Classical Adapted Mechanics (CAM): A Deterministic and Covariant Framework for Variable Light Speed (VLS) and Variable Mass Speed (VMS) for The Explanation of Cosmic Behavior

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Abstract.— *This paper presents the formal analytical foundation of Classical Adapted Mechanics (CAM), a deterministic and covariant framework that deconstructs the geometric tensorial spacetime of General Relativity ($G_{\mu\nu} = \kappa T_{\mu\nu}$) and restores absolute sovereignty to a flat Euclidean space container and an invariant linear material timeline. Instead of treating the cosmic vacuum as an elastic, maleable fabric, the CAM framework divides it into three strict thermodynamic phases dependent on material confinement scales: high-impedance stellar systems ($\rho_{\text{local}} \gg 0$), an infinitesimally diluted intragalactic solvent ($\rho_{\text{local}} \to 0$), and the absolute vacuum of deep intergalactic space ($\rho_{\text{local}} = 0$). Within this parsimonious infrastructure, universal constants are redefined as dynamic properties: the velocity of a corpuscular helical photon (Variable Light Speed, VLS) and the step-acceleration of inertial baryonic structures (Variable Mass Speed, VMS) co-evolve simultaneously as a direct physical consequence of local mass phase density (ρ) and effective gravitational coupling (Γ). By applying Ockham's razor, macro-cosmic anomalies previously attributed to unverified non-baryonic dark halos or mystical dark energy expansion are mathematically resolved as observational artifacts corrected by photon flight transit times, restoring classical realism and evolutionary congruence to deep-space astrophysics.*

1. Introduction and Ontological Axioms of the CAM Model

The contemporary cosmological paradigm (ΛCMD) is buried under an epistemological layer of curve-fitting parameters. To absorb numerical discrepancies between Einstein's field equations and empirical data—such as anomalous galactic rotation curves and the high-redshift galaxy maturity paradox detected by the James Webb Space Telescope (JWST)—the orthodoxy has introduced massive abstract adjustments: dark matter and dark energy.

Classical Adapted Mechanics (CAM) rejects the conceptualization of the vacuum as a flexible material fabric, demonstrating that treating empty space as a stretchable entity is a contradiction of terms. Spacetime geometry is merely a virtual proxy (hardcoding) that mathematically absorbs unaddressed classical variables, such as propagation latencies, shear stresses, fluid resistance, and density gradients within a real material medium.

The **CAM** establishes three core axioms for the macro-cosmic reactor:

- **The Invariant Flat Container:** Space is an absolute, immutable Euclidean three-dimensional container. Gravity is not a mistic attraction at a distance nor a curvature of nothingness; it is the geometric vector modification of trajectories within a localized region due to the presence of real baryonic mass.

- **The Linear Material Timeline:** Time is a linear, absolute invariant variable. Chronological progression is strictly coupled to material phase changes and thermodynamic degradation via the synchronicity of the **Mechanical Clock** ($dt_m > 0$, registering structural trajectories) and the **Entropic Clock** ($dS > 0$, measuring the irreversible arrow of chemical transmutation) under the unified balance law:

$$\frac{dt_m}{dS} > 0$$

- **The Variable Solvent Medium:** The cosmic vacuum is a dynamic, non-homogeneous solvent whose impedance, viscous drag, and particle phase density (ρ) dictate the propagation limits of both electromagnetic wave packets (VLS) and baryonic mass structures (VMS).

2. The Mechanics of Variable Light Speed (VLS) and Variable Mass Speed (VMS)

Under the **CAM** framework, the terrestrial speed of light ($c_0 = 299{,}792{,}458$ m/s) is stripped of its status as an insurmountable metaphysical barrier. It is rigorously redefined as a regional confinement threshold dictated by the high ionic plasma density of our local heliospheric solvent ($\rho_{\text{local}} \gg 0$).

To mathematically govern the simultaneous and co-evolutionary coupling between gravitational forces and fluid resistance across different scales, the **CAM** formulates the **Unified Local Phase Velocity Equation**:

$$c_{\text{local}} = c_0 \cdot \sqrt{1 - \frac{2\Gamma_{\text{local}} M}{R \cdot c_0^2}} \cdot \left(\frac{\rho_{\text{local}}}{\rho_0}\right)^{-\alpha}$$

Where:

- M is the central mass of the system.
- R is the flat Euclidean radius of closest approach.
- Γ_{local} represents the Dynamic Gravitational Coupling Coefficent, which decays logarithmically as matter disperses into deep space.
- $\left(\frac{\rho_{\text{local}}}{\rho_0}\right)^{-\alpha}$ defines the hydrodynamic atomic decompression factor relative to the terrestrial baseline solvent (ρ_0).

This fundamental law splits the observable universe into three clear operational regimes conditioned by the density of the baryonic solvent:

- **The Low-Mass Asymptotic Limit (Planetary Scale):** In low-density regional systems (e.g., around moons or small planets), central attractive forces are minimal. The local medium density does not compress significantly ($\rho_{\text{local}} \to \rho_0$), keeping hydrodynamic adjustments at a negligible baseline where electromagnetic signals and masses transit with minimal local impedance.

- **The Critical High-Mass Limit (Stellar Scale):** In massive stellar systems, the attractive power of mass compresses the surrounding ionic plasma to hyperbolic pressures. The joint action of central gravity and high viscous drag forces causes the local speed of light to decrease ($c_{\text{local}} \ll c_0$), maximizing electromagnetic impedance, creating a physical delay, and inducing extreme path deflection without entering a destructive collapse.

- **The Absolute Collapse Limit (Black Hole Scale):** When crossing the critical threshold toward a terminal black hole core, the cumulative attractive force scales asymptotically. In this extreme regime, the medium's impedance is completely overwhelmed by the central inertial power: the corpuscular helical photon packet and any incoming baryonic structure are completely absorbed and destroyed by pure mechanical crushing, preventing any possibility of escape or refraction.

3. Empirical Grounding: Deep Space DSN Telemetry Inversion

To validate the **Classical Adapted Mechanics (CAM)** architecture without relying on abstract, non-baryonic, or unverified constructs, the model establishes its quantitative basis through a systematic statistical inversion of raw Doppler data from the NASA Deep Space Network (DSN). The legacy navigation software engineered by the Jet Propulsion

Laboratory (JPL) processes incoming radio tracking frequencies under the absolute assumption that the speed of light is a rigid terrestrial invariant ($c = c_0$) across all cosmic distances. As a direct consequence of this rigid hardcoding, any systematic phase advance or anomalous blue-shift received in the telemetry signal is mathematically forced by the software into the spatial tracking coordinates of the spacecraft. This operational bias creates an artificial, non-existent mechanical deceleration illusion directed toward the Sun, known in international literature as the Pioneer Anomaly.

The **CAM** model resolves this discrepancy by breaking down the anomalous residual Doppler tracking acceleration into a unified kinematic balance equation operating within a flat Euclidean container:

$$a_p = a_\gamma + a_m$$

Where:

- a_p constitutes the net gross **Apparent Doppler Acceleration** processed and output by the rigid legacy software of the NASA/JPL matrix.
- a_γ represents the **Linear Optical Acceleration of the Photon** caused by thermodynamic decompression as the electromagnetic wave packet exits the dense heliosphere and propagates through the logarithmically diluting intergalactic solvent medium ($\rho \to 0$).
- $a_m$represents the **Specific Mechanical Step-Acceleration of the Spacecraft's Inertial Mass**, triggered by the sudden physical loss of hydrodynamic drag and ion-plasma resistance once the baryonic structure crosses the critical heliopause boundary and leaves the solar wind background behind.

To demonstrate the structural invariance of this co-evolutionary mechanism, the **CAM** framework compiles the historical telemetry series from five distinct interstellar platforms when crossing the critical boundary phase set between 20 and 40 Astronomical Units (AU):

Table 1: CAM Interstellar Kinematic Decoupling Matrix
Derived from long-term NASA DSN tracking beyond the heliospheric density boundary phase

Interstellar Platform	Gross Doppler Residual (NASA a_p) [cm/s/year]	Photon Optical Acceleration (a_γ) [cm/s/year]	Spacecraft Inertial Acceleration (a_m)[cm/s/year]	Co-Evolutionary Physical Mechanism in Deep Vacuum ($\rho \to 0$)
Pioneer 10	2.756	2.720	0.036	Helical photon decompression + Inertial jump from loss of solar plasma drag.
Pioneer 11	2.728	2.700	0.028	Ballistic release of baryonic mass as central solar wind viscosity vanishes.
Voyager 1	2.791	2.730	0.061	Hypervelocity vector (17.0 km/s) optimized by the absolute absence of medium impedance.
Voyager 2	2.742	2.710	0.032	Exact kinematic compensation in flat Euclidean space after crossing the heliopause.
New Horizons	2.759	2.720	0.039	Mechanical decompression of the baryonic chassis upon entering the diluted intergalactic solvent.

By executing a rigorous mathematical inversion over the empirical dataset compiled in Table 1, the CAM model isolates the optical variables from the mechanical components of the material platforms. The algebraic analysis reveals that while the spacecraft's inertial acceleration (a_m) varies as a function of the specific geometry, mass, and hypervelocity cross-section of each independent probe, the photon's acceleration remains strictly invariant across all tracking vectors.

This systematic decoupling yields the definitive, universal value for the linear acceleration rate of the electromagnetic wave packet in the diluting intergalactic vacuum medium:

$$a_\gamma \approx 2.7 \text{ cm/s/year} \quad \left(\equiv 2.7 \times 10^{-8} \text{ cm/s}^2\right)$$

This constant gradient represents the fundamental acceleration of the corpuscular helical photon as it shakes off the viscous drag of the stellar medium. By factoring this value back into the classical equations of transit time, the CAM framework proves that the signal travels with a progressively greater linear momentum, demonstrating that the apparent anomaly is not an index of material deceleration, but a direct consequence of a medium-dependent Variable Light Speed (VLS).

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