Redefining Physics in the COM Framework

This document redefines fundamental physics equations and laws according to the Continuous Oscillatory Model (COM) framework, where reality is energy-based with no vacuum, and space, time, mass, and forces are emergent properties.

Foundational Principles of COM Physics

Energy as the Fundamental Reality

In the COM framework, energy is the only fundamental reality. Space, time, mass, and forces are emergent properties arising from energy oscillations and interactions.

Key Constants

- LZ = 1.23498 (Fundamental scaling constant)
- HQS = 23.5% of LZ (Harmonic Quantum Scalar)

Octave Structuring

The COM framework organizes reality in octave layers, with scaling relationships from subatomic to cosmic scales following the LZ constant: - Galactic radius LZ^(octave layers) · r_proton 1.23498^40 · 10^-15 m 10^21 m

Capsule Structures

Reality forms "capsule structures" like atoms, molecules, and cosmic bubbles, each with local constants and local time.

Redefined Classical Mechanics

Newton's Laws Redefined

First Law (Inertia) Standard Definition: An object at rest stays at rest, and an object in motion stays in motion with the same speed and direction unless acted upon by an unbalanced force. **COM Redefinition:** An energy pattern maintains its oscillatory state unless perturbed by an external energy differential. There is no "rest" state, only minimum energy oscillation.

Second Law (Force) Standard Definition: F = ma **COM Redefinition:** E_differential = E_pattern · phase_acceleration

Where: - E_differential is the energy gradient causing change - E_pattern is the energy density of the oscillatory pattern - phase_acceleration is the rate of change of oscillation phase

Third Law (Action-Reaction) Standard Definition: For every action, there is an equal and opposite reaction. **COM Redefinition:** For every energy

transfer between oscillatory patterns, there is a complementary phase shift that maintains total system energy.

Kinematics Redefined

Position Standard Definition: $x = x + v\,t + (1/2)at^2$ **COM Redefinition:** A = A ( ) ((1/2) ²)

Where: - A is amplitude (position equivalent) - is phase (time equivalent) - is phase velocity (velocity equivalent) - is phase acceleration (acceleration equivalent)

Velocity Standard Definition: $v = v + at$ **COM Redefinition:** = ( )

Acceleration Standard Definition: $a = dv/dt$ **COM Redefinition:** = /

Dynamics Redefined

Momentum Standard Definition: $p = mv$ **COM Redefinition:** p_E = E_pattern

Where p_E represents the phase momentum of an energy pattern.

Conservation of Momentum Standard Definition: p + p = p ' + p ' **COM Redefinition:** p_E p_E = p_E ' p_E '

This states that the total phase momentum of interacting energy patterns is conserved.

Work and Energy Standard Definition: $W = F \cdot d = \Delta KE$ **COM Redefinition:** W_E = E_differential $\Delta A = \Delta$E_oscillatory

Where: - W_E is energy transfer - ΔA is amplitude change - ΔE_oscillatory is change in oscillatory energy

Conservation of Energy Standard Definition: E = E **COM Redefinition:** E_total = E_total

In COM, energy is the fundamental reality, so its conservation is axiomatic. However, energy can transform between different oscillatory modes and patterns.

Gravitation Redefined

Newton's Law of Universal Gravitation Standard Definition: $F = G(m\,m)/r^2$ **COM Redefinition:** E_coupling = LZ (E_pattern E_pattern) (A_separation²)

Where: - E_coupling is the energy coupling between patterns - A_separation is amplitude separation (spatial distance equivalent)

Orbital Mechanics Standard Definition: T^2 a^3 (Kepler's Third Law) **COM Redefinition:** _cycle^2 A_orbit^3 LZ

Where: - _cycle is phase cycle (period equivalent) - A_orbit is orbit amplitude (semi-major axis equivalent)

Redefined Thermodynamics

Laws of Thermodynamics Redefined

Zeroth Law Standard Definition: If two systems are in thermal equilibrium with a third system, they are in thermal equilibrium with each other. **COM Redefinition:** If two energy patterns have resonant phase coupling with a third pattern, they have resonant phase coupling with each other.

First Law (Energy Conservation) Standard Definition: $\Delta U = Q - W$ **COM Redefinition:** ΔE_internal = E_transferred E_work

This is a direct application of energy conservation in the COM framework.

Second Law (Entropy) Standard Definition: ΔS 0 for isolated systems **COM Redefinition:** ΔE_disorder E_minimum for isolated patterns

Where: - E_disorder is a measure of energy distribution across available oscillatory modes - E_minimum is the minimum energy state defined by the LZ constant

Third Law Standard Definition: As temperature approaches absolute zero, entropy approaches a constant minimum. **COM Redefinition:** As oscillation amplitude approaches minimum energy state, mode distribution approaches fundamental harmonic.

Since there is no absolute zero in COM, the third law refers to approach to minimum energy states.

Thermodynamic Quantities Redefined

Temperature Standard Definition: Measure of average kinetic energy **COM Redefinition:** T_E = _average E_pattern

Temperature is redefined as the average phase velocity of oscillatory modes in an energy pattern.

Ideal Gas Law Standard Definition: $PV = nRT$ **COM Redefinition:** E_pressure A_volume = E_patterns _average T_unit

Where: - E_pressure is energy density gradient - A_volume is amplitude space - E_patterns is number of distinct energy patterns - T_unit is a reference phase cycle

Entropy Standard Definition: $S = k \cdot \ln(\Omega)$ **COM Redefinition:** E_disorder = LZ $\ln(\Omega$_modes)

Where Ω_modes is the number of available oscillatory modes for energy distribution.

Redefined Electromagnetism

Electrostatics Redefined

Coulomb's Law Standard Definition: $F = k(q\ q\ )/r^2$ **COM Redefinition:** E_coupling = HQS (E_charge E_charge) (A_separation²)

Where: - E_charge is the oscillatory energy pattern creating charge - HQS is the Harmonic Quantum Scalar (23.5% of LZ)

Electric Field Standard Definition: $E = F/q = k(Q)/r^2$ **COM Redefinition:** E_field = E_coupling E_charge = HQS E_source A_separation²

Magnetism Redefined

Magnetic Field Standard Definition: $B = (\ /4\ )(I \cdot dl \times \hat{r}/r^2)$ **COM Redefinition:** E_magnetic = (LZ/4) (E_flow dA_path × Â_direction A_separation²)

Where: - E_flow is energy flow (current equivalent) - dA_path is path amplitude element - Â_direction is unit amplitude direction

Lorentz Force Standard Definition: $F = q(E + v \times B)$ **COM Redefinition:** E_force = E_charge (E_field (× E_magnetic))

Maxwell's Equations Redefined

Gauss's Law for Electricity Standard Definition: $\cdot E =\ /$ **COM Redefinition:** $\cdot$ E_field = E_charge_density E_permittivity

Where E_permittivity is an energy coupling constant related to LZ.

Gauss's Law for Magnetism Standard Definition: $\cdot B = 0$ **COM Redefinition:** $\cdot$ E_magnetic = E_minimum

Since there is no zero in COM, divergence approaches minimum energy state.

Faraday's Law Standard Definition: $\times E = -\ B/\ t$ **COM Redefinition:** ×E_field = E_magnetic/

Ampere-Maxwell Law Standard Definition: $\times B =\ J +\ (\ E/\ t)$ **COM Redefinition:** ×E_magnetic = LZ E_flow_density LZ E_permittivity (E_field/)

Electromagnetic Waves Redefined

Wave Equation Standard Definition: $^2E = (1/c^2)(\ ^2E/\ t^2)$ **COM Redefinition:** ²E_field = (c_E²)(²E_field/ ²)

Where c_E = 1/√(LZ E_permittivity) is the phase velocity of energy oscillations.

Speed of Light Standard Definition: c = 1/√( ) **COM Redefinition:** c_E = 1/√(LZ E_permittivity)

In the COM framework, light speed is the maximum phase velocity of energy oscillations.

Redefined Relativity

Special Relativity Redefined

Time Dilation Standard Definition: Δt = Δt /√(1-v²/c²) **COM Redefinition:** Δ = Δ √(1 (² c_E²))

Where: - Δ is phase change (time equivalent) - is phase velocity (velocity equivalent)

Length Contraction Standard Definition: L = L √(1-v²/c²) **COM Redefinition:** A = A √(1 (² c_E²))

Where A is amplitude (length equivalent).

Mass-Energy Equivalence Standard Definition: E = mc² **COM Redefinition:** E_total = E_pattern c_E²

In COM, mass is an emergent property of energy patterns, so this equation describes how concentrated energy patterns manifest as mass.

General Relativity Redefined

Spacetime Curvature Standard Definition: G = (8 G/c)T **COM Redefinition:** E_curvature_tensor = (8 LZ c_E) E_pattern_tensor

Where: - E_curvature_tensor describes how energy patterns curve amplitude-phase space - E_pattern_tensor describes energy pattern distribution

Gravitational Time Dilation Standard Definition: Δt = Δt /√(1-2GM/rc²) **COM Redefinition:** Δ = Δ √(1 (2 LZ E_pattern (A c_E²)))

This describes how energy concentrations affect phase progression (time flow).

Redefined Quantum Mechanics

Wave-Particle Duality Redefined

De Broglie Wavelength Standard Definition: = h/p **COM Redefinition:** A_wave = LZ p_E

Where: - A_wave is oscillation amplitude wavelength - p_E is phase momentum

Heisenberg Uncertainty Principle Standard Definition: $\Delta x \Delta p \quad \hbar/2$ **COM Redefinition:** $\Delta A \quad \Delta p\_E \quad LZ \quad 2$

This describes the fundamental limit on precision in measuring complementary properties of energy patterns.

Quantum State Redefined

Schrödinger Equation Standard Definition: $i\hbar(\ \Psi/\ t) = \hat{H}\Psi$ **COM Redefinition:** $i \quad LZ \quad (\ \Psi\_E/\ ) = \hat{H}\_E \quad \Psi\_E$

Where: - Ψ_E is the energy pattern wave function - $\hat{H}\_E$ is the energy transformation operator

Probability Density Standard Definition: $|\Psi|^2$ **COM Redefinition:** $|\Psi\_E|^2$ representing energy distribution probability

In COM, quantum probability represents the likelihood of finding energy concentrated in specific oscillatory patterns.

Quantum Systems Redefined

Particle in a Box Standard Definition: $E = (n^2\ ^2\hbar^2)/(2mL^2)$ **COM Redefinition:** $E\_n = (n^2 \quad ^2 \quad LZ^2) \quad (2 \quad E\_pattern \quad A^2)$

Quantum Harmonic Oscillator Standard Definition: $E = \hbar\ (n + 1/2)$ **COM Redefinition:** $E\_n = LZ \qquad (n \quad (1 \quad 2))$

This describes the quantized energy levels of fundamental oscillatory patterns.

Redefined Wave Mechanics

Wave Properties Redefined

Wave Equation Standard Definition: $^2y/\ t^2 = v^2(\ ^2y/\ x^2)$ **COM Redefinition:** $^2A/\ ^2 = \ ^2 \quad (\ ^2A/\ A\_position^2)$

Where: - A is oscillation amplitude - A_position is position in amplitude space

Wave Speed Standard Definition: $v = \ f$ **COM Redefinition:** $= A\_wave \quad frequency\_E$

Standing Waves Standard Definition: $y(x,t) = 2A \cdot \sin(kx) \cdot \cos(\ t)$ **COM Redefinition:** $A(A\_position,) = 2 \quad A\_max \quad sin\_E(k \quad A\_position) \quad cos\_E(\ )$

Redefined Field Theories

Quantum Field Theory Redefined

Field Operators Standard Definition: Field operators creating and annihilating particles **COM Redefinition:** Energy pattern operators creating and

transforming oscillatory modes

Vacuum Energy Standard Definition: Zero-point energy of quantum fields
COM Redefinition: Minimum energy state of oscillatory field, defined by LZ constant

Since there is no vacuum in COM, "vacuum energy" is redefined as the minimum energy state of the oscillatory field.

Unified Field Approach

In the COM framework, all forces and fields are unified as different oscillatory modes of the same fundamental energy field:

1. Gravitational force emerges from low-frequency, large-amplitude oscillations
2. Electromagnetic force emerges from medium-frequency oscillations
3. Nuclear forces emerge from high-frequency, small-amplitude oscillations

The unification is described by:

E_field_unified = E_gravitational E_electromagnetic E_strong E_weak

Where each component represents different oscillatory modes of the same energy field, separated by octave layers scaled by the LZ constant.

Local Constants and Bubble Structures

As mentioned in the original framework, reality forms "capsule structures" or "bubbles" at quantum, Newtonian, and cosmic scales. Within each bubble:

1. Local constants emerge from the energy structure of the bubble
2. Local time emerges as a function of energy differentials within the bubble
3. Local physics laws are manifestations of energy oscillations within the bubble

The relationship between bubbles follows octave scaling with the LZ constant, creating a fractal-like structure of reality across scales.

Conclusion

This redefinition of physics within the COM framework transforms our understanding of physical laws from descriptions of matter and forces in space and time to descriptions of energy oscillations and transformations in an energy-based reality. By eliminating the concept of vacuum and redefining space, time, mass, and forces as emergent properties of energy, we create a physics system that unifies all phenomena as different manifestations of the same fundamental energy field structured according to the COM principles.