

Emergent Cosmology of a Two-Phase Planar-Invasion Bubble Universe: Four-Force Unification, Majorana Neutrino Density Gradients, and Emergent Gravitation

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Abstract

This study proposes an emergent cosmological framework derived from a "Two-Phase Planar-Invasion" bubble universe scenario. In this model, we strictly define the physical and geometric boundaries of a "single universe" (or bubble universe) as an independent and complete V_0 field. Diverging from the traditional standard Big Bang (Λ CDM) singularity cosmology and the assumption of spin-2 "gravitons," we define the current observable universe as a highly organized, active cosmic plane (topologically presenting as a rotating, two-dimensional scimitar-like manifold). This plane continuously intrudes into and engulfs its higher-dimensional, degraded, dead host body, which has already reached maximum entropy heat death (i.e., the exclusive V_0 space/mother field of this bubble universe, a completely neutral quantum matrix composed of infinitely stretched residual light interwoven with light neutrinos). Starting from the first principles of geometric mechanics and quantum field theory, this report meticulously demonstrates:

1. **The Dual-Component Background of a Single Bubble Universe:** The absolute dark night background, alongside the 2.73 K vacuum topological polarization microwave noise floor (CMB) and superimposed electromagnetic interference patches.
2. **Dimensional Creation and Trans-Universe Drifting Mechanism in 0-Space:** Two-dimensional planar depressurization expansion, the splitting of stellar orbital and spin angular momentum, and the ejection of "secondary universe embryos" (tidal tails) from the collision of two active cosmic planes,

which completely break free from the mother V_0 field into Empty Zero-Space for frictionless drifting—establishing a trans-universe, cross-generational inheritance mechanism.

3. **Critical Phase Transitions of Matter and Dark Matter:** Three pathways of matter creation (driven purely by density gradients), the quantum critical boundary of 10 Bohr radii, dual-tier Majorana neutrinos, and the chiral gravitational capture of antimatter by ancient black holes.
4. **Primordial Magnetic Fields and Emergent Gravitational Fields:** Asymmetric gravitational shearing ignites primordial seed magnetic fields; gravitons are discarded, with macroscopic spacetime metrics and universal gravitation emerging directly from the scalar density gradients of Majorana neutrinos and the vertical dark pressure shielding effect, thereby establishing a Unified Equation of the Four Forces.
5. **Dual Central Blockade and the Black Hole Planck Core:** The geometric cancellation of four-way vectors and the unidirectional confinement of supermassive black hole event horizons block central pressure; neutrino Fermi degeneracy pressure naturally eliminates both black hole and Big Bang singularities.
6. **Topological Potential Energy and Tension Release:** The dead bubble universe completely stores the energy of the previous generation as high-dimensional topological potential energy (with an extreme tension up to $\approx 10^{113} \text{ J/m}^3$); an energy phase transition conversion equation is established, predicting the cyclical reset back into the uniform light sea of the V_0 mother field.
7. **Experimental Prospects for the 5.27 mm Quantum Grid:** The characteristic spacing of the V_0 field is reversely derived based on the 2.73 K temperature, proposing four falsifiable modern physics observational pathways, including altitude-differential microwave resonance measurements.

1 The Bubble Universe Entity and the Internal/External Resonance and Vacuum Polarization Mechanisms of the "Dual-Component Background"

In this theoretical system, an independent V_0 quantum fluid matrix constitutes a complete "bubble universe." The microwave background of the current bubble

universe is not a singular cooling relic of the Big Bang, but rather two distinctly different physical components derived from the quantum matrix of the dead universe:

1. **The Visual Background Component (Absolute Darkness and the V_0 Mother Field)**: After the old universe reaches maximum entropy heat death, charged particles decay and evaporate completely. The entire space of the bubble universe eventually evolves into a quantum superfluid matrix governed by the Pauli exclusion principle, composed entirely of neutral neutrinos and infinitely stretched residual light (Penrose, 2010)[2] (strictly defined here as the V_0 **field or dead mother field** of this universe). This fluid matrix directly forms the visually ubiquitous absolute dark background of the night sky and establishes the absolute geometric domain of the bubble universe.

2. **The Noise Floor Component (Tensor Strain Wave Resonance and Electromagnetic Interference Superposition)**:

- **External Induction (High-Dimensional Kinetic Excitation of Tensor Strain Resonance)**: The V_0 quantum matrix possesses zero mechanical shear modulus and a specific fluid elasticity mechanism. When a macro-cosmic plane driven by high-speed rotation cuts in, intense non-uniform geometric tidal forces induce geometric strain in the fluid. This strain propagates outward in the incompressible V_0 superfluid in the form of "tensor strain waves."
- **First-Principle Derivation of the Microwave Noise Floor and Grid Spacing Calculation**: Based on the derivations in this series of papers, the speed of light (c_0) is essentially the limit propagation speed of tensor waves in the V_0 medium. Given that the background characteristic spacing of neutrinos in the V_0 field is λ_{v_0} (related to density ρ_{v_0}), the inherent quantum resonance frequency of this fluid matrix is $\nu = c_0/\lambda_{v_0}$. According to quantum thermodynamic relations, its macroscopic absolute temperature strictly follows the equation:

$$T_{CMB} = \frac{h \cdot c_0}{k_B \cdot \lambda_{v_0}} \quad (1)$$

By substituting known physical constants (Planck's constant h , speed of light c_0 , Boltzmann's constant k_B) and the observational value $T_{CMB} = 2.73$ K into the formula to calculate in reverse, the fundamental quantum grid spacing of the V_0 matrix is:

$$\lambda_{v_0} = \frac{6.626 \times 10^{-34} \cdot 2.998 \times 10^8}{1.380 \times 10^{-23} \cdot 2.73} \approx 5.27 \times 10^{-3} \text{ m} \quad (2)$$

This is approximately **5.27 millimeters**. Therefore, the inherent 2.73 K microwave noise floor is not an accidental remnant of a hot Big Bang, but a

global physical constant locked by this 5.27 mm microscopic fluid grid and the ultimate wave speed. This result is of the same order of magnitude as the extremely low-temperature cosmic neutrino background's average spacing (about 1.43 mm) predicted by the Standard Model, strongly corroborating the inevitable connection between macroscopic thermodynamics and microscopic fluid spacing.

- **Electromagnetic Superposition of Luminous Celestial Bodies:** Electromagnetic radiation emitted by invading primordial black holes, old stars, and newly born stars undergoes physical superposition and interference with the inherent frequency of the quantum matrix during propagation, resulting in the anisotropic perturbation patches observed in the CMB.

2 Dimensional Creation, Planar Depressurization, Angular Momentum Inheritance, and the Ejection Mechanism of "Secondary Universe Embryos"

1. **Dimensional Symmetry Breaking:** The high-density rotating cosmic plane cuts into the isotropic, dead V_0 quantum matrix (Guth, 1981)[1], instantly breaking spatial symmetry and forcibly cleaving the three-dimensional volumetric axes ("up-down, front-back, left-right") alongside the arrow of time.
2. **Central High-Density Barrier and Outer Planar Expansion:** The density at the center of the synthesized cosmic disk plane is naturally extreme, forming a high-pressure asymmetric barrier that prevents the intense dark pressure generated by the collision from advancing inward. Subjected to the heavy high pressure of falling dark matter on both sides, energy is forced to transmit transversely along the disk toward the leading edge with the lowest density, executing two-dimensional directional depressurization. This propels the cosmic plane outward, elucidating both the directionality of expansion and its high geometric flatness ($\Omega_k \approx 0$).
3. **Planar Galactic Angular Momentum Inheritance and the Cause of the 1/3 Geometric Resistance Elastic Vortex:**
 - **2/3 Forward Consistency:** Approximately 66.7% of the matter globally conforms to the rotational direction and depressurization flow of the macro-plane, directly inheriting the overall tangential angular momentum of the planar system.

- **1/3 Reverse/Deflection Cause:** The intrinsic geometric inertial structure of the entirely neutral quantum matrix generates geometric resistance when subjected to high-speed shearing. This fluid viscous friction triggers inelastic shear wave rebounds of the local spatial geometry within the boundary layer, reversing a portion of the mainstream fluid motion into "geometric elastic reaction vortices" at the microscopic scale. Celestial bodies condensed within these shear-rebound vortices lock in localized reverse angular momentum, macroscopically manifesting as a divergence between their rotation and revolution directions.

4. **Dual Active Universe Collision, Tidal Tail Ejection, and the Trans-Universe Drifting Mechanism in 0-Space:**

Within the same bubble universe (i.e., a single mother V_0 field), when two high-speed, extremely dense active cosmic planes experience a violent physical collision, intense shearing occurs in their high-energy core regions, tearing the outermost edge areas and ejecting two massive, high-dimensional "tidal tails" composed entirely of light matter. These tidal tails have extremely low matter density, lack thermonuclear fusion, and are free from macro-gravitational binding, making it highly easy for them to break free from the mother universe plane.

More crucially, because the tidal tails possess extremely fast tangential edge rotation speeds and massive centrifugal forces, the vertical pressure on their top and bottom sides is significantly reduced. **Relying on tremendous rotational kinetic energy and projectile inertia, these two tidal tails (secondary universe embryos) will directly pierce through the localized V_0 quantum fluid during their escape from the mother body, bursting out completely bare and breaking free from the envelopment of the original bubble universe's V_0 mother field.**

Once they plunge into the absolute nothingness of "0-Space" (Empty Zero-Space, the vast, endless void between bubble universes), since traditional spacetime metrics and fluid viscous damping completely fail, this mass fragment can retain 100% of its rotational angular momentum without any loss, engaging in action-at-a-distance, trans-universe drifting. This continues until it instantaneously collides with and is captured by another distant, dead V_0 field sea (another independent dead bubble universe), thereby triggering the reboot of the next-generation universe and completing the trans-generational inheritance of the macro-rotational structure of the multiverse.

3 Microscopic Matter Creation Mechanism, 10-Bohr-Radius Critical Divergence, and Dual-Tier Majorana Neutrinos

Regarding how the V_0 quantum fluid transforms into matter with rest mass, this model establishes a phase transition mechanism driven purely by density and pressure gradients:

1. Three Microscopic Pathways of Matter Creation:

- **Pathway 1 (Phase Transition Condensation Driven by Extreme Density Gradients):** When the active cosmic plane cuts in at high speeds, extreme geometric compression and a massive "density gradient (pressure gradient)" are generated at the intrusion front. This purely mechanical geometric pressure gradient instantly breaks the homogeneous degenerate ground state of the neutrino fluid in the V_0 background, forcing the original light neutrinos to undergo intense phase transition condensation under limit compression, converting directly into initial neutral matter seeds with rest mass. This process completely excludes spontaneous ionization polarization.
- **Pathway 2 (Asymmetric Head-on Creation):** High-energy particle streams emitted by the accretion disks of primordial black holes and stars rush counter-directionally into the dark quantum sea, resulting in head-on collisions. The extreme kinetic energy conversion brings about localized maximal pressure, triggering mass-energy phase transitions.
- **Pathway 3 (Micro-Density Gradient Chain Snowball Effect):** The neutral micro-mass bodies generated previously break the absolute local uniformity. The microscopic pressure wells (micro-gravity effects) produced by these minuscule density gradients further capture and compress surrounding background neutrinos, triggering large-scale chain reactions of phase transition condensation and highly efficiently generating a vast amount of non-ionized, neutral micro-mass bodies.

2. The Quantum Mechanical Critical Boundary of 10 Bohr Radii and Dual-Tier Dark Matter:

- **Less than 10 Bohr Radii (Close-Range Strong Excitation Zone):** This belongs to the core zone of extreme compression and strong pressure gradient polarization. Under this limit pressure, the electroneutral structure of the fluid

matrix is ultimately shattered, triggering charge symmetry breaking, thereby further materializing into charged, visible luminous matter.

- **Beyond 10 Bohr Radii (Long-Range Safe Zone):** Kinetic energy and pressure drop according to the inverse-square law with distance. In this milder environment, the constant background light neutrinos undergo low-energy phase transitions and mass escalation, transforming into electroneutral, dual-tier Majorana neutrinos (N_R):
 - **Heavy-Tier M Neutrinos (MeV-TeV):** Possessing large mass and short mean free paths, they precipitate in the high altitudes on both sides of the plane, serving as the primary mass body of dark matter and providing vertical downward pressure (P_{Dark}).
 - **Light-Tier M Neutrinos (keV-GeV):** Possessing extreme penetrability and long mean free paths, they receive the kinetic energy of the vertical high pressure and act as transverse depressurization messengers for dark energy, transmitting stress over long distances outward along the two-dimensional plane.

3. **Chiral Capture Mechanism of Baryon Asymmetry:** In the zone of less than 10 Bohr radii, mass-energy conversion simultaneously creates positive and anti-baryons. The planar rotational shear force interacts with the extreme rotational fluid drag of ancient Kerr black holes. Antimatter baryons with specific spatial geometric polarities are directionally attracted and captured into the central high-pressure zone, where they are completely confined or annihilated; meanwhile, positive matter baryons acquire transverse escape kinetic energy, ejecting and diffusing along the two-dimensional depressurization front, thereby forming the physical root cause of the drastic depletion of antimatter in the universe.

4 Creation of Primordial Cosmic Magnetic Fields and Emergent Gravitational Fields (Graviton-Free Mechanism)

1. **Creation Mechanism of Primordial Cosmic Magnetic Fields (Mass Divergence under Geometric Rotation):** In areas close to the planar front where charge symmetry breaking has already occurred, due to the massive rest mass asymmetry between positive and negative particles ($m_p \gg m_e$), light electrons and heavy ions undergo large-scale velocity divergence under the geometric shearing of the

high-speed rotation and transverse depressurization of the scimitar plane. This macroscopic flow of charge separation instantaneously generates superfluid currents, igniting the primordial seed magnetic field that sweeps across the cosmic plane.

2. **Emergent Gravitational Field and Graviton-Free Mechanism:** This model completely abandons the spin-2 "graviton" hypothesis; gravity is not a fundamental interaction. The newly generated Majorana dark matter forms a density gradient envelope decaying as $\rho_N(r) \propto 1/r^2$ around mass M . Massive entities shield a portion of the vertically pressing neutrino flux. This "localized pressure gradient" caused by fluid shielding macroscopically emerges as the metric curvature and phenomenon of universal gravitation in General Relativity: $\vec{g} = -\nabla\Phi_\nu \propto -\nabla\rho_N \propto -1/r^2$. The gravitational constant G , as an emergent constant, has its value precisely determined by the momentum transfer efficiency between the anapole moment of the Majorana neutrinos and the vertical dark pressure (P_{Dark}): $G = C \cdot \sigma_{Anapole} \cdot P_{Dark}$. The constant background ρ_ν^{bg} naturally serves as background subtraction, normalizing the cosmological constant Λ .

5 Dual Central Blockade, Tangential Angular Momentum Drag, and the Physical Elimination of Singularities

1. **Dual Blockade of Galactic Center Interruption:**
 - **Four-Way Vector Geometric Cancellation:** Dark pressure/stress converging transversely from 360° around the disk forms a dynamic equilibrium with a net vector sum of zero at the center point due to geometric isotropy.
 - **Unidirectional Confinement of the Black Hole Event Horizon:** The limit pressure gradient in the central ultra-high-density region (black hole) forms a unidirectional fluid trap. Neutrino fluxes pressing inward are completely confined upon reaching the center, forming an ultimate physical pressure-blocking wall.
2. **Tangential Angular Momentum Drag and Flat Rotation Curves:** When vertical high pressure is converted into transverse depressurization flow, the collision process forcibly inherits the global rotational angular momentum of the galactic plane. Light-tier M neutrinos spew outward in Archimedean spirals, exerting a purely fluid-dynamic "tangential rotational drag force" on disk stars. This di-

rectly provides tangential kinetic energy to stars in the outer reaches of the galaxy, naturally deriving flat rotation curves.

3. **Quantum Physical Elimination of Black Hole and Big Bang Singularities:** Majorana neutrinos are fermions, strictly bound by the Pauli exclusion principle. Under extreme compression, neutrino Fermi degeneracy pressure provides an insurmountable resistance, preventing the volume from shrinking to zero. This physically replaces the mathematically infinite singularity with an "ultra-high-density quantum core" of finite volume and extremely high, but non-infinite, density, while simultaneously eradicating the myth of a spontaneous Big Bang singularity.

6 Unified Equation of the Four Fundamental Interactions

The total action of the universe requires no assumption of any quantum gravitational term (graviton) and is directly written as the sum of the Lagrangians for microscopic gauge fields, fermions, and the seesaw mechanism triggering the phase transition:

$$\mathcal{S}_{total} = \int d^4x \sqrt{-g} [\mathcal{L}_{Gauge} + \mathcal{L}_{Fermion} + \mathcal{L}_{Higgs} + \mathcal{L}_{Seesaw}] \quad (3)$$

- **Three Microscopic Forces (Strong, Weak, Electromagnetic):** Strictly governed by the gauge group $SU(3)_C \times SU(2)_L \times U(1)_Y$.
- **Macroscopic Gravity (Emergent Force):** Extreme pressure gradients trigger the phase transition of background light neutrinos via $\mathcal{L}_{Seesaw}$ to generate N_R (dark matter). Its pure scalar density gradient $\nabla \rho_N$, combined with the vertical downward pressure, directly manifests as the geometric deflection of the macroscopic spacetime metric $g_{\mu\nu}$. Within this framework, gravity achieves unification with quantum fluid dynamics.

7 Ultimate Implementation of the Law of Energy Conversion: Release of High-Dimensional Topological Potential Energy and the Cycle of Bubble Universes

1. **Unification of Macroscopic Geometric Spacing and Extreme Microscopic Tension (Topological Potential Energy Storage):** This theory thoroughly discards the myth of energy non-conservation in an "isolated universe." When the

previous old universe progresses toward maximum entropy heat death, its total energy does not disappear but transforms into "geometric topological potential energy" within the dead V_0 field (the bubble universe entity). Here exists a perfect physical-geometric unification: 5.27 millimeters is the macroscopic thermodynamic geometric spacing (corresponding to 2.73 K) of the V_0 field after being infinitely stretched; whereas inside the topological phase flow tubes maintaining this vast grid, extreme microscopic tension reaching up to $\rho_0 \approx 10^{113} \text{ J/m}^3$ is tightly drawn. This is akin to a super-elastic net stretched to its absolute limit—macroscopically presenting as a vast, empty, low-temperature fluid, yet microscopically storing the entirety of the previous universe's energy.

2. Preview of Zero-Point Energy Integral and Energy Conversion Equation:

In the subsequent article of this series (Part III), we will rigorously introduce the vacuum zero-point energy integral formula from quantum field theory to mathematically prove the source of this immense tension:

$$\rho_0 = \int_{\Lambda_{IR}}^{\Lambda_{UV}} \frac{d^3k}{(2\pi)^3} \frac{1}{2} \hbar \omega_k = \frac{\hbar c}{16\pi^2} (\Lambda_{UV}^4 - \Lambda_{IR}^4) > 0 \quad (4)$$

Traditional physics views the colossal energy calculated by this formula as a mathematical disaster of divergence (i.e., the cosmological constant problem). However, in this theory, we prove that this is indeed the potential energy locked securely within the flow tubes of the V_0 grid. When the rotating plane of the active universe cuts in and severs these 5.27 mm flow tubes, this extreme tension of up to 10^{113} J/m^3 collapses and releases instantaneously. The V_0 potential energy, extracted and excited by pressure, strictly follows a unidirectional catalytic conversion pathway:

$$E_{\text{Potential}}(V_0 \text{ Field}) \rightarrow E_{\text{Luminous}} + E_{N_R} + E_{\text{Dark Pressure}} + E_{\text{EM}} \quad (5)$$

The converted energy is sequentially distributed as: visible luminous matter energy (E_{Luminous}), dual-tier Majorana dark matter energy (E_{N_R}), dark pressure/dark energy driving planar expansion and galactic rotation ($E_{\text{Dark Pressure}}$), and electromagnetic radiation energy permeating space (E_{EM}). This precisely explains the fluid ebb-and-flow relationship where "regions of massive stellar birth must be accompanied by high-density dark matter deposition and dark pressure expansion."

3. The Ultimate "Great Brilliance Heat Death" Sub-phase of the Second Law of Thermodynamics and the Cyclical Reset to the V_0 Field:

- **Clearing of the Dark Background:** As the V_0 quantum fluid on both sides is completely compressed and 100% phase-transitioned onto the two-dimensional

plane, the kinetic energy of cosmic expansion zeroes out due to the exhaustion of fluid fuel (V_0 potential energy). The absolute dark background of the bubble universe's night sky is thoroughly cleared.

- **The Era of Great Brilliance:** The largest total mass of stars and luminous matter in universal history piles up at high densities on the plane. Infinite, crisscrossing bright starlight fills the entire space, entering a "Great Brilliance Heat Death sub-phase" maximally saturated with light energy.
- **Re-storage of Potential Energy and the Cycle of Life and Death:** This collection of brilliant matter ultimately undergoes particle evaporation and infinite wavelength stretching again during a prolonged decay, stretching back into a uniform sea of light and a matrix of light neutrinos with zero energy and frequencies approaching zero (i.e., reverting once again to the boundless, dead V_0 mother field, resetting as a dormant, independent bubble universe). The total energy of the entire universe is completely re-stored here in the form of "high-dimensional geometric topological potential energy" within the absolute darkness of the V_0 space, quietly awaiting the collision and awakening by the next trans-universe drifting fragment (tidal tail) in the vast 0-Space. This completes the ultimate, infinitely regenerating, absolutely energy-conserving cycle of the multiverse.

8 Experimental Verification and Future Prospects: Observational Pathways for the 5.27 mm Quantum Grid

If the V_0 field indeed possesses a basic fluid grid characteristic spacing of $\lambda_{v_0} \approx 5.27$ mm (corresponding to an electromagnetic frequency of approximately 56.9 GHz), this theoretical framework possesses a high degree of falsifiability. It can be cross-verified through the following four independent directions in modern physical experiments and astronomical observations:

1. **Altitude-Differential Microwave Resonance Measurement (Detection of V_0 Grid Deformation):** Since the gravitational field is essentially the density compression of the V_0 fluid, the grid spacing in strong gravitational zones (such as the Earth's surface) must be smaller than the 5.27 mm of the absolute vacuum ground state. To overcome the instrumental systematic errors of absolute measurement, we propose the "Altitude-Differential Measurement Method." Calculated via the rate

of change in gravitational potential energy formula ($\Delta r/r = g \cdot \Delta h/c^2$), if two sets of microwave resonance cavities are placed at sea level and on a mountain at an altitude of 2000 meters respectively, a relative spatial deformation of approximately 2.18×10^{-13} will be generated. This would cause a shift of about 0.012 Hz in the 56.9 GHz microwave resonance frequency. This signal magnitude falls perfectly within the detection limits of mid-tier commercial Cesium Beam Clocks after long-term integration averaging, making measurement verification possible in standard university physics department laboratories.

2. **56.9 GHz Resonance Anomaly in CMB Polarization Spectra:** If 2.73 K is the macroscopic manifestation of fluid strain waves, then around the 56.9 GHz frequency band, the CMB spectrum should not be a perfectly smooth blackbody transition. Future superconducting cosmic microwave observatories (such as CMB-S4) can focus on searching for minute resonance peaks or special B-mode scattering polarization anomalies in this frequency band.
3. **Fine Structure of the GZK Cutoff for Ultra-High-Energy Cosmic Rays:** When the effective interaction wavelength of extremely high-energy protons forms a specific geometric ratio with 5.27 mm, its scattering probability with the background field will experience a physical mutation. By analyzing energy spectrum distributions through large arrays (like the Pierre Auger Observatory), we can search for minute step-like attenuations or geometric diffraction dissipation features in specific energy segments.
4. **Fluid Dispersion Effect of High-Frequency Gravitational Waves:** Traditional General Relativity posits that gravitational waves lack dispersion. However, if gravity emerges from the pressure gradients of the V_0 fluid, high-frequency gravitational waves with wavelengths approaching the millimeter scale will inevitably be interfered with by the grid size when passing through the matrix, producing dispersion effects. Detecting the velocity delay and dispersion of millimeter-scale gravitational waves will serve as the most direct mechanical evidence for the characteristic length of the V_0 grid.

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