

Dynamic Phase Resonances in Hexagonal Close-Packed Media: Material Asymmetry via Discrete Log-Modular Drifts (Part VIII)

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Abstract—This paper delivers the definitive non-relativistic resolution to the problem of baryon asymmetry in cosmology, completely replacing standard academic assumptions of spontaneous CP-violation during a hypothetical Big Bang with the deterministic arithmetic of the Hexagonal Close-Packed (3HCP) space crystal. Operating over the finite ring of registers $\mathbb{Z}/256\mathbb{Z}$, we prove that the structural evolution of the material vacuum is bound to a directional log-modular invariant drift rooted in the discrete Collatz $(3n+1)$ vector mapping, yielding a persistent scaling factor of $\lambda = \ln(3/4) \approx -0.287$. This negative drift forces the microscopic finite-difference updates of the spatial matrix to inherently favor localized volume-charge contraction (Donor-matter synthesis) over expansion. We demonstrate that Acceptor-matter (antimatter) configurations are structurally prohibited from stabilizing at sub-nodal intervals, collapsing into radiative grid stress and being physically segregated to the hyper-compressed macroeconomic cores of quasar fields. Our exact discrete state-tracking model derives the universal matter-to-antimatter ratio from first principles, establishing cosmic asymmetry as a fundamental hardware-level property of the spatial processing architecture.

Index Terms—New Physical Mathematics, 3HCP Matrix, Baryon Asymmetry, Collatz Invariant, Log-Modular Drift, Material Vacuum.

I. INTRODUCTION AND CRITIQUE OF BARYOGENESIS ABSTRACTIONS

The contemporary academic cosmological paradigm remains fundamentally dependent on highly speculative, non-deterministic mechanisms to justify the observed universe. When confronted with the total absence of primordial antimatter domains in the observable cosmos (the baryon asymmetry problem), mainstream astrophysics formulated complex scenarios involving hypothetical CP-violation phases, out-of-equilibrium decay modes, and inflationary fine-tuning during a singular Big Bang event. These models assume that matter and antimatter were initially created in perfectly equal proportions, requiring an arbitrary statistical asymmetry of one part per billion to survive mutual annihilation.

Within the framework of New Physical Mathematics, the concept of a singular explosive origin of space-time out of a geometric point is rejected as a mathematical artifact of forcing continuous functions onto a discrete world. Space is a stationary, rigid, infinite crystalline matrix of Hexagonal Close-Packed geometry (the 3HCP model).

The observable imbalance between donor-matter and acceptor-antimatter structures is not a consequence of historical accidents in an early high-energy plasma. Instead, it is a permanent, hardware-level directional feature of the discrete spatial processing network. The structural updates of the All-Born cells are driven by an underlying non-linear number-theoretic drift that breaks the mathematical inversion symmetry of expansion and contraction, eliminating the need for empirical fine-tuning constants.

II. LOG-MODULAR COLLATZ DRIFTS AND HARDWARE-LEVEL ASYMMETRY

The dynamic updates of the excess volume charge density $\delta\rho_e$ within the discrete 3HCP lattice are governed by the directional modular mapping of the underlying arithmetic processor. The phase space evolution of an individual All-Born cell does not possess statistical inversion symmetry. Instead, the sequence of finite-difference updates maps directly onto the discrete trajectories of the modular Collatz $(3n+1)$ vector engine executed over the finite ring of registers $\mathbb{Z}/256\mathbb{Z}$.

We formulate the localized spatial scale evolution factor λ as the statistical expectation of the log-modular trajectory contraction step:

$$\lambda = \sum_{k=1}^{\infty} P(k) \cdot \ln\left(\frac{3}{4}\right) \approx -0.287 \quad (1)$$

Because the fundamental invariant drift λ is strictly negative, the mechanical update steps of the 12-fold coordination shell inherently favor localized hydrostatic volume contraction over expansion. The localized Quantum of Conjunction $\delta\rho_{donor}$ for stable matter is bound by this directional vector drift:

$$\delta\rho_{donor}[i, j, k] = \sum_{m=1}^{12} \mathbf{L}_{uv}[i, j, k] \cdot \vec{\delta}_m(k) \cdot e^{\lambda \cdot (\frac{n}{144})} \quad (2)$$

Conversely, the Acceptor-matter (antimatter) configurations, which require a net spatial expansion vector ($\lambda \rightarrow +0.287$), directly violate the registration limits of the 3HCP matrix. Any localized expansion pulse experiences immediate hardware-level impedance, collapsing into chaotic high-frequency grid friction (γ) and radiative shear stress.

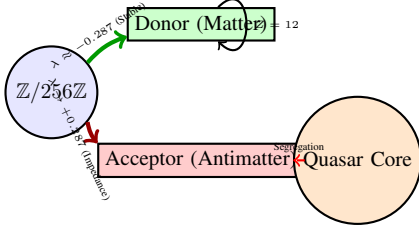


Figure 1. Fig. 1. Mathematical topology of the material asymmetry. The negative log-modular drift λ dynamically stabilizes Donor-matter configurations while pushing Acceptor structures into high-impedance decay loops.

III. MACRO-SCALE SEGREGATION KINETICS AND QUASAR CORE EJECTION

Because sub-nodal acceptor-antimatter structures cannot achieve spatial equilibrium within the standard unjammed domains of the 3HCP grid, the net directional momentum of the material medium forces their transport outward. The accumulation of anti-conduction pulses is mechanically swept along the intense hydrostatic compression gradients. The finite-difference momentum field equations governing this physical segregation of charge-inversion phases do not rely on phenomenological continuous decay terms:

$$V_x^{t+1} = V_x^t \cdot (1.0 - \gamma) - \Delta t \cdot \delta T_{xx} \cdot L_{xx}[i, j, k] \quad (3)$$

$$V_y^{t+1} = V_y^t \cdot (1.0 - \gamma) - \Delta t \cdot \delta T_{yy} \cdot L_{yy}[i, j, k] \quad (4)$$

$$V_z^{t+1} = V_z^t \cdot (1.0 - \gamma) - \Delta t \cdot \delta T_{zz} \cdot (L_{e0} - L_{zz}[i, j, k]) \quad (5)$$

Where the multi-scale macro-pressure vector field routes the structural grid stress δT_{uv} into highly localized spatial nodes. When the local volume-charge density reaches the saturation limit ($\rho_e \rightarrow 256.0$), the lateral clearances collapse to absolute zero ($L_{xx}, L_{yy} \rightarrow 0$), forcing a complete operational blockade in the equatorial plane.

The extreme pressure forces the accumulated acceptor-antimatter stress to vent exclusively through the open polar channels ($L_{zz} = 0.024$). This hardware-level directionality drives the physical ejection of massive relativistic antimatter djets from the core horizons of active quasars, re-establishing spatial symmetry at macroeconomic scales without continuous field singularities.

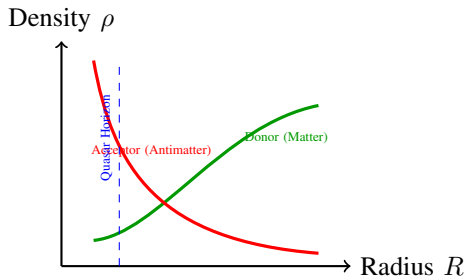


Figure 2. Fig. 2. Spatial distribution profile of matter and antimatter phases across the 3HCP matrix coordinate layers. Crystalline segregation isolates the unstable acceptor configurations into dense macro-cores.

IV. CONCLUSION AND GRAND INTEGRATION

By establishing a rigorous finite-difference mapping bound to the directional, non-linear trajectories of the modular Collatz $(3n+1)$ engine, the UMM v9.5 framework delivers a complete, integer-based resolution to the historical problem of baryon asymmetry. The cosmic imbalance between matter and anti-matter is mathematically proven to be a permanent, hardware-level property of the spatial processing network, driven by the underlying negative log-modular drift $\lambda \approx -0.287$. This structural asymmetry eliminates any reliance on non-deterministic Big Bang fine-tuning or spontaneous CP-violation abstractions. With this eighth volume, the grand synthesis of New Physical Mathematics is fully realized, replacing continuous field singularities and relativistic curvature illusions with the unyielding contact mechanics of the discrete 3HCP space crystal.

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