

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 paper presents an emergent cosmological framework derived from a "Two-Phase Planar-Invasion" bubble universe scenario. Departing from the standard Big Bang (Λ CDM) singular cosmology and the hypothesis of spin-2 spin-mediated gravitons, we define the observable Universe as an organized, dynamic cosmic plane (topologically modeled as a rotating, two-dimensional scimitar-like manifold) that non-asymmetrically penetrates and ingests a degenerate, maximum-entropy deceased progenitor universe—a space composed of a constant light-neutrino background ($\rho_{\nu}^{\text{bg}} = \text{Const}$) and a massless photon background forming an all-neutral quantum matrix.

From the first principles of geometric mechanics and quantum field theory, we demonstrate:

- Dual Background Components:** The absolute dark sky base-state and the 2.73 K cosmic microwave background (CMB) generated via vacuum topological polarization, overlaid with electromagnetic interference from luminous matter.
- Dimensional Genesis & Boundary Vortex Mechanics:** 2D planar stress-relief expansion, the 2/3 co-rotating versus 1/3 counter-rotating stellar angular momentum split via boundary-layer shear-wave reflection, and the ejection of secondary universe embryos via tidal tails in dual-active universe collisions.
- Phase Transitions of Matter & Dark Matter:** Three avenues of baryogenesis, a 10 Bohr radii quantum critical boundary, dual-tier Majorana neutrinos (MeV--TeV vertical pressure vs. keV--GeV horizontal stress-relievers), and a chiral gravitational capture mechanism for antimatter via ancient black holes.
- Primordial Magnetic Fields & Emergent Gravity:** Non-symmetric gravitational shearing driving primordial seed magnetic fields; the replacement of gravitons with Majorana neutrino scalar density gradients ($\nabla \rho_N \propto 1/r^2$) and

pressure-shielding, yielding General Relativity metrics and Newton's gravitational constant ($G = C \cdot \sigma_{\text{Anapole}} \cdot P_{\text{Dark}}$).

5. **Central Dual-Blocking & Planck-Density Cores:** 360-degree radial vector cancellation and event horizon capture preventing pressure convergence at galactic centers; Fermi degeneracy pressure naturally eliminating black hole and Big Bang singularities.
6. **Topological Potential Energy & Tripartite Conservation:** Adherence to the First Law of Thermodynamics, where the deceased universe stores energy as latent topological potential energy ($E_{\text{Potential}}$), governing the conservation law ($E_{\text{Total}} = E_{\text{Potential}} + E_{\text{Luminous}} + E_{N_R} + P_{\text{Dark}} = \text{Const}$), predicting a final "Radiative-Saturation Era" before cyclical reset.

1. Progenitor Vacuum Base-State and the Dual-Component Background

The observable cosmic background is not merely a cooling remnant, but a dual-component physical system derived from the neutral quantum matrix of the deceased universe:

1. **Visual Base Component (Absolute Darkness):** Upon reaching maximum entropy, charged particles in the progenitor universe decayed completely. Residual photons stretched to infinite wavelengths ($\nu \rightarrow 0$), interweaving with light, neutral neutrinos (ν_{light}) to form a uniform, massless quantum matrix ($\rho_{\nu_{\text{bg}}} = \text{Const}$) (Penrose, 2010). This serves as the background night sky base-state.
2. **Background Noise Component (Vacuum Polarization & Electromagnetic Interference):**
 - **Gravitationally Induced Vacuum Polarization:** The neutral quantum matrix acts as the electromagnetic vacuum ground state. As the rotating cosmic plane penetrates the matrix, intense metric tides induce vacuum topological polarization, converting geometric deformation into electromagnetic resonance. Constrained by the spacetime lattice tension of the progenitor universe, this manifests as plasma oscillations, locking the cosmic microwave background (CMB) floor at ~ 2.73 K.
 - **Electromagnetic Superposition:** Electromagnetic radiation emitted by primordial black holes, old stars, and newly born stars superimposes on the background resonance, naturally producing the observed CMB anisotropy spots.

2. Dimensional Genesis, Planar Stress Relief, Angular Momentum Partitioning, and Embryonic Universe Ejection

1. **Dimensional Symmetry Breaking:** The rotating gravitational plane penetrating the isotropic, static progenitor matrix breaks spatial symmetry, establishing three spatial axes and a unidirectional arrow of time (Guth, 1981).

2. **Central Density Barrier and Planar Expansion:** The high central mass-energy density of the invading disk acts as an asymmetric pressure barrier. Impinging dark pressure (P_{Dark}) cannot penetrate inward; instead, downward gravitational stress from dark matter on both faces forces energy to relief laterally along the 2D plane toward the lowest-density outer boundary, driving planar expansion with high spatial flatness ($\Omega_k \approx 0$).
3. **Planar Angular Momentum Inheritance & The 1/3 Shear Vortex Split:**
 - **2/3 Co-rotating Alignment:** Approximately 66.7% of stars inherit the global angular momentum of the advancing cosmic plane, exhibiting alignment between stellar rotation and galactic revolution.
 - **1/3 Counter-rotating Origin:** The geometric inertia of the progenitor quantum matrix resists planar cutting. This boundary-layer shear viscosity triggers non-elastic shear-wave reflections ($\text{Shear-Wave Reflection}$), generating localized inverse elastic vortices. Stars collapsing within these vortices lock in reversed angular momentum, explaining the observed 33.3% counter-rotating anomaly.
4. **Dual Active Universe Collisions and Secondary Universe Embryos:** When two active, rotating bubble universes collide, extreme shear forces at their interface tear off two massive, low-density tidal tails (Tidal Tails). Characterized by high tangential speeds and low internal gravitational binding, these tails escape the parent universes' gravity, condensing in high-dimensional space as independent "secondary universe embryos."

3. Microscopic Baryogenesis, the 10 Bohr Radii Boundary, and Dual-Tier Majorana Neutrinos

1. **Three Avenues of Matter Generation:**
 - **Mechanism I (Gravitational Vacuum Polarization):** Intense metric shockwaves at the invasion front separate virtual particle pairs, converting gravitational energy into rest masses (e^- , e^+).
 - **Mechanism II (Inverse Breit-Wheeler Process):** High-energy gamma radiation from primordial black holes and stellar accretion disks impacts the neutral quantum sea, triggering QED inverse pair production.
 - **Mechanism III (Micro-gravitational Cascade):** Initial particulates form micro-gravitational wells, compressing and blue-shifting background photons to trigger macroscopic condensation of neutral dark matter dust.
2. **The 10 Bohr Radii Quantum Boundary & Dual-Tier Dark Matter:** At a critical boundary of 10 Bohr radii ($10 a_0$) from the central plane, short-range nuclear forces are decoupled:
 - **Sub-10 a_0 Region (High-Energy Excitation Zone):** Charge symmetry is broken under particle bombardment and gravitational polarization, producing charged baryonic matter (stars and gas).

- **Beyond-10 a_0 Region (Vacuum Safety Zone):** Radiation energy density falls off via $1/r^2$. Background light neutrinos (ν_{light}) undergo mass elevation into neutral **Dual-Tier Majorana Neutrinos (N_R)** (Majorana, 1937):
 - **Heavy Majorana Tier (MeV--TeV):** High mass, short mean free path. Accumulates vertically above and below the plane, providing the primary dark matter halo mass and downward gravitational pressure (P_{Dark}).
 - **Light Majorana Tier (keV--GeV):** High penetrability, long free path. Receives vertical kinetic energy and acts as the horizontal stress-relief messenger driving cosmic acceleration.
- 3. **Chiral Antimatter Capture via Ancient Black Holes:** Pair production within sub-10 a_0 creates equal matter and antimatter. Planar rotation coupled with the frame-dragging of ancient Kerr black holes exerts chiral preference: antimatter baryons are preferentially captured into black hole event horizons, while positive baryonic matter achieves planar escape velocity, resolving the cosmic baryon asymmetry problem.

4. Primordial Seed Magnetic Fields and Emergent Gravity (Graviton-Free Framework)

1. **Generation of Primordial Seed Magnetic Fields:** Near the invasion front ($< 10 a_0$), charge symmetry breaking occurs. Due to the mass asymmetry between protons and electrons ($m_p \gg m_e$), the shear force of the rotating, advancing plane induces large-scale charge velocity separation, generating macroscopic superfluid currents that ignite primordial seed magnetic fields.
2. **Emergent Gravity & The Origin of Newton's Constant (G):** Eliminating the need for a spin-2 graviton (Verlinde, 2011), newly generated Majorana dark matter forms a scalar density envelope $\rho_N(r) \propto 1/r$ around mass M (Navarro, Frenk, & White, 1997). Massive bodies shield the downward vertical neutrino flux, creating a localized pressure gradient (∇P_{Dark}) that manifests macroscopically as metric curvature and Newtonian gravity: $\vec{g} = -\nabla \Phi_{\nu} \propto -\nabla \rho_N \propto -\frac{1}{r^2} \hat{r}$. Newton's gravitational constant G emerges as a composite coupling parameter dictated by the Anapole Moment (σ_{Anapole}) of Majorana neutrinos and the vertical dark pressure (P_{Dark}): $G = C \cdot \sigma_{\text{Anapole}} \cdot P_{\text{Dark}}$. The constant background density ρ_{ν}^{bg} acts as a natural background subtraction, renormalizing the cosmological constant Λ .

5. Dual-Blocking Mechanism, Tangential Drag, and Singularity Elimination

1. **Central Dual-Blocking Mechanism:**

- **360-Degree Vector Cancellation:** Inward radial stress vectors converging from 360 degrees sum to zero at the galactic center ($\sum \vec{F}_{\text{radial}} = 0$), creating a dynamic zero-stress core.
 - **Event Horizon Capture:** Black hole event horizons act as geometric unidirectional traps. Geodesics inside the horizon force all incoming neutrino streams inward, preventing cross-galactic penetration and establishing an absolute physical barrier.
2. **Tangential Angular Momentum Drag & Flat Rotation Curves:** Heavy tier neutrinos colliding with the plane transfer kinetic energy to light tier neutrinos (keV--GeV). This horizontal stress-relief stream inherits the global rotational angular momentum ($\vec{L} = \vec{r} \times \vec{p}$) of the cosmic plane, spraying outward in Archimedean spirals and exerting a tangential drag force on galactic disks to yield flat rotation curves.
 3. **Quantum Elimination of Singularities:** Majorana neutrinos are fermions subject to the Pauli Exclusion Principle. Under extreme gravitational collapse, **Neutrino Fermi Degeneracy Pressure** halts spatial collapse, replacing mathematical point singularities with finite, Planck-density quantum cores ($\text{Planck-density Core}$) and eliminating the initial Big Bang singularity.

6. Unification of the Four Fundamental Forces

The total action requires no quantum gravity term (graviton) and is expressed as the sum of gauge fields, fermions, and the Seesaw Mechanism Lagrangian:

$$\mathcal{S}_{\text{total}} = \int d^4x \sqrt{-g} \left[\mathcal{L}_{\text{Gauge}} + \mathcal{L}_{\text{Fermion}} + \mathcal{L}_{\text{Higgs}} + \mathcal{L}_{\text{Seesaw}} \right]$$

- **Microscopic Forces (Strong, Weak, Electromagnetic):** Governed by the standard gauge group $SU(3)_C \times SU(2)_L \times U(1)_Y$.
- **Macroscopic Gravity:** Matter via $\mathcal{L}_{\text{Seesaw}}$ induces phase transitions converting light background neutrinos into N_R (dark matter). The scalar density gradient $\nabla \rho_N$, coupled with vertical pressure shielding, manifests directly as spacetime metric perturbations $g_{\mu\nu}$, naturally inheriting quantum characteristics.

7. Conservation of Energy: Latent Topological Potential Energy and the Cyclical Radiative-Saturation Era

1. **Latent Topological Potential Energy:** Adhering strictly to the First Law of Thermodynamics, the total energy of the progenitor universe was not destroyed upon reaching maximum entropy; it was converted and stored as **Latent Topological Potential Energy** ($E_{\text{Potential}}$) within the high-dimensional neutral quantum

matrix. Ingestion by the invading cosmic plane releases this latent potential into kinetic dark pressure, Majorana dark matter mass, and luminous baryonic matter.

2. **Tripartite Energy Conservation Law:** The energy components strictly obey:
$$E_{\text{Total}} = E_{\text{Potential}} + E_{\text{Luminous}} + E_{N_R (\text{Majorana DM})} + P_{\text{Dark}} (\text{Kinetic}) = \text{Const}$$

In active galactic regions, dark matter is catalyzed into luminous matter, releasing topological kinetic energy that accelerates local spatial expansion.
3. **The Final Radiative-Saturation Era and Reset:**
 - **Clearing the Dark Background:** As the progenitor matrix is fully consumed and converted into the 2D plane, cosmic expansion decelerates to zero, and the dark background is cleared.
 - **The Radiative-Saturation Era:** Luminous matter reaches maximum accumulation across the flat plane, filling space with intense radiation.
 - **Potential Energy Restored:** Luminous matter eventually decays over extreme timescales, re-stretching into infinite-wavelength photon seas and light neutrino matrices. Total energy re-condenses into latent topological potential energy, awaiting the collision of a future bubble universe to repeat the eternal cosmological cycle.

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