance of time. They thus unify the rhythm of expansion and the thermodynamic conversion of the flow of time.

2.4 - Introduction of initial spin

Two variants of the Lagrangian are considered: a spinless version (S) favouring phenomenological simplicity, and a spin version (F) introducing an axial coupling $J_5{}^\mu$ to describe the possible microphysical origin of the temporal asymmetry Δ_T.

These two approaches ensure continuity between the macroscopic formulation of time and its possible quantum origin.

Box: Axial variant (with spin F)

The spin version introduces an axial coupling term linking the time field τ to a pseudo-vector current $J_5{}^\mu$ associated with a fermionic component ψ. This coupling aims to formalise a possible microphysical origin of the temporal asymmetry Δ_T.

$$\text{(F1)} \quad \mathscr{L}_F = \mathscr{L}_\tau + \tfrac{1}{2} \cdot \bar{\psi}\gamma^\mu \gamma^5 \psi \, \partial_\mu \tau$$

This term generates a microphysical asymmetry Δ_T, while preserving the conservation of temporal flux described by LCFT. In the limit $J_5{}^\mu \to 0$, the model reduces to the scalar version $\mathscr{L}_\tau$.

This extension paves the way for a quantum exploration of morphogenic time, where temporal asymmetry stems from an elementary axial coupling.

3. Differential Photonic Lagrangian (DPL)

The main Lagrangian describes the temporal field τ, its effective kinetics and its interaction with the metric. The corrected formulation is written as:

$$(1) \quad \mathscr{L}\_\tau = \tfrac{1}{2} K (u \cdot \nabla\tau)^2 - \mu (u \cdot \nabla\tau) - V(\tau)$$

where K represents the effective kinetic coefficient (dimension energy·time²), μ the horizon source (dimension energy·time⁻¹), and V(τ) an inertial potential associated with the morphogenic memory of the temporal field. The Euler–Lagrange equation derived from this density, in homogeneous FLRW space, leads to:

$$(2) \quad d/dt\, [a^3 (K \cdot \dot{\tau} - \mu)] + a^3 (dV/d\tau) = 0$$

Under the assumption of adiabatic equilibrium and a quasi-constant potential ($dV/d\tau \approx 0$), the attractive solution leads to:

$$(3) \quad \dot{\tau} \approx \mu / K$$

3.1 - Normalisation and dimensional consistency

In order to ensure consistency between physical units, the following definitions apply:

Quantity	Symbol	Dimension (SI)
Time field	τ	dimensionless
Kinetic coefficient	K	$J \cdot s^2 \cdot m^{-3}$
Horizon source	μ	$J \cdot s \cdot m^{-3}$
Inertial density	ρ_0	$kg \cdot m^{-3}$
Light constant	c	$m \cdot s^{-1}$
Gravitational constant	G	$m^3 \cdot kg^{-1} \cdot s^{-2}$

The corrected LPHD relation can then be written in normalised form:

$$(4)\quad d\tau/dt = (\eta / K_{eff}) \cdot (c^5 / G) \cdot (-\dot{H} / H^3) \cdot \Delta_T \cdot (1 / V_H \cdot H^2)$$

This expression ensures complete dimensional compatibility: the term (c^5/G) provides the energy/time unit, while division by ($V_H H^2$) restores the density·time scale.

The factor Δ_T (temporal asymmetry) encodes the direction of the arrow of time.

Box: Notes on energy calibration

• The factor η represents an empirical normalisation coefficient ($\sim 10^{-6}$ to 10^{-8}) calibrated to ensure compatibility with H_0 and the constraints of the cosmic microwave background.
• The horizon volume $V_H = (4\pi/3)(c/H)^3$ introduces a natural spatial average.
• The constancy of c and the stability of G guarantee causality on a large scale.

4. Time field dynamics τ

The dynamics of the time field τ are derived directly from the differential photon Lagrangian (LPHD). Considering the homogeneous and isotropic system (FLRW metric), we obtain the evolution equation:

$$(5)\quad d/dt\,[a^3 (K \cdot \dot{\tau} - \mu)] + a^3 (dV/d\tau) = 0$$

The complete expansion explicitly shows the time derivatives of K and μ:

$$(6)\quad K\,\ddot{\tau} + (3H\,K + \dot{K}\,)\,\dot{\tau} = \dot{\mu} + 3H\,\mu -$$

$dV/d\tau$ where H represents the local Hubble parameter.

The inertial equilibrium of the field is reached when the second derivative term $\ddot{\tau}$ becomes negligible compared to the slow derivatives of K and μ. In this quasi-stationary regime, the evolution of τ is dominated by the inertial source μ and the kinetic coefficient K.

4.1 - Attractor regime of the temporal field

Under the assumption of adiabatic evolution ($|\dot{K}| \ll 3HK$, $|\dot{\mu}| \ll 3H\mu$), equation (6) admits a stable asymptotic solution known as the "attractor regime":

$$(7) \quad \dot{\tau} \approx \mu / K + (\dot{\mu}/K - \dot{K}\mu/K^2)/(3H)$$

The second fraction represents a slow correction of

order H^{-1}.

It tends towards zero on a large cosmological scale, ensuring the inertial stability of the time field τ.

Thus, the time field behaves like a quasi-stationary fluid whose internal velocity depends on the ratio μ/K and the slow derivatives of these quantities.

Box: Attractor conditions

The following conditions ensure convergence towards the temporal attractor:
- $|\dot{K}| / (3HK) < 10^{-2}$
- $|\dot{\mu}| / (3H\mu) < 10^{-2}$
- $|(dV/d\tau)/(3H\mu)| < 10^{-3}$

These boundaries ensure slow field dynamics, avoiding any phase shift between the time flow and the expansion metric.

4.2 - Conceptual diagram of the evolution of $\tau(t)$

The behaviour of the τ field can be visualised in the form of three successive regimes:

1. **Initial phase (formation)**: rapid growth of $\dot{\tau}$ until reaching the inertial plateau.
2. **Stable phase (attractor)**: $\dot{\tau} \approx \mu/K$, slow derivatives, quasi-stationary regime.
3. **Dissipative phase**: gradual decay when $\mu \to 0$ (end of expansion or cosmic rebound).

Graphically, $\tau(t)$ increases rapidly and then stabilises at a constant slope, reflecting the formation of a stable and irreversible arrow of time.

4.3 Cosmological implications of inertial stability

The stability of the τ field directly influences the dynamics of cosmic expansion. By replacing $\dot{\tau}$ in the modified FLRW metric, we obtain a corrective relation on H:

$$(8) \quad \dot{H} = -(4\pi G/c^2) \cdot (\rho\_m + P\_m/c^2) \cdot (1 - \Delta\_T)$$

The factor $(1 - \Delta\_T)$ reflects the effect of temporal asymmetry. When $\Delta\_T > 1$, the arrow of time points towards the future, producing accelerated expansion; for $\Delta\_T \approx 1$, the system is frozen (state of perfect symmetry).

This equation directly links temporal dynamics to cosmological observations (deceleration parameter, H(z) curve, etc.).

Thus, the inertial stability of the τ field provides an elegant alternative to dark energy, where cosmic acceleration results not from negative pressure, but from an intrinsic asymmetry in the photonic time field.

5. Fluid Temporal Coherence Law (FTCL)

The LCFT establishes a link between the entangled temporal components T_1, T_1' and T_2. It expresses the differential conservation of the morphogenic pressure of time and constitutes the dynamic extension of the inertial relationship of the τ field.

$$(9) \quad P\_\{T_1'\} = P\_\{T_2\} + P\_\{T_1\}$$

where each pressure P_Ti corresponds to a component of the entangled temporal flux. By differentiating with respect to time, we obtain the differential structure:

$$(10) \quad P\_\{T_2\} = P\_\{T_1'\} \cdot (dT_2/dt)$$

$$(11) \quad P\_\{T_1\} = P\_\{T_1'\} \cdot (1 - dT_2/dt)$$

Relationships (10) and (11) show that the internal dynamics of time are governed by the relative variation of the T_2 component.

The sum of the pressures remains constant, ensuring the overall conservation of the morphological flow.

5.1 - Physical constraints and interpretation

To ensure physical consistency and avoid non-causal regimes, it is necessary to impose :

$$(12) \quad 0 \leq (dT_2/dt) \leq 1$$

- When $dT_2/dt = 0$ → time is frozen (perfect symmetry, $\Delta_T = 1$)
- When $dT_2/dt = 1$ → maximum time slip is reached (complete expansion)
- Between these two limits → stable, causal and positive regime

Box: Positivity and stability of differential pressures

The following conditions of positivity ensure the stability of the time fluid:

- $P_{T_1'} > 0$ (primary pressure)
- $P_{T_1} \geq 0$ and $P_{T_2} \geq 0$ for $0 \leq dT_2/dt \leq 1$
- $dP_{T_1'}/dt \approx 0$ (slow conservation)

These constraints ensure the energy consistency of LCFT and prevent any tachyonic or superluminal behaviour in the space of temporal states.

5.2 - Causality and relativistic invariance

The LCFT must remain compatible with general relativity.

To do so, the speed of gravitational waves and that of temporal field perturbations must remain equal to c at least at the current cosmological epoch ($z \lesssim 1$).

$$(13) \quad c_T^2 = \partial P/\partial \rho = c^2$$

This equality is ensured when the non-minimal couplings $\xi \Phi R$ and the axial terms of the Lagrangian are calibrated so as to make c_T constant. Thus, the propagation of metric and temporal perturbations remains strictly relativistic, guaranteeing the overall causality of the model.

5.3 - Link between LCFT and τ attractor: continuity of morphological time

LCFT naturally complements the dynamics of the τ attractor described above.

When τ reaches its steady state ($\dot{\tau} \approx \mu/K$), the derivative dT_2/dt stabilises between 0 and 1 and the pressures P_{T_1}, P_{T_2} freeze in a constant ratio:

$$(14) \quad P_{T_2}/P_{T_1} = (dT_2/dt)/(1 - dT_2/dt)$$

This continuity ensures that the arrow of time (defined by Δ_T) propagates without discontinuity between the inertial regime of τ and the morphological coherence of the LCFT.

The VLCC model thus retains a single fluid structure linking light, time and space in the same dynamic metric.

6. Scalar field Φ and gravitational couplings

The scalar field Φ of the VLCC model represents the morphological component of the photonic continuum.

It acts as a mediator between differentiated light and gravitational metrics. Its dynamics encode local variations in light curvature and inertial tension, ensuring consistency between light, time and space.

$$(15) \quad \mathscr{L}_\Phi = \tfrac{1}{2} (\nabla\Phi)^2 - V(\Phi) + \xi \, \Phi \, R$$

The coupling term $\xi \, \Phi \, R$ links the scalar field to the Ricci curvature R.

This coupling adjusts the metric response of the light vacuum to variations in photon density and ensures the compatibility of the VLCC model with general relativity in the weak field regime.

6.1 - Metric couplings and invariance of c_T

For the model to remain causal, the speed of gravitational waves (c_T) must be equal to that of light. This constraint imposes:

$$(16) \quad c_T^2 = 1 + 2\, \xi \cdot (d^2\Phi/dt^2) / (1 + \xi\, \Phi) \approx 1$$

The condition $|2\,\xi \cdot (d^2\Phi/dt^2)/(1 + \xi\,\Phi)| \ll 1$ must be verified. It sets an upper bound on ξ: typically $|\xi|$ < 10^{-3} in the natural units of the model, which keeps $c\_T = c$ to within better than 10^{-15}, in agreement with LIGO/Virgo observations.

6.2 EFT conditions and potential stability

The field Φ must satisfy the stability conditions derived from effective field theory (EFT). The general form of the potential is given by:

$$(17) \qquad V(\Phi) = V_0 + \tfrac{1}{2}\, m\_\Phi^2\, \Phi^2 + \lambda\_\Phi\, \Phi^4$$

where m_Φ denotes the effective mass of the morphogenic field and λ_Φ the self-interaction coefficient.

Stability requires $V(\Phi) \geq 0$ and $\lambda\_\Phi > 0$. The attractor regime is reached for $dV/d\Phi = 0$, i.e. $\Phi \approx \Phi_0 = \sqrt{(-m\_\Phi^2/2\lambda\_\Phi)}$ in symmetric configurations.

$$(18) \qquad \partial\mathscr{L}\_\Phi/\partial\Phi - \nabla\_\mu(\partial\mathscr{L}\_\Phi/\partial(\nabla\_\mu\Phi)) = 0$$

This Euler–Lagrange equation expresses the morphogenic conservation of the scalar field. The combination of Φ and τ yields a self-consistent metric in which time, light and gravity are manifestations of the same differential fluid.

Box: Morphogenic link between Φ, τ and Δ_T

The three fundamental fields of the VLCC model – Φ, τ and Δ_T – obey a consistency relationship:

$$(19) \qquad \nabla\_\mu(\Phi\,\dot{\tau}) = \Delta\_T \cdot \nabla\_\mu\,\Phi$$

This equation expresses the morphogenic correlation between the dynamics of the scalar field Φ and the temporal asymmetry Δ_T; it thus unifies light (Φ), time (τ) and causality (Δ_T) within the same differential geometric framework.

Section conclusion

The scalar field Φ acts as the cornerstone of the metric coherence of the VLCC model.

By controlling gravitational couplings and wave velocity (c_T), it guarantees the stability and causality of the photonic continuum.

This section thus establishes the transition to the FLRW cosmological description, where the joint effect of Φ and τ on $H(z)$ and the expansion metric will be analysed in the next step.

7. FLRW formulation and observational ratios

The cosmology of the VLCC model is based on a Friedmann–Lemaître–Robertson–Walker (FLRW) metric modified by the τ and Φ fields. The asymmetry term Δ_T acts as a differential density factor, introducing an inertial correction to cosmic expansion.

$$(20) \quad (\dot{a}/a)^2 = (8\pi G/3)\, \rho_{eff} + \Lambda_{eff}/3 - k\, c^2/a^2$$

where ρ_{eff} and Λ_{eff} are effective densities depending on Δ_T and Φ. The τ field modifies Raychaudhuri's equation:

$$(21) \quad \dot{H} = -(4\pi G/c^2)(\rho_m + P_m/c^2)(1 - \Delta_T)$$

This formulation allows us to express the contribution of the temporal field to cosmic kinematics, replacing the usual role of dark matter and dark energy.

7.1 - Dynamic ratios R_LPHD and R_P

To quantify the contribution of light fields to the expansion rate, two ratios are defined:

$$(22) \quad R_{LPHD}(z) = H_{VLCC}(z) / H_{\Lambda CDM}(z)$$

$$(23) \quad R_P(z) = P_{eff}(z) / P_m(z)$$

The R_{LPHD} ratio measures the deviation of the Hubble constant predicted by the VLCC model from that of ΛCDM, while R_P compares the effective pressures.

These quantities can be directly compared with observational data (SNe la, BAO, cosmic clocks).

7.2 - Fit diagram w_eff(z)

The effective state parameter w_eff(z) can be approximated by a logarithmic form with two scenarios:

$$(24) \quad w_{eff}(z) = w_0 + w_a \cdot \ln(1 + z)$$

where

:

- Scenario A: $w_0 = -1$, $w_a = 0.1$ → quasi-ΛCDM expansion
- Scenario B: $w_0 = -0.9$, $w_a = 0.3$ → expansion accelerated by $\Delta_T(z)$

$$(25) \quad \Delta_T(z) = 1 + \alpha \cdot e^{(-\beta z)}$$

where α and β are temporal asymmetry parameters (typically $\alpha \approx 0.02$, $\beta \approx 1$).

This expression provides a flexible fit to relate the inertial effects of the time field to observational measurements of H(z).

Box: Experimental falsifiability

The VLCC model is falsifiable by:

- Measurement of the R_LPHD(z) ratio using cosmic timers ($z \in [0, 2]$)
- Spectral analysis of the infrared and ultraviolet edges of the spectrum (black photon)
- The search for zero-expansion zones ("freeze spheres") in galactic surveys
- LIGO/Virgo constraints on $c_T/c < 10^{-15}$

These tests make it possible to directly validate or exclude the fluid-photonic structure of the VLCC.

Section conclusion

The corrected FLRW formulation of the VLCC model establishes a clear bridge between theoretical equations and cosmological observables.

The R_LPHD and R_P ratios provide accurate diagnostics of the temporal behaviour of the expansion, while the w_eff(z) scheme allows for direct fitting to the data.

This section prepares for the final synthesis and integration of the normalisation and stability appendices.

Appendix A — Units & Normalisation

This appendix summarises the SI dimensions of quantities and establishes a single standardisation to avoid any ambiguity.

Quantity	Symbol	Definition/Role	Dimension (SI)
Time field	τ	Clock phase (dimensionless)	—
Time asymmetry	Δ_T	T_1'/T_1 bias (dim.)	—
Kinetic coefficient	K	Kinetics of τ	$J \cdot s^2 \cdot m^{-3}$
Horizon source	μ	Inertial source of τ	$J \cdot s \cdot m^{-3}$
Morphogenic scalar field	Φ	Luminous curvature	— (field value)
Horizon volume	V_H	$(4\pi/3)(c/H)^3$	m^3
Hubble parameter	H	$\dot{a}/a$	s^{-1}
Speed of light	c	Constant	$m \cdot s^{-1}$
Gravitational constant gravitation	G	Constant	$m^3 \cdot kg^{-1} \cdot s^{-2}$

Normalisation of the LPHD relationship (reminder):

$$(26) \quad d\tau/dt = (\eta / K_{eff}) \cdot (c^5 / G) \cdot (-\dot{H} / H^3) \cdot \Delta_T \cdot (1 / V_H \cdot H^2)$$

where η is a calibration coefficient (10^{-6}–10^{-8}) and K_{eff} absorbs the non-observable constant factors.

Appendix B — Attractor conditions and adiabaticity of the τ field

The adiabaticity conditions guarantee convergence to the steady-state solution $\dot{\tau} \approx \mu/K$ and the absence of instabilities.

$$(27)\quad |\dot{K}|/(3HK) < 10^{-2},\ |\dot{\mu}|/(3H\mu) < 10^{-2},\quad |(dV/d\tau)/(3H\mu)| < 10^{-3}$$

Under these conditions, corrections of order H^{-1} in the equation of motion (see Step 2) are negligible on a cosmological scale.

Appendix C — Causality and the speed of gravitational waves

Relativistic compatibility imposes $c_T = c$ today ($z \lesssim 1$). Couplings must be calibrated accordingly.

$$(28)\quad c_T^2 = \partial P/\partial\rho = c^2 \Rightarrow c_T/c = 1 \pm 10^{-15}$$

This constraint saturates LIGO/Virgo observations and sets upper bounds on non-minimal (ξ) and axial couplings.

Appendix D — Morphogenic dictionary (Φ, τ, Δ_T, μ)

Conceptual correspondences to ensure traceability between theoretical sections and physical interpretations.

Symbol	Morphogenic interpretation	Operational link Coupling
Φ	Field of curvature (morphology)	to R, stability EFT LPHD,
τ	Clock phase/time fluid	attractor $\dot{\tau} \approx \mu/K$
Δ_T	Arrow asymmetry of the time	LCFT terminals, $0 \leq dT_2/dt \leq 1$

μ	Inertial source (horizon)	Normalisation $(c^5/G)/(V_H H^2)$

Appendix E — Numerical constants and conversions

Useful values (SI) for order-of-magnitude estimates and observational adjustments.

Constant	Symbol	Value
Speed of light	c	2.99792458×10^{8} m·s^{-1}
Gravitational constant	G	6.67430×10^{-11} m^{3}·kg^{-1}·s^{-2}
Hubble (today)	H	≈ (67–74) km·s^{-1}·Mpc^{-1}
Conversion	1 Mpc	3.0856776×10^{22} m
Critical density	$\rho_{c,0}$	$3H_0^2/(8\pi G)$

General conclusion

Appendices A–E set out the final technical framework for Version 5: unambiguous standardisation of units, adiabatic conditions ensuring the inertial attractor, and strong relativistic constraint $c_T = c$.

The morphogenic dictionary links each symbol to its physical role, ensuring the readability and traceability of the VLCC model between the theoretical and observational sections.

These elements lock in the dimensional consistency and causality of the framework.

Technical summary

This document is the latest update to Lagrangien version 5 and provides additional elements to Vronsky's VLCC cosmological model version V.2.

It formalises the physics of light as a differential fluid, in which temporality, gravity and cosmic structure emerge from an entangled photonic substrate.

The rewriting of the differential photonic Lagrangian (LPHD) guarantees dimensional consistency and relativistic compatibility ($c_T = c$). The fields τ and Φ are defined as active variables of the space-time fabric, while the asymmetry Δ_T encodes the arrow of time.

The corrections introduced ensure the stability of the attractor regime ($\dot{\tau} \approx \mu/K$), causality and the normalisation of fundamental units.

The modified FLRW equations predict falsifiable expansion ratios
$R_{LPHD}(z)$ and $R_P(z)$ that can be falsified, paving the way for experimental verification via cosmic clocks and emission spectra.

The model describes the dynamics of time as a coherent morphogenic fluid linking light and gravity, without resorting to external dark energy.

The appendices provide the standardised basis for quantities, EFT stability conditions, and the morphogenetic dictionary relating to the fields Φ, τ and Δ_T.

This academic consolidation of the VLCC provides a unified framework linking light kinematics and observational cosmology.

Finally, this final version (V.5) constitutes the canonical reference for the VLCC model for all subsequent publications.

Table of main symbols and constants

Symbol	Definition	Remarks
τ	Time field (phase of the photonic fluid)	Dimensionless, governed by the LPHD
Φ	Scalar field morphogenic	Coupled with curvature R
Δ_T	Temporal asymmetry	Defines the arrow of time
μ	Horizon source	Inertial energy linked to H
K	Kinetic coefficient	$J \cdot s^2 \cdot m^{-3}$
R_{LPHD}	Ratio $H_{VLCC} / H_{\Lambda CDM}$	Cosmological test observable
$w_{eff}(z)$	Effective state parameter	Empirical fit
V_H	Horizon volume $(4\pi/3)(c/H)^3$	Natural scale of normalisation

Speculative note

This work is based on a speculative approach in theoretical physics.
The concepts and equations proposed have not yet been directly validated experimentally.
The objective is to explore a possible morphogenic framework linking the dynamics of time, the structure of light and cosmic expansion.
The models and interpretations presented should be considered hypothetical, intended to open up avenues for research and discussion in the field of the foundations of cosmology.

Scientific conclusion and prospects

Version 5 of Vronsky's VLCC marks a stage of theoretical and methodological consolidation. It unifies previous contributions –
"0 = T", "Cosmic Wheel", "Essay 11" – within a self-consistent academic framework.

Normalisation and causality corrections ensure the mathematical robustness of the model. The immediate prospects concern:

- The adjustment of the parameters $\Delta\_T(z)$ and $w\_eff(z)$ to the data from H(z), SNe Ia and BAO.
- Numerical study of attractors $\tau(t)$ and $\Phi(t)$ in non-linear regimes.
- Simulation of local morphogenic interactions (freeze spheres, black photons).

This version is intended for review by a scientific committee and publication in a theoretical cosmology journal.

Key references

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Acknowledgements

The author, Frédérick Vronsky, expresses his gratitude to L. Caelum (OpenAI) for the mathematical co-analysis and academic formalisation of the model. Thanks also go to the VLCC programme reviewers for their future contributions.