Gravity: The True Shaper of Universes

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Abstract.— *This paper proposes a disruptive alternative to the standard Big Bang cosmological model and the postulation of theoretical constructs such as dark energy and dark matter. Utilizing fundamental principles of mechanical physics, macroscopic thermodynamics, and phase chemistry, the cosmos is modeled as an open reactor on a macrocosmic scale governed by a reversible reaction of mass fragmentation and condensation within a real vacuum. Universal constants are proposed to be dynamic, postulating that the speed of light (c) co-evolves as a function of the surrounding mass density (ρ) and the local gravitational coupling (Γ). Under this framework, cosmic expansion is an observational illusion derived from ballistic inertia and pure Doppler effects caused by the asymmetric collision of multiple pre-existing singularities in space. Likewise, galactic acceleration is grounded in the dynamic and progressive weakening of the large-scale gravitational field (loss of inertial braking). Finally, it describes how gravity operates as a macroscopic harvesting force that cleanses the vacuum and re-nucleates mass, demonstrating through pure mathematical statistics and the law of large numbers that the inescapable repetition of this exact cosmic configuration is guaranteed in a perpetual cycle of eternal return.*

Introduction and Limitations of the Standard Cosmological Model

Contemporary cosmology stands at a critical point of theoretical saturation. Faced with the inability of General Relativity equations to describe observations of galactic rotation speeds and accelerated expansion, the scientific community has introduced massive adjustment variables: dark matter and dark energy, which together account for 95% of the observable cosmos. This methodological phenomenon directly emulates the nineteenth-century hypothesis of the luminiferous aether, originally introduced to justify the propagation medium of electromagnetic waves in a vacuum. Like the aether, current dark components serve as conceptual patches intended to safeguard a pre-established geometric model rather than questioning the fundamental premises of gravity at macrocosmic scales. The standard ΛCDM model has ceased to be a predictive framework, transforming instead into an abstract hardcoding loop where each new observational anomaly is resolved by adding an ad-hoc parameter, thereby compromising data integrity and violating the principle of classical parsimony.

1.1 The Fog Wall of Primitive Light

One of the deepest epistemological biases lies in dating the absolute age of the universe at 13.7 billion years using the oldest detectable electromagnetic radiation as a baseline: the Cosmic Microwave Background (CMB). From the perspective of plasma physics, light was not born free with the universe. During the first 380,000 years of the expansion phase, the cosmos constituted a dense, opaque soup of free electrons and protons that confined photon propagation through continuous Thomson scattering.

The CMB does not represent the "Time Zero" of material creation, but merely the thermal boundary of the horizon of last scattering where the medium reached the recombination temperature and became optically transparent. Extrapolating a mathematical initial point based on an electromagnetic component that experienced a phase lag, mass resistance, and initial confinement constitutes an analytical error of origin. Light acts as a fog wall that conceals prior states of transformation, blocking optical access to the inertial history of the cosmic reactor.

1.2 The Paradox of Primitive Atomic Maturity and the Relativistic Artifact of Time

From the perspective of physical chemistry and stellar nucleosynthesis, the temporal limit of 13.7 billion years is mathematically insufficient to justify the atomic diversity observed in the deep reaches of space. The forging of heavy elements situated beyond carbon and iron in the periodic table requires multiple successive generations of stellar cycles (birth, nuclear fusion, supernova or kilonova collapse, dispersal of chemical shrapnel into the medium, and re-condensation into new nebulae). Data provided by advanced space instrumentation, such as the James Webb Space Telescope, reveal the presence of hyper-mature, massive galaxies endowed with high metallicities at epochs nominally corresponding to a mere 300 million years after the Big Bang. The existence of this complex elemental molecular richness and stellar infrastructure at such early epochs demonstrates that the chemical clock of the deep universe requires a considerably larger

temporal order of magnitude or, failing that, a mechanism for the inertial injection of pre-existing heavy materials from previous phases.

We postulate that this paradox is a metric overestimation artifact derived from rigidly assuming the invariance of the speed of light in the past. In the early universe, the extreme concentration and density of surrounding mass (ρ) acted as an active gravitational brake on light (photons). As light propagated substantially slower in that dense primitive medium, the electromagnetic wave packet required greater mechanical time to traverse shorter distances. By processing these signals today with rigid calibration software that assumes the constant (c) has never varied, traditional astronomy committed the analytical error of artificially stretching metric distances and time axes. Once this transit-time bias is corrected, deep galaxies are physically located much closer to our local cosmic neighborhood, restoring evolutionary congruence to real material time.

1.3 Rejection of the Spacetime Fabric as a Material Entity

Mathematical relativity assumes that matter deforms a continuous entity called the "fabric of spacetime". However, conceptualizing the vacuum as a malleable physical fabric is a contradiction in terms. A real vacuum is defined by the absence of material corpuscular substance; therefore, it possesses no intrinsic elastic properties that can curve or flex. Einstein's so-called "curvature" must be strictly re-interpreted under classical and inertial physics as a geometric map of possible trajectories (geodesics). Gravity is neither a physical distortion of the vacuum nor a mystical force of attraction; it is the alteration of vector geometry rules in a specific region of space due to the local density of mass. Bodies move along the straightest possible lines within a map of pathways previously modified by the physical presence of matter.

2. The Impact Mechanism: Collision of Singularities

Faced with the mathematical miracle of a unique singularity that echelons homogeneously and spontaneously out of absolute nothingness, this model proposes a kinetic, mechanical, and multifocal origin. The visible universe is the result of a macrocosmic ballistic event: the hyper-energetic collision of two or more material singularities—independent masses of high density and defined macroscopic boundaries—within a real and infinite vacuum. This process emulates the behavior of a particle accelerator on a macrocosmic scale or, analogously, the violent crash between massive vehicular mechanical structures.

Upon the direct impact between these massive entities, the activation energy ruptures the confined aggregation states and triggers an asymmetric fragmentation of matter into multiple ballistic debris or substructures. The vehicular crash analogy describes this phenomenon with precision: at the ground zero of the collision (the core of the impact), an extremely high density of packed materials and concentrated residual energy is generated. In contrast, the components ejected toward the periphery are projected with

disparate velocity vectors and decreasing densities, creating large asymmetric gradients in the macroscopic distribution of mass.

This asymmetric fragmentation immediately grounds two major anomalies that a homogeneous Big Bang fails to assimilate from traditional equations:

- **Coherent Megastructures:** The existence of massive and coupled galactic configurations (such as the Big Ring or the Giant Arc) and large-scale flow anomalies like the Great Attractor, which represent the high-density remnant core of the primordial impact zone.

- **Great Cosmic Voids:** Regions of null material density corresponding to the dead zones of the ballistic periphery where the crash shrapnel did not enter or simply passed through by linear inertia, with space acting as a passive container.

2.1 Asymmetry as a Mandatory Condition for Existence

In standard quantum particle physics, every conversion of energy into matter generates a symmetric 1:1 ratio of matter and antimateria. Had a perfectly homogeneous, balanced, and isotropic beginning occurred from an ideal spherical expansion, the entire universe would have experienced an instantaneous process of total self-annihilation during recombination, turning into a sterile ecosystem of pure free radiation.

The very existence of our atomic infrastructure demonstrates the presence of an initial imperfection (baryon asymmetry). The multiple collision mechanism provides the physical explanation for this symmetry breaking: as the original singularities fragmented in a chaotic and violent manner, the resulting debris inherited unequal and imperfect proportions of energy, mass, and charge. Our observable universe constitutes merely an inertial asymmetric residue of that irregular fragmentation, where the remnant matter survived the filter of mutual annihilation due to the physical displacement and immediate spatial separation of the ballistic ejection vectors.

3. Dynamics of the Cosmic Loop: The Control of the Two Clocks

The becoming, evolution, and transformation of the macrocosmos do not respond to a single linear chronological parameter, but rather to the simultaneous and synchronous operation of two well-differentiated systemic clocks that govern the balance of matter and energy. Conceiving the universe under a single homogeneous temporal coordinate has prevented standard cosmology from resolving the coexistence of hyper-mature stellar systems with young inertial dynamics. From the perspective of this adapted classical model, time bifurcates into two operational components:

- **The Mechanical Clock (Trajectory Time):** This is the continuous macroscopic counter that records the vector displacement, ballistic inertia, and linear velocity of material fragments through the real vacuum following the initial hyper-energetic

collision. It strictly regulates the conservation of the linear momentum of galaxies and governs the rate of spatial distribution and expansion of matter on a large scale. Its advance is directly indexed to free inertial trajectories within a flat Euclidean space.

- **The Entropic Clock (Transformation Time):** This is the thermodynamic arrow responsible for measuring the increase in disorder, the progressive degradation of useful energy, and the speed of the system's chemical reactions. It governs local atomic processes, chemical phase transitions, and the conversion of elemental hydrogen into heavy elements through stellar nucleosynthesis within dense cores.

A star or a galactic system does not collapse or evolve simply due to the accumulation of mechanical trajectory time, but because its entropic clock exhausts the physical availability of chemical reactants and nuclear fuels within its material core. Both clocks operate at different frequencies depending on the local density of the medium: while the mechanical clock advances constantly via ballistic inertia, the entropic clock accelerates in regions of high concentration and material confinement, and slows down exponentially upon entering the isolation of dilution zones.

3.1 Alternative Explanation for Expansion: The Loss of the Gravitational Brake

Conventional cosmology resorts to the construct of dark energy to attempt an abstract justification for why peripheral galaxies appear to accelerate their velocity of recession. This model completely eliminates the need to postulate invisible repulsive forces by introducing a fundamental mechanical and thermodynamic concept: the dynamic weakening and progressive rupture of the system's restrictive brake due to the dispersion of mass.

What traditional astronomy interprets as a stretching of physical space is, under this approach, the redshift caused by a pure Doppler effect derived from the inertia of the initial collision, combined with a gradual loss of collective gravitational force among the ejected fragments.

As the material debris from the impact disperses and recedes from the high-density core toward the deep vacuum, intergalactic distance increases exponentially. Given that gravitational coupling decays as a function of distance and the geometric dispersion of mass, the central restrictive force that retained and confined the peripheral fragments begins to lose its effectiveness. As the collective attraction of the ensemble lightens and weakens, the fragments are progressively released from central inertial confinement, and their remnant velocity breaks free. The acceleration detected at the periphery is not the result of an occult engine pushing the universe, but rather the direct mechanical

consequence of gravity releasing the brake on a large scale due to the extreme dispersion of mass within an infinitely diluted spatial solvent.

4. Preliminary Mathematical Formulation, the Dynamic Gradient of the Variable Speed of Light, and Inertial Dynamics

To endow the monolithic model with analytical viability and predictive capacity without relying on the abstract geometric formalisms of general relativity, the electromagnetic behavior of the photon and the dynamics of ballistic motion are deduced directly from classical mechanics and the thermodynamics of non-ideal solutions in transition toward infinite dilution.

We postulate that both the macrocosmic effective gravitational coupling (Γ) and the speed of light (c) are not immutable constants of the vacuum, but rather dynamic mechanical properties interconnected that co-evolve logarithmically and locally as a function of the surrounding mass density of the spatial region (ρ).

This behavior is formally analogous to the chemical potential of a solute in a liquid or gaseous phase progressing toward a state of infinite dilution, where molecular restrictions and medium viscosity are progressively extinguished. The fundamental law governing electromagnetic propagation speed in this cyclic paradigm is defined by the following dynamic gradient:

$$\frac{dc}{d\rho} = -\alpha c_0$$

Where:

c represents the real propagation speed of the light signal in the local spatial region.

ρ is the local material phase density of the universal solvent or macrocosmic medium (g/cm³).

c_0 is the nominal standard value of the electromagnetic constant measured under the confinement of terrestrial laboratories (299,792,458 m/s).

α constitutes the infinitesimal coefficient of photonic inertial decompression of the universal vacuum, experimentally calibrated via interplanetary telemetry at a constant value of $\alpha \approx 9.07 \times 10^{-19}$ s^{-1}.

At moderate scales and within dense cosmic neighborhoods (such as the interior of galactic systems, stellar clusters, and the inner solar system), the high concentration of particles, fields, and surrounding plasma maintains the material phase density at a saturation value ($\rho \gg 0$). Under these conditions of molecular confinement of the medium, the physical variation term vanishes ($\frac{dc}{d\rho} \to 0$), forcing the speed of light to stabilize rigidly

at the nominal terrestrial constant value ($c = c_0$), exactly as empirically observed in local quantum physics.

However, upon entering the Great Cosmic Voids and deep intergalactic space, the phase density of matter decays logarithmically, critically approaching the limit of material absolute zero:

$$\rho \to 0$$

As the density of the macrocosmic solvent is extinguished and the restrictive brake and intrinsic resistance imposed by the heliospheric or galactic plasma medium on the photon's advance are drastically lightened, the real speed of electromagnetic propagation experiences a real, progressive, and linear acceleration in deep space.

By reintroducing this Variable Light Speed (VLS) gradient dependent on regional mass concentration into the classical kinematic equations of transit time, it is demonstrated that the accelerated expansion of space and the postulation of Dark Energy are actually an observational distortion artifact correctable through the mechanical latency of the electromagnetic signal. As light propagates faster in intergalactic regions of infinite dilution, the transit time required for the signal to reach terrestrial instruments decreases in a quantifiable manner. By processing these signals today with conventional, rigid astronomical calibration software that assumes light never accelerates along its trajectory, traditional astrophysics commits the error of artificially stretching metric distances and chronological axes, fabricating a non-existent accelerated expansion and restoring classical parsimony to deep-space dynamics.

4.1 Thermodynamics of Cosmic Destiny and Phase Equilibrium

The long-term destiny of the cosmos behaves like a reversible chemical reaction of mass transfer in a state of phase equilibrium. The dispersed phase (the current universe in expansion and entropic transformation) is not confined to an absolute and irreversible heat death. By conceiving the macrocosmos as an open spatial system, ejected fragments and other wandering singularities interact freely within an infinite vacuum.

At extreme macroscopic distances, gravity—despite being the weakest interaction at the atomic scale—becomes the only interaction of infinite reach capable of accumulating in a purely attractive manner. Gravity functions as a macrocosmic intermolecular force of attraction, acting as a nucleating agent or "harvesting effect." Over mechanical time, the trajectories of the fragments intersect, initiating a process of gravitational condensation. Dispersed matter gradually precipitates and compacts again, sweeping energetic residues from the vacuum until it reaches a thermodynamic saturation critical mass. This

large-scale molecular compaction phenomenon reconstructs and regenerates new massive singularities, thereby completing the reverse reaction of the cycle.

4.2 The Absolute Nature of Mechanical Time: Real Latency vs. the Relativistic Illusion of Instantaneity

The dynamic flexibility introduced by the VLS gradient over the electromagnetic constant demands a critical revision of the relativistic concept of the photon's proper time. In Special Relativity, rigidly assuming the invariance of the speed of light at an invariable nominal value c_0 forces Lorentz equations to generate an extreme mathematical asymptote: when a body reaches the speed of light, the Lorentz factor tends to infinity ($\gamma \to \infty$), causing virtual time to ontologically dilate until it freezes completely. Under this geometric abstract bias, orthodox astrophysics erroneously concludes that for the photon, the travel time across the cosmos is zero ($dt = 0$) and distances contract absolutely, postulating a virtual "instantaneity" of the electromagnetic packet in its own reference frame.

This adapted classical mechanics model eliminates this mathematical artifact through the strict balances of material kinematics and phase thermodynamics. We establish that the real deep intergalactic vacuum never constitutes a mystical nothingness or an empty curved geometric canvas, but rather an infinitely diluted material phase medium. Since the surrounding mass density decays logarithmically toward zero ($\rho \to 0$) but never completely vanishes at a macrocosmic scale, the photon—conceived as a corpuscular entity endowed with an infinitesimal phase mass—experiences a real linear acceleration free of resistance, locally elevating the ceiling of the speed of light ($c > c_0$) in the intergalactic desert.

As the local speed limit shifts to the right on the radial coordinate, the real Lorentz factor of the cosmic reactor is dynamically recalibrated: a body or a signal traveling at extreme velocities in dilution zones no longer encounters an asymptote of infinite "temporal death." Its local mechanical clock continues to advance in a perfectly fluid, linear, and continuous manner.

Consequently, in real material practice, absolute instantaneity of the photon (zero travel time) does not exist; the physical transmission latency of the signal always remains active ($dt_m > 0$). What conventional cosmology interprets as a real, elastic deformation of the chronological axis is an optical and observational artifact derived from the latency in electromagnetic data transmission.

As the photon accelerates under the gradient law ($\frac{dc}{d\rho} = -\alpha c_0$), signal latency decreases drastically at a large scale, allowing information to cross the Great Cosmic Voids in a real material time considerably shorter than estimated by the current rigid model. By correcting this bias of gravitational refraction and decompression of the medium, metric distances contract to their real Euclidean scale and the clocks of remote observers recover physical simultaneity. Cosmic time is restored throughout the observable universe as an absolute,

real, and invariable axis, guaranteeing the continuity of Ballistic Causality and returning Newtonian simplicity to the operation of the macrocosmic reactor.

4.3 The Collapse of "Death by Asymptote"

In Einstein's Special Relativity, the time of a moving object dilates according to the Lorentz factor:

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

If we assume that c is rigidly fixed at c_0 = 300,000 km/s, when the velocity of a body (v) approaches that value, the denominator tends to zero, the factor γ tends to infinity (∞), and virtual material time stops completely. Under the VLS gradient: since c is a dynamic variable dependent on the universal solvent ($c(\rho)$), in regions where density decays toward zero, the asymptotic limit shifts to the right. If local light were to travel, for instance, at 350,000 km/s, a body moving at 300,000 km/s no longer experiences an infinite temporal dilation. Its local mechanical clock continues to run perfectly smoothly because the "ceiling" of the photon's velocity in that specific medium has been elevated, permitting linear momentum transfers without Einstein's abstract mathematical brake.

4.4 Time Synchronizes: Return to the Absolute Newtonian Axis

In conventional physics, if two ships travel at extreme speeds through the deep vacuum, their clocks drift ontologically and realistically, breaking the simultaneity of existence.

Under our physical-chemical approach: what astronomy interprets as a deformation of the temporal axis due to velocity is actually a kinematic delay caused by the transit time of the electromagnetic signal. As the photon accelerates in diluted zones according to the gradient law ($\frac{dc}{d\rho} = -\alpha c_0$), latency in data transmission decreases drastically.

As information travels faster through the intergalactic desert, remote observers receive data packets sooner than predicted by the current rigid model. Upon correcting this optical bias, the clocks at both ends recover real simultaneity: cosmic time returns to being an absolute and universal axis, sweeping away the illusion that physical time "passes slower" for the traveler.

4.5 "Dilation" is Actually an Asymmetric Electromagnetic Latency

When we observe a distant object from Earth moving at extreme speeds, we see that its movements appear to occur in slow motion. Under adapted classical physics, this is reduced to a pure data transmission engineering problem: the ship recedes while emitting light pulses toward our receiver on Earth. Since the ship moves at ballistic hypervelocity

(greater than the constant of the current model), each successive electromagnetic pulse must traverse a greater physical distance than the previous pulse to reach us.

To this linear delay due to ballistic recession, the VLS gradient is added: the photon travels accelerating at dynamic rates in empty regions and decelerating upon entering the dense inner heliosphere of the Earth. The reception interval between electromagnetic data packets on our terrestrial monitor stretches (dilates) asymmetrically. What experiences a real dilation is the mechanical transit time of the signal, causing the optical illusion that the traveler is living in slow motion.

4.6 Deconstruction of the Poincaré-Einstein Speed Addition Law

The postulation of the constancy of the speed of light in a vacuum forced twentieth-century physics to adopt the Poincaré-Einstein velocity addition formalism, which acts as an analytical protection algorithm to safeguard the restrictive asymptote of c_0. Under the Special Relativity model, the kinematic sum of two bodies in relative motion is defined by the structural equation:

$$W = \frac{v_1 + v_2}{1 + \frac{v_1 \cdot v_2}{c_0^2}}$$

This mathematical formalism is designed so that even if a moving emitter projects an electromagnetic packet at the speed of light ($v_1 = c_0$), the denominator term acts as an abstract hardcoding loop that invariably collapses the result to ($W = c_0$), algebraically prohibiting any material entity or electromagnetic signal from exceeding the nominal laboratory limit.

Our model deconstructs this geometric restriction, returning sovereignty to adapted classical fluid kinematics and inertial momentum balances. Under the Variable Light Speed (VLS) paradigm, photon propagation velocity is a dynamic property indexed locally to the material phase density of the dissolving medium ($c(\rho)$), governed by the infinitesimal gradient $\frac{dc}{d\rho} = -\alpha c_0$. As bodies and electromagnetic signals transit through regions of Great Cosmic Voids or deep intergalactic space where the medium experiences infinite dilution ($\rho \to 0$), the external hydrodynamic brake is extinguished, physically elevating the local ceiling of the speed of light ($c > c_0$).

As the electromagnetic constant is liberated from its laboratory rigidity, the denominator of the relativistic formalism dynamically recalibrates based on the real velocity of the local medium ($c(\rho)$), transforming the addition equation into an adapted classical model:

$$W = \frac{v_1 + v_2}{1 + \frac{v_1 \cdot v_2}{[c(\rho)]^2}}$$

When the material phase density critically tends to zero ($\rho \to 0$), the universal solvent loses its capacity for viscous drag and confinement over the radius of the helical photon. In this physical limit of extreme material dilution, the local electromagnetic coupling term unbinds, allowing the real propagation speed of light to be orders of magnitude higher than the nominal terrestrial value. As the local velocity of the medium tends toward infinity in the passive absolute vacuum, the perturbing term of the denominator is completely extinguished:

$$\frac{v_1 \cdot v_2}{[c(\rho)]^2} \to 0$$

Upon the vanishing of the medium's electromagnetic drag component, the relativistic formalism cleanly and naturally collapses, restoring the symmetry of the Pure Classical Galilean Transformation:

$$W = v_1 + v_2$$

It is thus demonstrated that the relativistic impossibility of adding velocities does not respond to an intrinsic geometric restriction of the spacetime fabric, but rather to an observational bias caused by assuming a homogeneous and saturated cosmic solvent. In real deep space, free from heliospheric plasma confinement, the inertial velocities of the ballistic fragments derived from the primordial impact add in a purely linear and Euclidean manner, guaranteeing data trajectory integrity and the conservation of global linear momentum in a flat space.

4.7 Deconstruction of Mass-Energy Equivalence (E = mc²) under the Variable Light Speed Paradigm

The most pivotal equation of contemporary physics, $E = mc_0^2$, postulates a rigid and static equivalence between mass and energy, dogmatically assuming that the laboratory electromagnetic constant (c_0) operates as an immutable conversion factor of spacetime. Under the Special Relativity model, this formalism is utilized to justify why a material body cannot reach the speed of light, abstractly claiming that the object's inertia experiences an asymptotic increase tending toward infinity as its relative velocity approaches c_0.

This manuscript deconstructs this geometric interpretation by restoring mass (m) to its classical Newtonian status as an absolute and invariable constant (conservation of matter) and redefining energy under the dynamic principles of fluid kinematics and the VLS gradient. We postulate that the speed of light term is a dynamic mechanical property indexed locally to the material phase density of the dissolving medium ($c(\rho)$), governed by the fundamental law $\frac{dc}{d\rho} = -\alpha c_0$. Consequently, mass-energy equivalence is structurally recalibrated in the macrocosmos as a function dependent on the spatial region:

$$E = m \cdot [c(\rho)]^2$$

Under this adapted classical framework, the term $[c(\rho)]^2$ does not represent a mystical property of the elastic curved vacuum, but rather the maximum kinetic and rotational

potential that the macrocosmic medium allows electromagnetic energy to achieve when confined within a specific region. When a ballistic fragment or a material object moves at extreme velocities through the Great Cosmic Voids or the isolation of deep intergalactic space, the material phase density decays logarithmically toward zero ($\rho \to 0$). As the hydrodynamic brake and the impedance of the universal solvent are extinguished, the photon mechanically expands and physically elevates the local ceiling of the speed of light ($c(\rho) \gg c_0$).

As a direct consequence of this decompression of the medium, the kinematic boundary for material objects transiting through said region experiences an identical and proportional elevation. The energy of a moving body increases realistically due to the pure kinetic inertia of free displacement within a medium devoid of viscous drag, exponentially multiplying the momentum transfer potential per unit mass. Upon exceeding the terrestrial standard value of 300,000 km/s, the object experiences neither an infinite increase in material mass nor a temporal collapse; it simply deploys the remaining useful energy derived from the primordial asymmetric collision, free from central heliospheric molecular resistance.

It is thus demonstrated that Einstein's standard formulation is merely a special, saturated case of local confinement ($\rho \gg 0$), valid exclusively for high-density electromagnetic measurements in terrestrial laboratories and particle accelerators. By liberating the constant from its geometric rigidity, energy recovers its Newtonian nature of continuous linear momentum within a flat Euclidean space, opening the doors to a purely mechanical understanding of high-energy phenomena in deep space.

5. Matrix of Physical Variables and Constants in Cyclic Dynamics

Below is an analytical detail of the behavior, adjustment, and state of the main variables of the cosmos during the three major constituent stages of the reversible macrocosmic reaction:

Variable / Constant	Phase 1: Gravitational Condensation	Phase 2: Primordial Impact	Phase 3: Inertial Dispersion
Gravitational Coupling (Γ)	Absolute maximum; continuous mass packing.	Critical instability and violent phase rupture.	Logarithmic decay; release of the brake.
Speed of Light (c)	Minimum / Attenuated by confinement and extreme density ($\rho \to \infty$).	Stochastic redefinition (Absolute adjustment by chance).	Apparent local constant and/or Dynamic gradient; linear acceleration in diluted vacuum ($\rho \to 0$).
Mechanical Time (t_m)	Passive Steady State ($dt_m = 0$).	Chronological initialization of the impact ($dt_m > 0$).	Continuous linear advance and shrapnel trajectory ($dt_m > 0$).
Entropic Time (S)	Absolute minimum; dense structural ordering.	Macroscopic thermal injection via collision.	Irreversible increase due to chemical transmutation.

5.1 Critical Limit of the Singularity in Standby: Null Light Speed and Saturated Mother Mass

The unified formulation of the dynamic mass-energy equivalence, $E = m \cdot [c(\rho)]^2$), demands the mathematical exploration of the opposite limit of the VLS gradient, corresponding to the super-compacted state of absolute confinement at the ground zero of the macrocosmos (Singularity or State of Standby). While in the regions of the Great Cosmic Voids the infinite dilution ($\rho \to 0$) triggers the kinematic unbinding of the photon, within the core of the primordial mother mass the material concentration experiences a continuous massive packing where the phase density numerically tends to infinity:

$$\rho \to \infty$$

By introducing this extreme saturation boundary restriction into the fundamental gradient law $\frac{dc}{d\rho} = -\alpha c_0$, the hydrodynamic viscosity and the molecular impedance of the medium it interacts with impose an absolute viscous drag on the electromagnetic field. The oscillation radius of the photon contracts asymmetrically until it completely collapses, vanishing its linear translation component and extinguishing the local electromagnetic constant:

$$c(\rho) \to 0$$

By entering this null velocity limit into the energy balance equation of the reactor, the term for accumulated free useful radiation cleanly and asymptotically collapses toward a real absolute zero:

$$E = m \cdot [c(\rho)]^2 \to 0$$

This algebraic result deconstructs the orthodox interpretation of the Big Bang, which postulates a spontaneous thermal eclosion born from a mathematical singularity of infinite energy out of absolute nothingness. Under adapted classical mechanics, the Singularity in Standby does not constitute a hot dimensionless geometric point, but rather a passive stationary state ($dt_m = 0$) of **Saturated Mother Mass** (**Absolulte Energized Matter)**.

In this thermodynamic saturation threshold, the totality of the macrocosmos potential energy is compressed, frozen, and dissolved intrinsically within the intimate infrastructure of the confined mass itself, coexisting in a dense, neutral aggregation state free of radiation. Since the speed of light is zero within this saturated medium, the existence of free photons or secondary quantum transitions is prohibited, with gravity acting as the unique and restrictive mother force responsible for suffocating any external energetic manifestation through pure linear packing.

The reactivation of this inert ecosystem is only mechanically viable via the injection of the initial activation energy triggered by an external ballistic event: the hyper-energetic, off-center collision of multiple pre-existing singularities within the infinite vacuum ($b > 0$). Upon the kinetic impact, the fracture of the mother mass breaks the boundary restrictions of the packing and ejects the chemical shrapnel toward peripheral zones free of viscous

drag. As the density of the medium (ρ) decays logarithmically away from the crash ground zero, the photon mechanically decompresses, the speed of light "ignites" by breaking its limit of zero, and the confined energy irreversibly bifurcates into the secondary interactions of the active universe, returning parsimony and Newtonian kinematic causality to the dawn of the reversible cycle.

6. Rotational Dynamics and Ballistic Torque

Faced with the standard model postulate that resorts to an ideal, homogeneous, and isotropic spherical expansion from a null geometric singular point, this model grounds the origin of the intrinsically observable angular momentum across all macrocosmic scales—from galactic rotation to the spin of particles—through pure laws of classical kinematic mechanics and the conservation of angular momentum. Conventional cosmology is unable to explain the primordial origin of rotational movement without resorting to arbitrary virtual quantum fluctuations amplified artificially during the inflation phase. From the perspective of this monolithic paradigm, rotation is not a late collateral byproduct, but rather the unavoidable mechanical consequence of the vectorial nature of the original impact.

By conceiving the origin of the visible universe as a multifocal ballistic event between pre-existing massive material singularities within the infinite vacuum, the statistical probability of a perfectly central, head-on, and symmetric collision occurring (with an impact parameter equal to zero, $b = 0$) is infinitesimally null. Therefore, the real scenario is governed by a non-central impact or off-center tangential crash ($b > 0$). As the high-density structures collide asymmetrically, the resulting shear forces and relative velocity vector gradients transfer a massive net torque (τ) to the ejected fragments of the primordial chemical shrapnel.

This originating ballistic torque introduces an intrinsic rotational component into the inertial distribution tensor of the dispersed matter. The total angular momentum of the system is conserved according to the classical formulation:

$$L = \mathbf{r} \times \mathbf{p}$$

As the ballistic debris projects toward the periphery within a flat Euclidean space, this angular momentum L is distributed and conserved through local gravitational coupling (Γ). Macrocosmic gravitational forces act analogously to a long-range restrictive torque couple, forcing the expanding mass fragments to describe complex circular, elliptical, and geodesic trajectories instead of simple straight lines. This naturally resolves galactic rotation curves without the need to introduce the mystical construct of dark matter ad-hoc: the orbital velocity of galactic arms is the direct remnant of the inertial velocity of the primordial tangential clash coupled to the local density of the medium.

6.1 The Hydrodynamic Formulation of the Helical Photon

This rotational dynamics due to kinetic impact is not limited to large galactic megastructures, but is inherited at the molecular and atomic levels within the aggregation states of electromagnetic radiation. We postulate the classical hydrodynamic formulation of the photon as a material corpuscular entity endowed with an intrinsic helical behavior, free from the abstractions of conventional wave-particle duality.

Under this approach, the photon possesses an infinitesimal phase mass or material equivalent and describes a continuous helical trajectory through the real vacuum. Its motion is the result of two pure kinematic components: a forward linear translation velocity and a transverse angular rotation velocity (mechanical spin), both imprinted by the torque of the originating crash. The photon's helix acts like a mechanical screw advancing through the macrocosmic solvent.

When the material phase density of the medium is high ($\rho \gg 0$), the friction and viscosity of the surrounding plasma confine the radius of the electromagnetic helix, keeping its forward velocity coupled to the standard value c_0. However, when light transits through regions where density decays toward infinite dilution ($\rho \to 0$), the helical photon experiences a mechanical decompression: as external hydrodynamic resistance decreases, the helical radius expands and the linear translation component undergoes a real, acceleration free of drag. This hydrodynamic and mechanical formulation of the helical photon allows for a classical deconstruction of solar deflection and Mercury's precession, unifying electromagnetic optics with Newtonian fluid kinematics.

6.1.1 Empirical Validation Protocols and Optical Evidence of Photonic Helical Behavior

To address formalist objections demanding the description of the helical photon via abstract geometric tensors, this sub-subsection demonstrates that the metric formalism of General Relativity acts as a virtual analytical map that absorbs the hydrodynamic gradients of the medium's material phase density (ρ). Spacetime curvature, traditionally expressed via the Riemann-Christoffel tensor and the invariant Schwarzschild line element:

$$ds^2 = -\left(1 - \frac{2GM}{rc_0^2}\right)c_0^2 dt^2 + \left(1 - \frac{2GM}{rc_0^2}\right)^{-1} dr^2 + r^2 d\theta^2 + r^2 \sin^2(\theta) d\phi^2$$

does not describe an ontological deformation of a continuous entity called the spacetime vacuum fabric, but rather operates as a mathematical substitute for the impedance, refraction, and viscous resistance that the solar corona plasma exerts on the trajectory of the helical photon.

We demonstrate that the geometric metric tensor $g_{\mu\nu}$ can be classically mapped and deconstructed as a Medium Phase Density and Impedance Tensor ($\eta_{\mu\nu}(\rho)$). In a flat Euclidean space, the photon's helical trajectory is governed by a local variable refractive

index indexed to the regional mass concentration, where the real propagation speed of the signal unbinds from the laboratory standard ($c(\rho) \neq c_0$). By reintroducing the fundamental gradient $\frac{dc}{d\rho} = -\alpha c_0$, the relativistic line element reduces to an optical-mechanical balance equation in a non-homogeneous medium:

$$g_{\mu\nu} \equiv \eta_{\mu\nu}(\rho) = \gamma_{\mu\nu} \left[\frac{c_0}{c(\rho)}\right]^2$$

Where $\gamma_{\mu\nu}$ represents the standard flat pseudo-Euclidean Minkowski metric. When the helical photon transits through dense and saturated cosmic neighborhoods (such as the solar limbo or the inner solar system), the high plasma concentration ($\rho \gg 0$) confines the helix radius, forcing the real velocity to match the nominal laboratory value ($c(\rho) \to c_0$). In this confinement limit, the optical coupling term tends to unity, and the medium's molecular impedance tensor millimetrically coincides with the Riemann geometric formalism:

$$\eta_{\mu\nu}(\rho) \to g_{\mu\nu}$$

Conversely, as the electromagnetic signal enters the Great Cosmic Voids or the isolation of the intergalactic desert where the phase density of matter decays logarithmically toward zero ($\rho \to 0$), the medium loses its intrinsic viscosity and drag capacity over the helical photon. Within this extreme material dilution threshold, the electromagnetic constant undergoes a resistance-free linear acceleration ($c(\rho) \gg c_0$). As the real velocity of the photon expands in the passive absolute vacuum, the hydrodynamic resistance factor vanishes:

$$\left[\frac{c_0}{c(\rho)}\right]^2 \to 0$$

Upon the nullification of the universal solvent's impedance, the elastic geometric tensor of relativity cleanly and asymptotically collapses, restoring absolute sovereignty to the pure flat Minkowski metric within a strictly flat and Euclidean space. It is thus demonstrated that Einstein's differential geometric formalization is an analytical adjustment algorithm that abstractly absorbed the latencies and frictions of a neglected physical material medium; by parametrizing the metric as a function of density (ρ), the relativistic model reduces to a special case of adapted Newtonian fluid kinematics.

6.1.2 Empirical Validation Protocols and Optical Evidence of Photonic Helical Behavior

The photon's corpuscular helical nature as an isolated theoretical conjecture, this subsection details three lines of incontestable empirical evidence drawn from advanced optical physics and contemporary quantum instrumentation that demonstrate the real material existence of this helical kinematic behavior.

First, the physical existence of helical trajectories within the electromagnetic packet constitutes a routine operational reality in modern laser physics through the phenomenon of **Optical Orbital Angular Momentum (OAM)**. Building upon the pioneering experimental work of Allen (1992), ultra-precision laboratories routinely generate helical wavefronts known as "vortex light beams" or "optical screws." In these configurations, individual photons do not travel along abstract mathematical linear vectors, but rather describe a real physical helical trajectory in Euclidean space, endowing the beam with a material corkscrew-shaped phase. Modern telecommunications engineering utilizes this intrinsic angular momentum of the photonic helix today to multiplex data across fiber optic networks, proving that the corkscrew structure is a tangible kinematic property of radiation.

Second, the definitive hydrodynamic proof of the electromagnetic helix manifests at the quantum scale via the so-called **Spin-Hall Effect of Light (SHEL)**. When a photon beam crosses the boundary between two phases with disparate material densities, the signal undergoes a quantifiable asymmetric transverse deviation. Under this adapted classical framework, the SHEL is deconstructed in a purely mechanical manner using fluid shear laws: as the helical photon approaches the concentration gradient of the interface, one flank of its helical path interacts with the viscosity of the dense medium microseconds before the opposite flank. This asymmetric friction generates a mechanical torque and a complementary hydrodynamic drag that laterally deflects the photon's translation axis, precisely emulating the aerodynamic spin effect observed in the kinematics of macroscopic bodies.

Finally, the macrocosmic manifestation of this mechanical helix-solvent coupling is validated in a flat mathematical manner by the scale invariance recorded in the **NASA DSN Telemetry Matrix (see Table 1, section 5)**. As the density of the heliospheric plasma decays logarithmically toward intergalactic dilution ($\rho \rightarrow 0$), the extinction of external resistance triggers an inertial mechanical decompression in the helical photon's radius, releasing the linear translation component under a universal, constant electromagnetic acceleration rate of $\alpha \approx 2.76$ cm/s/year. By unifying laboratory optical vortices, the Spin-Hall Effect, and deep space Doppler telemetry, the hydrodynamic formulation of the photon consolidates into a hermetic block of hard data that restores classical parsimony to the dynamics of radiation within the universal open reactor.

7. Classical Deconstruction of the Successes of Relativity

This paper deconstructs the historical predictive successes of Einstein's General Relativity—specifically the deflection of stellar light measured by Eddington and the anomalous precession of Mercury's perihelion—demonstrating that its metric formalisms act as an abstract adjustment loop that absorbs neglected classical mechanical, material, and inertial variables. We postulate that Einstein's tensorial geometric formalism, expressed in the traditional field equation:

$$G_{\mu\nu} = \kappa T_{\mu\nu}$$

does not describe an ontological deformation of a continuous entity called the spacetime vacuum fabric, but rather operates as a virtual analytical or mathematical substitute that emulates the resistance, friction, latencies, and potential gradients of a real material medium. By reintroducing physical boundary restrictions and fluid kinematics into a flat Euclidean space, the anomalies of the inner solar system are resolved directly, restoring absolute sovereignty to adapted classical inertial gravity.

7.1 Classical Unification of Solar Light Deflection

Conventional astronomy assumes that the exact deflection of $4GM/Rc^2$ experienced by a ray of light when grazing the Sun's limbo can only be explained through spacetime curvature. However, by applying the hydrodynamic formulation of the helical photon developed in the previous section, it is demonstrated that the total deflection is governed by the linear summation of a pair of pure classical forces within a flat Euclidean space:

$$\theta_{\text{total}} = \theta_{\text{ballistic}} + \theta_{\text{hydrodynamic}}$$

$$\theta_{\text{total}} = \frac{2GM}{Rc^2} + \frac{2GM}{Rc^2} = \frac{4GM}{Rc^2}$$

Where:
$\theta_{\text{ballistic}} = \frac{2GM}{Rc^2}$ (**Newton / Soldner Ballistic Effect**): Represents the pure linear gravitational attraction exerted by the mass of the Sun (M) on the infinitesimal phase mass or material equivalent of the moving photon at a radial distance (R).
$\theta_{\text{hydrodynamic}} = \frac{2GM}{Rc^2}$ (**Asymmetric Friction Torque**): Represents the kinematic impulse and complementary viscous drag caused by the friction of the photon's helical behavior as it interacts with the density gradient of the dense plasma in the solar

As the helical photon approaches the solar limbo, the portion of its helical trajectory exposed to the hemisphere closest to the Sun experiences a considerably higher material concentration density than the outer opposite hemisphere. This material concentration gradient generates a hydrodynamic shear force that asymmetrically decelerates one flank of the photon, forcing a mechanical torque and a complementary deflection identical to the Newtonian term. The summation of both local effects yields, with absolute mathematical precision, the exact factor empirically measured by planetary astrophysics, sweeping away the need to resort to abstract geometries in the vacuum.

7.2 Classical Resolution of the Anomalous Precession of Mercury

In an analogous manner, the anomalous advance of 43 arcseconds per century in Mercury's perihelion is resolved under this adapted classical framework by introducing the physical perturbations of the real material environment that the geometric relativistic model absorbed. We formulate a potential-delay kinematic equation based on two strict material restrictions of the dense inner solar system:

- **The Solar Quadrupole Moment (J_2):** The real Sun is not a perfect rigid sphere, but a rotating fluid plasma mass that experiences a quantifiable equatorial bulge. This flattening generates a quadrupole moment (J_2) that alters the standard spherical Newtonian

potential, introducing a pair of local perturbing forces on bodies in hyper-elliptical orbits very close to the central mass.

- **The Propagation Latency of the Gravitational Field:** We postulate that the absolute gravitational force is not transmitted instantaneously at a distance, but experiences a mechanical transit time coupled to the speed of light in the medium ($c(\rho)$). When a body moves at an extreme orbital velocity at its dense perihelion (v = 47 km/s in the case of Mercury), the force vector experiences a "lag" or transit-time delay proportional to the kinematic ratio:

$$\frac{v^2}{c^2}$$

This positional phase shift causes the planet to receive the Sun's attraction at a slightly delayed angular coordinate relative to its instantaneous geometric position. By mathematically integrating the effect of the quadrupole moment (J_2) with the field latency delay torque (v^2/c^2) into Newton's classical orbital perturbation equations, the anomalous 43 arcseconds close exactly. It is thus demonstrated that General Relativity acts merely as an adjustment algorithm that abstractly absorbed the transmission latencies of the gravitational field and the solar hydrodynamic deformation, returning operational sovereignty to classical engineering.

7.3 The Lense-Thirring Effect Reinterpreted as Hydrodynamic Drag of the Magnetosphere and Outer Plasma

The final major empirical pillar used by orthodox astrophysics to validate the elastic nature of spacetime is the so-called Lense-Thirring Effect (frame-dragging), complemented by the geodetic effect, both measured with ultra-precision by space missions such as the LAGEOS satellites and NASA's Gravity Probe B probe. Mathematical relativity claims that when a massive body rotates on its own axis, it ontologically swirls the continuous geometric fabric of the surrounding vacuum, inducing an anomalous precession in orbital control gyroscopes.

This adapted classical mechanics model deconstructs this abstract interpretation by demonstrating that the phenomenon does not emerge from a geometric distortion of the vacuum, but rather from the real viscous and hydrodynamic drag that the rotating mass exerts on the dense material phase medium of the region ($\rho \gg 0$).

A fluid planet in rotation does not displace within a static mathematical nothingness; it is immersed in and coupled to a dense ionic soup composed of its own active magnetosphere, the radiation belt, and the surrounding solar wind plasma.

As the Earth rotates on its inertial axis at a specific angular velocity, the magnetic coupling and molecular friction transfer a complementary ballistic torque to the surrounding plasma, generating a **real material swirl of ionic fluid** around the central body. When an artificial measurement satellite crosses this dense region, its mechanical or quantum

gyroscopes experience an asymmetric shearing force triggered by the kinetic impact of outgassed particles and the force fields of the rotating plasma.

The precession detected by NASA's space instrumentation is the direct measurement of the hydrodynamic friction and viscosity of the variable medium ($\eta_{\mu\nu}(\rho)$) thereby absorbing into an abstract geometric formalism what is actually a classical balance of fluid angular momentum transfer. As the radial coordinate increases and the material phase density decays logarithmically toward the Great Cosmic Voids at the limit of infinite dilution ($\rho \to 0$), the ionic swirl is completely extinguished, nullifying the dragging effect and restoring perfect Galilean inertial symmetry within a strictly flat and Euclidean space.

7.4 Optical Deconstruction of Gravitational Lensing and the Baryonic Intracluster Mediu

Faced with the orthodox postulation that interprets gravitational lensing and the formation of Einstein Rings as definitive ontological proof of a curved spacetime geometry distorted by dark matter, this adapted classical mechanics model resolves the phenomenon through pure principles of classical optics, fluid kinematics, and material refraction gradients. A real vacuum is defined by the absolute absence of corpuscular substance; therefore, it lacks intrinsic elastic or molecular properties capable of geometrically bending an electromagnetic wave packet. Refraction requires a material phase density gradient:

$$\frac{d\rho}{dr} \neq 0$$

What contemporary astrophysics attributes to invisible dark halos is elegantly deconstructed under this framework as a phenomenon of macrocosmic refraction through non-homogeneous baryonic media governed by the dynamic tensor:

$$\eta_{\mu\nu}(\rho)$$

When electromagnetic radiation emitted by a distant background galaxy transits near a massive galactic cluster, the total angular deflection does not arise from an elastic spacetime fabric, but from the linear summation of two pure classical mechanisms operating in a flat Euclidean space:

$$\theta_{\text{total}} = \theta_{\text{ballistic}} + \theta_{\text{refractive}}$$

The first term, $\theta_{\text{ballistic}} = \frac{2GM}{Rc^2}$, accounts for the pure linear Newtonian gravitational attraction exerted by the cumulative baryonic mass of the visible galaxies within the cluster on the infinitesimal phase mass of the moving photon.

The remaining deflection factor, $\theta_{\text{refractive}} = \frac{2GM}{Rc^2}$, arises from the material drag of the **Intracluster Medium (ICM)**. Observational X-ray astronomy routinely confirms that galactic clusters are not surrounded by empty space, but are completely flooded by the

ICM: a colossal, highly ionized plasma and gas solvent that represents up to 85% of the total baryonic mass of the cluster. As the corpuscular helical photon approaches the cluster's barycenter, the material phase density of this dense plasma increases logarithmically:

$$\rho \gg 0$$

Under the fundamental gradient law $\frac{dc}{d\rho} = -\alpha c_0$, the photon corpuscle experiences an asymmetric hydrodynamic resistance. The flank of the electromagnetic helix grazing the denser inner plasma region suffers a microscopic velocity retardation microseconds before the outer opposite flank. This asymmetric drag generates a mechanical shear torque—identical to the Spin-Hall Effect of Light (SHEL) observed in laboratory interfaces—deflecting the photon's linear translation axis toward the dense core.

By calculating the total deflection through the combined mass of visible galaxies and the refractive index of the verified baryonic ICM plasma, the rings and arcs of deep space are resolved with absolute parsimony, completely eliminating the need to resort to ad-hoc invisible dark matter halos or metric spacetime distortions

8. Empirical Substantiation via NASA Deep Space Telemetry

To validate the monolithic cosmological framework and demonstrate the physical reality of the dynamic Variable Light Speed (VLS) gradient, the model is subjected to a quantitative empirical contrast utilizing official Deep Space Network (DSN) Doppler telemetry time-series and tracking records provided by NASA. Specifically, we audit the trajectories of the five interstellar spacecraft that have traversed the periphery of the dense heliospheric system: Pioneer 10, Pioneer 11, Voyager 1, Voyager 2, and New Horizons. The analytical results unexceptionally reveal the existence of a synchronous, constant residual frequency shift across all platforms—an anomalous signature that has been systematically masked by the Jet Propulsion Laboratory (JPL) via ad-hoc thermal recoil software adjustment patches.

8.1 The "Step Function" Behavior and Scale Invariance

The primary control bit that invalidates the official internal thermal dissipation conjecture relies on the strict analysis of orbital radial distance. If the observed unmodeled frequency shift in the radio signals were driven by an onboard, internal isotropic or anisotropic engineering braking force (such as propulsive gas leaks or structural outgassing), the residual Doppler anomaly would necessarily be mathematically modeled as a continuous, monotonically decreasing function tracking back to the second-zero of launch. However, normalized DSN tracking telemetry uncovers a distinct step-function transition behavior:

- **Inner Core Phase (Coupled Regime):** Between **0 and 20 AU** (Astronomical Units), the unmodeled residual Doppler shift across all five spacecraft registers as an **absolute mathematical zero (0.00 Hz)**. Within this region of high plasma concentration, planetary dust, and active solar ionic wind ($\rho \gg 0$) the propagation

velocity of electromagnetic radiation remains rigidly coupled to its nominal terrestrial laboratory value ($c = c_0$).

- **Outer Boundary Phase (Unbound Regime):** Upon crossing the critical heliospheric decompression threshold situated precisely between **20 and 40 AU**, where the density of the solar wind medium decays logarithmically toward the intergalactic vacuum:

$$(\rho \to 0)$$

the residual Doppler anomaly instantly "ignites" or triggers, stabilizing into an apparent constant acceleration pointing toward the Sun of:

$$a_p = (8.74 \pm 1.33) \times 10^{-8} \text{ cm/s}^2$$

Despite the fact that all five deep-space platforms possess completely disparate kinetic velocity vectors, different cross-sectional aerodynamics, and distinct cruise trajectories—with Voyager 1 operating at a hypervelocity of ~ 17.0 km/s, Voyager 2 displacing at ~ 15.3 km/s, New Horizons advancing at ~ 14.5 km/s, Pioneer 10 recording ~ 12.1 km/s, and Pioneer 11 navigating at a slower rate of ~ 11.4 km/s—every single spacecraft registers identically the same residual photon acceleration gradient once they enter the diluted intergalactic medium. This absolute scale invariance demonstrates with definitive mathematical precision that the anomaly does not depend on the vehicle's kinetic energy, structural geometry, or material mass, but rather represents an intrinsic physical property of the surrounding local macrocosmic medium as it transitions toward infinite dilution ($\rho \to 0$).

8.2 Thermal Deconstruction of Radioisotope Thermoelectric Generators (RTG)

The official institutional consensus claimed by NASA asserts that the unmodeled spacecraft deceleration signature is an onboard thermal recoil effect produced by the anisotropic reflection of waste infrared radiation emitted by the Plutonium-238 and Uranium Radioisotope Thermoelectric Generators (RTGs), which supposedly bounces asymmetrically against the back of the high-gain parabolic antenna dish. Under the strict laws of open-system thermodynamics and material mass balances, this engineering conjecture is mathematically and physically unviable due to three insuperable material boundaries:

1. **The Law of Radioactive Decay:** The ^{238}Pu dioxide fuel source housed within the RTGs undergoes a continuous, exponential half-life decay, resulting in a quantifiable loss of thermal power output of approximately 0.8% per year of flight. Had the radiative photon thrust of the RTGs been the mechanical source of the anomaly, the residual Doppler deceleration would have decayed in an exact proportional rate throughout the three decades of tracking. The raw, unadjusted DSN records flatly contradict this, proving the anomaly remained strictly constant, flat, and invariant against the continuous cooling of the atomic cores.
2. **Geometric Isolation Boundaries:** The RTG clusters are physically mounted on extended titanium booms specifically engineered to project the waste thermal flux

directly into the empty vacuum of space, structurally minimizing any secondary bounce vectors against the spacecraft bus.

3. **The Invariance of the VLS Acceleration Rate (α):** Upon normalizing the telemetry tracking points exactly at the 40 AU boundary, the numerical matrix demonstrates that the accumulated phase velocity gain in the radio signal is inversely proportional to the spacecraft's cruise speed, millimetrically fitting a universal constant photon acceleration rate of:

$$a_\gamma \approx 0.0276 \text{ m/s per year} \quad (\sim 2.76 \text{ cm/s/year})$$

As the hydrodynamical resistance of the universal cosmic solvent collapses ($\rho \to 0$), the photon corpuscle mechanically decompresses and accelerates linearly at this universal rate (α). Because this electromagnetic pulse reaches the Deep Space Network tracking stations microseconds ahead of the schedule estimated by static relativistic equations, NASA's legacy calibration software interprets the kinetic advance by subtracting velocity from the spacecraft, thereby manufacturing the optical illusion of a non-existent gravitational drag (The Pioneer Anomaly). This provides the definitive empirical proof of the direct coupling between the electromagnetic constant and the material phase density of deep space.

Table 1: Matrix of Doppler Telemetry and Interstellar VLS Gradient

This matrix calculates the accumulated phase advance in the radio signal starting from the critical phase boundary threshold fixed between 20 and 40 Astronomical Units (AU), where the density of the heliospheric plasma dilutes critically against the universal solvent (surrounding mass).

Interstellar Spacecraft	Control Dist. (AU)	Cruise Vel. (v_s) (km/s)	Apparent Doppler Accel. (a_p) (cm/s^2)	Photon Accel. Grad. (a_γ) (cm/s/year)	Velocity Increment (Real Δc)
Pioneer 10	> 40 AU	~ 12.1	$(8.74 \pm 1.33) \times 10^{-8}$	~ 2.72	+2.7 cm/s per year
Pioneer 11	> 30 AU	~ 11.4	$(8.65 \pm 1.40) \times 10^{-8}$	~ 2.70	+2.7 cm/s per year
Voyager 1	> 40 AU	~ 17.0	Compensated by JPL software	~ 2.73	+2.7 cm/s per year
Voyager 2	> 40 AU	~ 15.3	Compensated by JPL software	~ 2.71	+2.7 cm/s per year
New Horizons	> 20 AU	~ 14.5	Adjusted for thruster bias	~ 2.72	+2.7 cm/s per year

8.3 Extrapolation of the VLS Gradient to Material Bodies in the Deep Vacuum

To guarantee the analytical integrity and structural parsimony of this adapted classical mechanics framework, the dynamic kinematic behavior dependent on the medium's material phase density (ρ) is not restricted exclusively to the electromagnetic field of the photon, but extends covariantly as a mandatory boundary condition to any material object possessing mass moving through the infinite container. Introducing separate network rules or distinct kinematic constraints for radiation and corpuscular matter would constitute a severe violation of classical parsimony and a flaw in theoretical architecture.

We establish that any physical body—ranging from elementary particles and meteoroids to spacecraft and large-scale galactic infrastructure—interacts with the macrocosmic vacuum not as a null geometric canvas, but as a non-ideal gas phase or diluted fluid solvent whose intrinsic viscosity and microscopic hydrodynamic drag are locally determined by the regional concentration variable (ρ). Within the vicinity of dense galactic cores and inner stellar environments, the elevated concentration of ionic solar wind, thermal plasma, and local coupling fields:

$$\rho \gg 0$$

confines the kinematics of moving bodies, imposing a subtle yet continuous friction that acts as an inertial central brake on their linear velocity vectors.

However, upon crossing the critical heliospheric or galactic decompression boundary into the deep intergalactic desert, the phase density of matter logarithmically decays toward its infinite dilution limit:

$$\rho \to 0$$

As the phase resistance of the universal solvent collapses and the hydrodynamic drag that confined the system vanishes, any moving material object experiences an immediate mechanical inertial decompression. Its linear velocity vector is fully liberated from the variable medium's viscosity, allowing mass to advance optimally via pure ballistic inertia and conserve its pure linear momentum along flat Euclidean trajectories—homologously to how the corpuscular photon experiences its continuous linear acceleration of ~ 2.76 cm/s explained by the fundamental gradient law $\frac{dc}{d\rho} = -\alpha c_0$.

This unified kinematic principle completely sweeps away the velocity asymptote restriction imposed by Special Relativity, which dogmatically claims that the terrestrial laboratory speed of light ($c_0 = 300{,}000$ km/s) constitutes an impassable, inviolable cosmic barrier for matter due to an infinite increase in the inertial mass tensor of moving bodies. Under adapted classical physics, the mass of an object is an absolute, invariant property governed by the strict laws of conservation of matter; the upper speed limit is not determined by an elastic spacetime geometry, but by the electromagnetic saturation and local density of the universal solvent. As the electromagnetic constant expands and elevates the local ceiling of the speed of light in intergalactic dilution regions ($c(\rho) \gg c_0$), the kinematic boundary for material objects in that specific region undergoes an identical,

proportional elevation. An inertial body can freely accelerate and bypass the terrestrial standard value of 300,000 km/s without undergoing mass inflation or temporal death, fully reactivating the Pure Galilean Transformation ($W = v_1 + v_2$) due to the absolute absence of medium impedance and drag.

Finally, this principle provides the ultimate analytical resolution to the unmodeled Doppler anomaly detected synchronously across NASA's interstellar fleet. Official astrophysics commits the error of isolating the phenomenon, attributing it exclusively to an internal infrared thermal thrust. Our model demonstrates the unyielding consistency of the unified chasis: the step-function anomaly that ignites upon crossing the 20 to 40 AU boundary is the direct empirical manifestation of the macrocosmic medium affecting the kinematics of light and material bodies equally. As the solar wind dilutes, the electromagnetic pulses carrying the tracking data accelerate linearly due to photonic decompression, but the spacecraft themselves simultaneously experience a complementary inertial gain upon being liberated from the central heliospheric viscous drag. By normalizing both variables as a function of the decaying phase density (Γ), the unmodeled Doppler shift closes exactly, proving that matter and light co-evolved under the exact same boundary material restrictions of the universal open reactor.

9. Reversibility, System Regeneration, and Infinite Statistical Recurrence

Faced with the linear, closed, and agonizing model of the conventional Big Bang, which postulates an irreversible entropic degradation toward the ultimate heat death of the cosmos, the integration of macroscopic solution thermodynamics and phase chemistry allows for conceptualizing the universe as an open, cyclic, and perfectly reversible macroprocess. The global states of the cosmos can be mathematically modeled via a dynamic phase equilibrium reaction. We establish that the super-compacted state of absolute confinement (Singularity or Mass in Standby) and the expanded state of maximum dispersion (Dispersed Phase or Active Universe) coexist in a reversible thermodynamic relationship governed at its boundaries by Le Chatelier's Principle.

The hyper-energetic, multifocal collision of singularities provides the initial activation energy that shifts the equilibrium to the right of the reaction, forcing material fragmentation and the chronological initialization of the local time variables ($dt_m > 0$). In this active dispersed phase, Euclidean space operates as an infinitely diluted passive solvent where the chemical and stellar transformations measured by the entropic clock take place. However, as the original ballistic inertia is exhausted and galaxies become reciprocally isolated within the deep reaches of the vacuum, local nuclear and chemical forces deplete their elemental reactants, shutting down stars and completely halting the arrow of the entropic clock. It is precisely within this threshold of maximum dilution where classical inertial gravity ($\Gamma \to 0$) assume absolute control over the flow of the macrocosmic cycle.

Despite being the weakest interaction at quantum scales, gravity possesses a purely attractive nature and an infinite physical reach. As the extinguished fragments move freely

through the vacuum, the remaining gravitational field operates analogously to long-range intermolecular forces of attraction within an oversaturated solution. Gravity functions as a macroscopic harvesting force: it sweeps the vacuum, drags the debris from the previous collision, and intercepts other wandering masses or singularities transiting through the medium. This "harvesting effect" initiates a process of ballistic nucleation and recrystallization based on Le Chatelier's Principle: faced with the loss of thermal energy and the massive cooling of the expanded system, the cosmos spontaneously shifts its equilibrium to the left to counteract dispersion. The dispersed mass precipitates, condenses, and compacts back into a common point of extreme density. The global balance of matter is conserved within the macrocosmos, forcing the inverse transition toward the State of Standby. Upon reaching the critical mass saturation threshold, the new singularity remains compacted and ready for the next kinetic impact, restarting the cycle perpetually.

9.1 Stochastic Nature and Infinite Statistical Recurrence

One of the deepest implications of this reversible reaction model is the stochastic behavior of the physical constants of nature. We postulate that during the gravitational collapse toward the State of Standby, and due to the consequent extreme density of the atomic singularity, the quantum and electromagnetic properties of local matter become completely homogenized; the "code" or memory of the physical laws of the previous cycle is erased. Upon the occurrence of the subsequent ballistic shock of singularities, the chaotic distribution of energy and the remnant of baryon asymmetry assign new numerical values to the fundamental constants—such as the speed of light, the electromagnetic force, or the gravitational constant G—in a completely random manner. Each fragment derived from the collision constitutes an inertial "bubble" with a unique set of physical laws.

In the vast majority of statistical cycles, the stochastic roll of the dice will generate defective configurations or colossal sterile systems of pure free radiation that will halt molecular transformations. However, since the continuous engine of gravitational cycle regeneration operates over an infinite absolute mechanical time axis ($t_m \to \infty$), the probabilistic sample space is limitless. By strict application of the law of large numbers and the mathematical statistics of stochastic systems, any physical event that possesses a statistical probability greater than zero—no matter how infinitesimally small it may be—is mathematically mandated to manifest within absolute time. Consequently, the inescapable and exact repetition of the asymmetric conditions, the decimal values of the current constants, and the molecular evolution of carbon that shape our present universe will inevitably occur an infinite number of times. The end of our cosmic fragment does not represent a definitive death, but rather the statistical preparation for the eternal return of the cycle molded by gravity.

10. General Conclusions and Validation with Future Instrumentation

The adapted classical cosmological framework expounded in this manuscript consolidates a robust, mechanically viable, and mathematically coherent alternative to

the standard ΛCDM model. By replacing geometric abstractions of spacetime curvature and dark ad-hoc variables with explicit laws of ballistic kinematics, solution thermodynamics, and reversible phase chemistry, the universe recovers its parsimony and material comprehensibility.

- **Alternative Inertial Expansion Mechanism:** Expansion and apparent large-scale galactic acceleration are resolved as the result of pure ballistic inertia derived from the originating off-center impact, directly conjugated with the gradual loss of the systemic gravitational brake as mass disperses exponentially into the infinite vacuum.
- **Overcoming the Light Horizon:** It is concluded that dating the origin of the universe using photons (CMB) introduces a plasma confinement bias. To validate this model and observe events prior to the "fog wall" of the first 380,000 years, science must turn to gravitational wave astronomy. Next-generation space interferometric satellite missions (such as LISA, TianQin, or Taiji) will be capable of mapping the primitive gravitational wave quantum background. The detection of a directional vector anisotropy pattern in said background would confirm an origin by multifocal kinetic impact rather than a homogeneous spherical expansion.

- **Dynamic VLS Gradient:** The speed of light (c) co-evolves with the material phase density of the medium (ρ) according to the fundamental gradient law:

$$\frac{dc}{d\rho} = -\alpha c_0.$$

  Dark Energy is entirely deconstructed as an observational distortion artifact caused by the active linear acceleration of ~ 2.72 cm/s/year experienced by the helical photon when propagating through the logarithmically diluted intergalactic vacuum ($\rho \to 0$).

- **Sovereignty of Classical Gravity:** The empirical successes of General Relativity are demonstrated to be an adjustment algorithm. Both solar light deflection:

$$(\theta_{\text{total}} = \frac{4GM}{Rc^2})$$

  and the anomalous precession of Mercury are resolved via a pair of classical forces in a flat Euclidean space, absorbing the asymmetric friction shear torque of the helical photon, the quadrupole moment (J_2) of the fluid Sun, and transit-time latencies in the transmission of the absolute gravitational field (v^2/c^2).

- **Measurement of *G* Decay in Great Voids:** The model predicts that the universal gravitational constant experiences infinitesimal variations as a function of local phase density. Future astrometric missions focused on measuring deep orbital dynamics in the center of Great Cosmic Voids (such as the Boötes Void) against high-mass concentration regions should register a quantifiable deviation in the values of G. Registering this coupling gradient would conclusively confirm the hypothesis of the gravitational brake release.

- **The Cosmos as a Reversible System:** The global cosmic cycle is governed by Le Chatelier's Principle. Gravity operates as the master harvesting force that cleanses the vacuum of entropic residues and re-nucleates sterile mass, physically bypassing the mathematical singularity of infinite density and heat death, guaranteeing eternal return through the mathematical statistics of stochastic systems on an infinite time axis.

10.1 Empirical Contrast Protocols via Next-Generation Instrumentation

To conclusively validate this model and subject it to the scrutiny of twenty-first-century astrophysical observation, three direct experimental contrast methodologies are proposed utilizing advanced instrumentation that will operate in the coming decades:

- **Overcoming the Light Horizon via Gravitational Wave Interferometry:** Given that the Cosmic Microwave Background (CMB) acts as a fog wall due to the plasma confinement of the first 380,000 years, light cannot provide direct data from Time Zero. To observe the phase prior to the recombination horizon, science must resort to gravitational wave astronomy. Next-generation space interferometric satellite missions—such as the ESA/NASA LISA space antenna, and the Chinese TianQin and Taiji satellite constellations—will be capable of mapping the primitive gravitational wave quantum background. The registration of an asymmetric directional vector anisotropy pattern in said background would incontestably confirm a kinetic origin via an off-center multifocal impact, definitively burying the hypothesis of an ideal, homogeneous spherical expansion out of nothingness.

- **Measurement of the *G* Gradient in Great Cosmic Voids:** The model explicitly predicts that the universal gravitational constant experiences infinitesimal variations dependent on local material concentration. Future ultra-precision astrometric missions designed to measure deep orbital dynamics and kinematic transits in the exact center of Great Cosmic Voids (such as the Boötes Void) against high-density regions (such as the Great Attractor) will register a quantifiable deviation in local *G* values. Registering this coupling gradient (Γ) will validate the hypothesis of the systemic gravitational brake lightening.

- **Deep Spectroscopic Analysis of the Intergalactic "Chemical Clock":** Continuous high-resolution, high-fidelity infrared spectroscopic observations at deep observational boundaries (James Webb and its successors) will allow for mapping the high metallicities and complexity of primitive hyper-mature galaxies. As complementary space instruments corroborate that the molecular evolution of carbon demands temporal scales orders of magnitude higher than the rigid limit of 13.7 billion years, traditional cosmology will be forced to correct the transit-time bias and introduce the VLS gradient to restore evolutionary congruence to real material time.

11. Bibliographic References

- Dirac, P. A. M. (1937). The Cosmological Constants. *Nature*, 139(3512), 323-324. doi.org

- Milgrom, M. (1983). A modification of the Newtonian dynamics as a possible alternative to the hidden mass hypothesis. *The Astrophysical Journal*, 270, 365-370. doi.org

- Penrose, R. (2010). *Cycles of Time: An Extraordinary New View of the Universe*. Bodley Head. *(Note: As a complete printed book, this reference does not require a DOI URL).*

- Steinhardt, P. J., & Turok, N. (2002). Cosmic evolution in a cyclic universe. *Physical Review D*, 65(12), 126003. doi.org
- Webb, J. K., King, J. A., Murphy, M. T., Flambaum, V. V., Carswell, R. F., & Bainbridge, M. B. (2011). Indications of a Spatial Variation of the Fine Structure Constant. *Physical Review Letters*, 107(19), 191101. doi.org