MANIFESTO OF THERMAL EVOLUTION AND NEUTRON COSMOLOGY

Supplement 1

Arian Mamayenko

ORCID iD: https://orcid.org/0009-0003-1889-1825

Official Registration of Intellectual Property: No. 05/2026/162, Ministry of Culture, Spain, 2026

Digital Object Identifier (DOI): https://doi.org/10.5281/zenodo.19818840

APPENDIX 18: KINEMATICS OF PHASE STATES AND THE MECHANICAL NATURE OF ATOMIC SPECTRA

(Dynamic relaxation and resonance of the preon framework)

This appendix determines the physical mechanisms of phase transitions and spectral radiation within the framework of Preon Architecture. The concept of probabilistic orbitals is entirely excluded in favor of the classical mechanics of a relativistic resonator and the elastic relaxation of the electron's preon framework.

1. Mechanics of the States of Matter

The phase state of matter is determined by the degree of freedom of the preon node (electron) relative to the field of the nucleus. In the preon model, a phase transition is a change in the mechanical operating mode of the electronic gyroscope under the influence of external pressure and temperature.

Phase	Electron State	Mechanical Mode	Spectrum Type
Solid	Static niche	Mechanical strut	Continuous / Banded
Liquid	Tied drift	Collective sliding	Blurred lines
Gas	Resonant orbit	Free gyroscope	Line (pure)
Plasma	Free flight	Kinematic gas	Continuum (Bremsstrahlung)

2. Spectroscopy as a Process of Relativistic Relaxation

The emission of a photon is considered a process of mechanical restoration of the geometric symmetry of the preon triangle. The electron functions as a **relativistic micro-accumulator**: the

absorption of external energy deforms (compresses) the preon triangle by a magnitude of ΔR, and the subsequent relaxation generates a transverse wave in the preon medium.

$$\Delta E = P_{vac} \cdot \Delta V = P_{vac} \cdot 4\pi R_0^2 \cdot \Delta R$$

$$h = \frac{4\pi \cdot P_{vac} \cdot R_0^4}{\xi \cdot c}$$

Engineering specification of emission variables:

• ΔE — Quantum energy (the work of the vacuum to compress the preon triangle).
• P_{vac} — Structural pressure of the preon ocean ($\approx 2.06 \cdot 10^{25}$ Pa).
• R_0 — Equilibrium radius of the electron's preon assembly ($\approx 2.19 \cdot 10^{-13}$ m).
• ΔR — Radial amplitude of the mechanical deformation of the framework.
• h — Planck's constant (derived coefficient of node stiffness).
• ξ — Geometric packing coefficient (≈ 3 for the electron).

Technological Bridge (Supplement 3): The discovered effect of mechanical memory of the inertial framework ("electron as a micro-accumulator") is the physical foundation for the creation of logical qubits. The engineering implementation of quantum gates based on relaxation phase control is detailed in **Appendix 79.5 (Supplement 3)**.

3. Frequency and Resonant Harmonics

The emission frequency ν is determined by the deformation coefficient at a specific harmonic of the nucleus's resonant field. The line nature of spectra is due to the strict geometric symmetry of the preon triangle, which is capable of maintaining stable resonance only on discrete vibration modes.

$$\nu = R_{preon} \left(\frac{1}{\eta_1^2} - \frac{1}{\eta_2^2} \right)$$

Specification of resonance variables:

• ν — Frequency of the emitted soliton (photon) in the preon gas.
• R_{preon} — Base acoustic resonance of the preon vacuum.
• η_1, η_2 — Numbers of resonant harmonics (vibration modes) of the preon triangle.

4. Ionized Media and the Continuum

In the plasma state, the electron is unblocked. The continuous emission spectrum is the result of stochastic deformations of the electron's framework as it flies past ions. The absence of fixed harmonics leads to the emission of quanta with arbitrary tension energy, which forms the observed energetic continuum.

> ***Conclusion:*** *The atomic spectrum is the "acoustic passport" of the preon assembly. The line nature of spectra is due exclusively to the geometric symmetry of the preon triangle. This turns spectroscopy into a branch of subatomic strength of materials.*

APPENDIX 19: ENERGETICS OF NUCLEON REPACKING AND THE PREON LIMIT OF STABILITY

(The mechanical nature of the mass defect and the thermodynamics of nucleon assemblies)

This appendix examines thermonuclear fusion and nuclear decay not as the interaction of abstract strong or weak forces, but as a process of geometric optimization of the packing density of preon frameworks (nucleons) under the influence of environmental pressure.

1. Physical Nature of the Mass Defect and Confinement Pressure

In the Preon Architecture, mass is a measure of the tension of the preon field within the node. The mass defect is not a mystical disappearance of matter, but the release of topological tension energy when the system transitions to a more compact form.

When nucleons combine into a nucleus, the external pressure of the preon ocean performs mechanical work to pack them, minimizing the total effective volume.

$$E_{bind} = P_{vac(nuc)} \cdot \Delta V_{total}$$

Topological Focusing Effect: The geometry of the nucleon node acts as a lens. While the base pressure in the open vacuum is $P_{vac} \approx 2.06 \cdot 10^{25}$ Pa, inside the nucleus, topological shielding increases the density of the preon flux, creating a local confinement pressure of $P_{vac(nuc)} \approx 10^{31}$ Pa. It is precisely this super-compressed framework that blocks beta decay and retains the G-preons.

Mathematical Link (Supplement 2): The concept of local confinement pressure (10^{31} Pa) forms the basis for the analytical derivation of the Fermi constant. A detailed mathematical calculation of the conductivity of the preon background inside the nucleon node is presented in **Appendix 46 (Supplement 2)**. This proves the unified hydrodynamic nature of the atmospheric vacuum and intranuclear interactions.

2. Topological Tension Index and the Stability Curve

The dependence of specific binding energy on the mass number of the nucleus is strictly determined by the **Topological Tension Index (T_{index})**—the coefficient of balance between the number of E-dominants (protons), G-dominants (neutrons), and the volume of the lattice.

$$T_{index} = \frac{N_E \cdot Z^{3/2}}{N_G \cdot \ln(A)}$$

The mechanics of the packing curve are divided into three phases:

• **Synthesis Zone (Example ^4He):** The assembly of light, loose nucleons (D+T) into the ideal 3D symmetry of the Helium-4 tetrahedron. Volume reduction under environmental pressure expels 17.6 MeV of mechanical energy into the vacuum.
• **Iron Limit (56-Fe):** $T_{index} \approx 32.5$. The point of maximum structural strength. The preon assembly reaches an absolute balance between Coulomb repulsion and the exponential compression of the medium.
• **Decay Zone (Endothermic):** Adding nucleons heavier than iron requires external work to press preons into an overstressed lattice. At $T_{index} > 45$, internal pressure tears the nucleus apart.

> **Technological Bridge (Supplement 3):** The T_{index} determines not only the natural stability limit but also the architectural barriers to the artificial synthesis of transuranic elements ($Z \geq 120$). Overcoming the decay zone via engineering by constructing a spherically symmetrical "Topological Fullerene" is described in **Appendix 67 (Supplement 3)**.

3. Calculated Energy Yield Equation

The total energy yield of any nuclear reaction is calculated through the difference in volumes (tension integrals) of the initial and final states:

$$Q = \Delta E_{tension} = P_{vac(nuc)} \cdot \left(\sum V_{start} - \sum V_{end} \right)$$

Engineering Specification of Variables:

• Q — Total energy yield of the reaction (kinetic equivalent of the mass defect).
• $\Delta E_{tension}$ — Change in the topological tension energy of the preon nodes.
• $P_{vac(nuc)}$ — Nuclear confinement pressure, amplified by the topological focusing effect.
• V_{start}, V_{end} — Effective volumes of the preon traps of the initial reactants and reaction products.
• T_{index} — Topological tension index of the nucleus macrocrystal.

4. Conclusion

> ***Fundamental Conclusion:*** *Nuclear energy is the energy of elastic deformation of the vacuum stored in preon nodes. Repacking nucleons allows the field to relax by reducing volume, releasing confinement energy. This turns nuclear physics into a rigorous engineering discipline for calculating geometrically optimal spatial structures.*

APPENDIX 20: MECHANICS OF GRAVITY AND PREON ELECTRODYNAMICS

(The effect of topological screening and the hydraulics of the vacuum medium)

This appendix demystifies the nature of long-range forces (gravity and electromagnetism). In the Preon Architecture, there are no innate forces of attraction or repulsion. All interactions are a consequence of hydrodynamic screening or changes in partial pressure within the preon ocean.

Connection to the Main Manifesto (Thermodynamics and Mechanics):
A clear line must be drawn here between cause and effect. Thermodynamic cooling (Thermal Evolution) is the global *motive* of the Universe. But the effects described in this appendix—screening (gravity) and preon pressure drops (electromagnetism)—are the very engineering *tools* by which the Universe mechanically compresses and structures matter to warm itself and overcome entropy.

1. Gravity as an Acoustic Shadow (Screening Effect)

Gravity is not the curvature of empty space, but the result of the mutual shading of objects within the isotropic flow of the preon vacuum. Any massive body (nucleus) acts as a preon scatterer, absorbing a portion of the medium's momentum.

When two bodies are close together, they block each other from the flows of external structural pressure $P_{vac} \approx 2.06 \cdot 10^{25}$ Pa. A region of low pressure (an "acoustic shadow") arises in the zone between the bodies. The external, uncompensated pressure of the medium pushes the bodies together.

$$F_{grav} = \mathbb{K}_{screen} \cdot P_{vac} \cdot \frac{\Sigma_1 \cdot \Sigma_2}{4\pi r^2}$$

Specification of gravitational variables:

• F_{grav} — Force of so-called "gravitational attraction" (in fact, the force of external preon indentation), [N].
• P_{vac} — Isotropic structural pressure of the vacuum ($2.06 \cdot 10^{25}$ Pa).
• Σ_1, Σ_2 — Effective topological screening cross-sections (proportional to the number of nucleons in the bodies), [m²].
• $\mathbb{K}_{screen}$ — Preon opacity coefficient (the probability of momentum transfer from a preon to a topological node). Replaces the mystical constant G.

2. Mechanical Electrodynamics (Preon Pressure Equation)

Unlike gravity (passive scattering), an electric charge is an active pumping node: a source (E^+) or sink (E^-) of preon gas pressure. The electric field E is an equalization flow striving for the thermodynamic equilibrium of the medium.

$$E = -\xi \cdot \nabla \Psi_{preon}$$

Engineering specification of field variables:

• E — Electric field intensity vector (speed and direction of the medium's equalization flow).
• ξ — Electromechanical coupling coefficient (conductivity of the vacuum channel).
• $\nabla \Psi_{preon}$ — Potential (pressure) gradient of the preon gas at a given point in space.

3. Mechanical Destruction Under Local Pressure Drops

The absence of electrons ("sinks") in the material's structure leads to an uncompensated expansion of the nuclear frameworks. The substance transitions into a state of critical internal tension.

Examples of macroscopic destruction:

• **Lichtenberg Figures (Dielectric Rupture):** A clear demonstration of the destruction of a solid body by internal preon pressure. The branching channels are not current paths, but physical cracks in the lattice caused by a local field overstrain that exceeded the material's tensile strength.
• **Electrode Debris (Lattice Fatigue):** The mechanical degradation of electrodes in high-power galvanic systems. The constant pulsation of electron density ("sinks") forces the metal lattice to execute micro-movements, leading to a loss of structural cohesion and turning the monolith into powder.
• **Lightning Hydraulics:** A thunder discharge is the collapse of a cavitation bubble in the atmospheric preon gas. An electron-deficient zone (cloud) creates a "vacuum suction" which, upon channel breakdown, is restored at the speed of sound in the preon medium, generating a macroscopic shockwave.

4. Conclusion

> ***Fundamental Conclusion:*** *Understanding gravity and electrodynamics as pressure mechanics allows the engineer to foresee structural failure where classical physics sees only abstract forces. In the preon paradigm,* ***any electrical or gravitational load is strictly a mechanical load.***

APPENDIX 21: THERMODYNAMICS OF THE VACUUM AND THE DEMYSTIFICATION OF UNIVERSAL CONSTANTS

> ***Historical context:*** *Throughout the 20th century, fundamental constants (c, G, h) were used by the scientific community as empirical coefficients to adapt mathematical models to observed data. In the absence of a physical model of the vacuum medium, official science postulated the immutability of these values. This led to the formation of the false concept of the "fine-tuning of the Universe," substituting the mechanical causality of the medium with numerological approximation.*

This appendix determines the physical parameters of the preon ocean (vacuum) and shifts the "fundamental constants" from the category of magic numbers to the category of measurable characteristics of the medium. In the Preon Architecture, the physical vacuum is defined as a superdense gas of background preons. The "fine-tuning of the Universe" postulated by science is merely a reflection of the mechanical causality of this medium.

1. Vacuum Pressure as a Factor of Matter Stability

The partial pressure of the preon background P_{vac} is an external mechanical force that prevents preon assemblies (electrons and nucleons) from Coulomb decay. It is precisely this pressure that ensures the structural integrity of matter. The calculated value of P_{vac} correlates with the energy density of the cosmic microwave background:

$$P_{vac} \approx \frac{\rho_p v_p^2}{3} \approx \frac{\hbar c}{L_p^4}$$

Engineering specification of variables:

- P_{vac} — Partial pressure of the preon background (force of external compression).
- ρ_p — Dynamic density of the preon medium (analogous to the mass density of a gas).
- v_p — Chaotic (thermal) velocity of the background preons.
- L_p — Length of the preon (characteristic geometric size of the preon node).
- $\hbar, c$ — Reduced Planck constant and the speed of light.

2. The Speed of Light as an Acoustic Parameter of the Medium

The speed of light c represents the phase velocity of transverse shear propagation in the preon gas. Its value depends directly on the current thermodynamic state of the vacuum (2.7K):

$$c(T) = \sqrt{\frac{K_p(T)}{\rho_p}}$$

Medium elasticity parameters:

- $K_p(T)$ — Bulk modulus of elasticity of the preon vacuum, dependent on temperature T.
- ρ_p — Inertial density of the medium.

3. Anomalies and Vacuum Refraction

The postulate regarding the immutability of the speed of light holds exclusively under conditions of an isotropic background. A variable speed of light is observed wherever the density of the preon ocean is heterogeneous:

- **Shapiro Effect (Gravitational Delay):** The slowing of a signal near masses is a physical refraction of the wave in an area of increased preon density created by the mass's screening effect.
- **Slowing of Light in Laboratory Conditions:** Experiments reducing the phase velocity of light in a Bose-Einstein condensate to ultra-low values confirm that the parameter c is determined by the "viscosity" and configuration of the substance's preon assemblies.
- **Pioneer Anomaly:** The shift in signal frequency due to local density gradients of the medium at the periphery of the Solar System.

4. Planck's Constant as a Viscosity Coefficient

The constant h is interpreted as the minimum quantum of action—the mechanical work required to overcome the viscous resistance of the preon gas during the formation of a wave soliton (photon). The energy quantization effect is a direct consequence of the hydrodynamic constraints of the vacuum medium on momentum transfer.

> ***Conclusion:*** *Universal constants lose their magical status and become derivative values dependent on the thermodynamic state of the preon ocean. This approach shifts theoretical*

> *physics into the realm of applied thermodynamics and continuum mechanics.*

APPENDIX 22: ENDOGENOUS SYNTHESIS OF MATTER AND ABIOGENIC EPITAXY IN THE EARTH'S CRUST

According to the principles of the Preon Architecture, the planet is an open thermodynamic system that continuously transforms the flux of the vacuum preon background into the mass of matter. The core functions as the primary focus of hydrogen generation, while the crust acts as a stationary target for molecular assembly.

1. The Mechanism of Structural Targets and the Role of Entropy

The synthesis of heavy elements and complex hydrocarbon chains is impossible in mobile liquid magma due to the high level of thermal noise (entropy). The effective assembly of preon structures requires a stationary target with minimal amplitude of thermal vibrations, a role fulfilled by the cooled lithospheric crust.

Bio-matrix epitaxy:

Biological life is integrated into geological processes as a structural template. Organic remains in crustal strata serve as "seeds" for synthesis. The ascending flow of hydrogen from the depths interacts with these carbon matrices, initiating the process of epitaxial growth of hydrocarbon chains.

2. Abiogenic Origin of Water and Hydrocarbons

The formation of the hydrosphere, as well as oil and coal deposits, is determined as the continuous result of the hydrogenation of endogenous and structural elements:

- **Water synthesis (H_2O):** Atomic hydrogen born in the core reacts with oxygen within the stable layers of the crust, continuously replenishing the World Ocean's reserves.

• **Hydrocarbon synthesis (CH_n):** The hydrogen flux reacts with carbon templates (both endogenous and biological). Methane (CH_4) invariably accompanies coal and oil seams as a primary byproduct gas of this hydrogenation reaction.

> ***Conclusion:*** *The Earth's crust is an active precipitation chamber of the preon flux. Hydrocarbon deposits are renewable condensation zones where matter acquires complexity, using biological "seeds" as structure catalysts. This approach requires a revision of geology as an applied discipline of subcentral materials science.*

APPENDIX 23: THE THERMODYNAMIC LIMIT OF CIVILIZATION AND THE TRANSITION TO CONTROLLED SYNTHESIS

This appendix examines the current state of human civilization as a phase transition within the open preon system of the planet. The resource crisis is interpreted as a natural consequence of the disrupted balance between endogenous synthesis and consumption.

1. The Equation of Critical Deficit

The capacity of planetary synthesis (V_{syn}) is limited by the throughput of the crust and the pressure of the core. When the rate of consumption (V_{con}) exceeds the rate of replenishment, the system shifts into a mode of degradation of the accumulated potential:

$$\Delta R = \int (V_{syn} - V_{con}) dt < 0$$

Engineering specification of variables (Deficit Equation):

• ΔR — Change in the global resource potential of the system (degradation of the accumulated reserve).

• V_{syn} — Rate of endogenous (planetary) synthesis of matter.

• V_{con} — Rate of macroscopic consumption by civilization.

• dt — Time interval of integration.

Mechanism of regulation: Resource scarcity is a built-in evolutionary filter. It forces an intelligent species either to reduce consumption and population (regression) or to make a qualitative technological leap—a transition from the exploitation of geological deposits to the direct control of the preon synthesis of structures.

2. The Role of Nanotechnology in Overcoming the Barrier

The creation of artificial structures (e.g., carbon nanotubes) via controlled epitaxy is an act of transferring the synthesis function from the planet's depths to the laboratory. This allows civilization to escape the dictate of the planetary resource cycle and transition to a model of unlimited growth, based on the direct conversion of energy into complex matter.

3. Conclusion

> *The current global crisis is a "sieve of the Mind." Either the species will learn to synthesize matter at a rate exceeding its needs, or it will be subjected to thermodynamic correction through scarcity and social collapse. The Manifesto of the Preon Architecture provides the theoretical foundation for transitioning to the second scenario: the conscious control of metrics and matter.*

APPENDIX 24: MECHANICAL NATURE OF THE NEUTRINO AND DIFFERENTIATION OF WAVE PERTURBATIONS IN THE VACUUM

Within the framework of the Preon Architecture, the physical vacuum is considered an elastic medium (preon gas). All elementary particles and radiation are classified as specific types of

mechanical perturbations of this medium. The key is the distinction between transverse and longitudinal waves.

1. Photon: Elastic Relaxation (Transverse Shear)

The electron is a stable preon assembly (a "micro-accumulator"). When it receives excess energy, its framework deforms, accumulating internal tension. The emission of a photon occurs at the moment this deformation is released:

- **Mechanism:** The smooth return of the framework to its original symmetrical state generates an elastic vibration in the medium.
- **Wave Type:** Transverse shear of the preon background (analogous to the ringing of a taut string).
- **Interaction:** It is effectively absorbed by the electron shells of atoms due to the resonant matching of deformation types.

2. Neutrino: Structural Impact (Longitudinal Compression)

Unlike a photon, a neutrino does not arise from a smooth relaxation, but at the moment of a catastrophic restructuring of the nucleon framework (beta decay, synthesis):

- **Mechanism:** The instantaneous change in the geometry and volume of the nucleus during the transformation of a neutron into a proton generates a sharp pressure impulse.
- **Wave Type:** Longitudinal shock wave (an acoustic pop of the vacuum, analogous to the sound of a gunshot).
- **Super-penetrability:** Due to the lack of a transverse component, the longitudinal impulse passes through interatomic voids and loose electronic structures without engaging with them.

3. Kinematic Parameters

The neutrino velocity v_ν is determined by the bulk modulus of elasticity of the preon gas K_p, the shear modulus of the medium G_p, and its density ρ_p. The speed of the longitudinal impulse ("sound of the vacuum") always tends towards the limit set by the stiffness of the medium:

$$v_\nu = \sqrt{\frac{K_p + \frac{4}{3}G_p}{\rho_p}}$$

Engineering specification of variables:

v_ν — neutrino velocity (the speed of the longitudinal acoustic wave in a vacuum).
K_p — bulk modulus of the preon gas (the medium's resistance to compression).
G_p — shear modulus of the preon medium (stiffness against transverse displacement).
ρ_p — dynamic density of the preon ocean.

The presence of a microscopic mass in the neutrino is explained by the local excess density of the preon background within the moving wave front.

> ***Conclusion:*** *The difference between light and neutrinos is a difference in the acoustics of the medium. The photon is the harmonic "ringing" of stable systems; the neutrino is the "shock front" of systemic transformations. This model completely resolves the question of the neutrino's "ghostliness," shifting it into the realm of high-frequency continuum mechanics.*

APPENDIX 25: DEMYSTIFICATION OF "DARK MATTER" THROUGH THE PREON PRESSURE GRADIENT

The problem of the "hidden mass" of galaxies is a consequence of ignoring the physical properties of the vacuum medium. In the Preon Architecture, the anomalous rotation speeds of stars are explained not by the presence of hypothetical particles, but by the external pressure of the preon background.

1. Gravity as a Pressure Difference

Classical gravitation represents the effect of bodies screening themselves from the all-encompassing pressure of background preons. On galactic scales, this effect is supplemented by a general pressure gradient directed toward the center of the galactic vortex, where the medium's absorption density is at its maximum.

> ***Conclusion on Dark Matter:*** *What astrophysics calls "dark matter" is, in reality, the external partial pressure of the vacuum preon gas. Galaxies are held together not by an internal invisible mass, but by the external compression of the medium.*

2. Analysis of the Failure to Detect Particles (HAWC, IceCube)

The null results of costly experiments searching for WIMPs (Weakly Interacting Massive Particles) confirm the absence of a material carrier of "dark mass." Attempts to find particles in an environment where the dynamic pressure of the medium is at work are methodologically flawed and lead to an unjustified waste of civilization's resources.

3. Conclusion

The mathematical replacement of "dark matter" with the pressure gradient of the preon vacuum allows for the unification of quantum mechanics and cosmology without introducing entities beyond necessity. Gravity at the macro level is a hydrodynamic effect in the ocean of preons.

APPENDIX 26: DUAL-CIRCUIT THERMODYNAMICS OF ENDOGENOUS SYNTHESIS

(Magma generation and endothermic epitaxy of the crust)

For a correct description of geological processes, the Preon Architecture introduces the principle of dual-circuit thermodynamic equilibrium. The planet functions as a global heat engine,

where processes are divided by entropy level and the sign of energy release.

1. First Circuit: Exothermic Magma Generation (Core and Mantle)

At the core-mantle boundary, the ultra-high pressure of the preon gas and gravity initiate the synthesis of the most stable light element nuclei up to the iron peak: hydrogen, oxygen, silicon, aluminum, iron. This process is strictly exothermic: preon assemblies optimize their geometry, shedding colossal volumes of excess tension (heat) into the medium.

The released heat melts the synthesized rock, forming liquid magma consisting primarily of robust oxides (SiO_2, Al_2O_3, Fe_2O_3). Magma is the primary high-entropy "broth" and transport medium for the dissipation of the core's heat.

2. Second Circuit: Endothermic Barrier and Crust Epitaxy

The synthesis of superheavy elements (Au, Pt, U) and long hydrocarbon chains is impossible in a molten state due to destructive thermal noise. The synthesis of elements heavier than iron is an endothermic process requiring the overcoming of increased Coulomb repulsion to integrate new preons into the nucleon framework.

To perform this work, the ascending flux of light ions requires a cold stationary matrix—the lithospheric crust. The kinetic energy of the ascending flux and the macroscopic vacuum pressure transition into the internal energy of atomic bonds. Thus, endothermic synthesis in the crust acts as a global radiator, absorbing the core's excess energy.

Engineering specification of synthesis factors:

- $\langle P_{vac} \rangle$ — Average macroscopic vacuum pressure (external compressor to overcome the Coulomb barrier).
- **Enthalpy ($\Delta H > 0$)** — Positive enthalpy change during the formation of heavy nuclei in the crust (heat absorption).

3. Empirical Base (Nuclear Astrophysics and Accelerators)

The practice of modern physics proves a fundamental principle: the step-by-step endothermic complexification of matter requires a stationary target with low entropy.

Experimental evidence:

- **Astrophysics (LUNA):** Experience studying the CNO and $NeNa$ cycles confirms that the complexification of nuclei is achieved by bombarding stationary targets with a low-energy proton beam, not in a high-entropy plasma.
- **Superheavy Mass Synthesis (JINR, GSI):** Obtaining elements up to Oganesson-118 requires strict heat dissipation from the solid-state target. Melting the target instantly halts the accumulation of structures due to kinetic chaos.

> ***Conclusion:*** *The ascending flux of protons from the core encounters the cooled lithosphere as a stationary target. The accumulation of complex architectures is only possible in the cold layers of the crust, where the kinetic energy of the flux transforms into the mass of heavy elements and hydrocarbons.*

APPENDIX 27: MATHEMATICAL JUSTIFICATION FOR THE STABILITY OF PREON ASSEMBLIES

(Calculus of variations and the mechanics of bound states)

This appendix formalizes the intuitive mechanics of the Preon Architecture through a rigorous mathematical framework. The core concept—the presence of sub-elementary constituents and an intense short-range attraction—mathematically allows for the existence of stable three-body bound states.

1. Lagrangian and Effective Potential

The interaction of preons is described by introducing a scalar mediator ϕ of mass M, which generates a short-range attraction. The Lagrangian of the minimal model takes the form:

$$\mathcal{L}_{M1} = -\frac{1}{4}F_{\mu\nu}F^{\mu\nu} + \overline{\psi}_E(i\gamma^\mu D_\mu - m_E)\psi_E + \frac{1}{2}\partial_\mu\phi\partial^\mu\phi - \frac{1}{2}M^2\phi^2 - y_E\phi\overline{\psi}_E\psi_E$$

Specification of field components:

• ψ_E, m_E — E-preon field and its base rest mass.

• ϕ, M — Scalar mediator ("glue") and its mass, determining the interaction radius of the contraction.

• $F_{\mu\nu}$ — Electromagnetic field strength tensor.

• y_E — Yukawa coupling constant, determining the intensity of the preon interaction with the mediator.

• γ^μ, D_μ — Dirac matrices and covariant derivative (relativistic kinematics of the field).

In the non-relativistic approximation, this interaction forms the effective Yukawa-Coulomb potential, where the Coulomb force competes with short-range contraction:

$$V_{ij}(r) = \frac{\alpha q_i q_j}{r} - \lambda_{ij}\frac{e^{-Mr}}{r}$$

Force balance parameters:

• α — Electromagnetic interaction constant (Coulomb Barrier).

• λ_{ij} — Short-range contraction coefficient (intensity of the Yukawa potential).

• r — Distance between preons within the node.

• q_i, q_j — Electric charges of the interacting preons.

2. Three-Body Hamiltonian and Stability Threshold

To verify the viability of the three-preon assembly (electron), the Hamiltonian of the system in Jacobi coordinates is applied, allowing the separation of the center of mass motion and internal

vibrations:

$$H = -\frac{\nabla_x^2}{2\mu_x} - \frac{\nabla_y^2}{2\mu_y} + V_{12}(r_{12}) + V_{13}(r_{13}) + V_{23}(r_{23})$$

Jacobi coordinates and masses:

- μ_x, μ_y — Reduced masses of the three-body system, determining the inertia of the framework's internal deformations.
- ∇_x, ∇_y — Momentum operators in the space of the preons' relative coordinates.

The entire physics of the preon triangle formation is governed by a single dimensionless parameter g, linking the preon mass m, the short-range attraction force λ, and the mediator mass M :

$$g = \frac{m\lambda}{M} > 1.826$$

Stability parameters:

- g — Dimensionless stability parameter.
- m — Mass of the preon.
- λ — Short-range attraction force.

The calculus of variations strictly proves that the three-particle assembly overcomes kinetic pressure and reaches the stability threshold (binding energy $E_b < 0$) only when the critical threshold $g > 1.826$ is exceeded.

3. Overcoming the Pauli Principle for the Electron Assembly (EEE)

Standard quantum mechanics faces the problem of the Pauli principle when attempting to describe the electron as an assembly of three identical fermions. Within probabilistic models, this requires the introduction of artificial hidden symmetry parameters (similar to "color" in quantum chromodynamics).

However, the Preon Architecture resolves this contradiction by transitioning from a "probabilistic gas cloud" to rigid spatial mechanics. The three E-preons do not occupy a single spherical s-state. Due to the balance of forces ($F_m = F_e$), they are rigidly localized in space, forming the vertices of an equilateral triangle. Their geometric separation at the distance of the Absolute Coulomb Barrier automatically provides the necessary degrees of freedom, rendering the Pauli principle inapplicable to this rigid framework structure.

4. Conclusion

> ***Conclusion:*** *The size of the electron is not a random value, but an equilibrium point where the contraction of the mediator ϕ is balanced by Coulomb repulsion and vacuum pressure. Mathematically, this corresponds to a radius of $a_* \sim 1.5/M$.*
>
> *The concept of a composite electron made of three base sub-elements held by intense attraction is not a philosophical abstraction. Variational analysis confirms: this mechanism is absolutely viable and provable within strict mathematical models.*

APPENDIX 28: MATHEMATICAL FORMALIZATION OF THE RIGID PREON FRAMEWORK OF THE ELECTRON

(Relativistic Hamiltonian and specification of variables)

Classical probabilistic quantum mechanics is insufficient to describe a composite electron (an assembly of three E-preons with the same charge) because it operates on the concept of "probability clouds" and does not account for rigid spatial geometry and the macroscopic pressure of the vacuum medium. This appendix formalizes the mechanics of the Preon Architecture through a rigorous Hamiltonian and elasticity potentials.

1. Internal Degrees of Freedom and the Pauli Principle

To satisfy the requirements of fermion quantum statistics in a rigid three-component framework, an additional internal spatial index $a = 1, 2, 3$ is introduced, reflecting the localization of preons at the vertices of a geometric triangle. This allows the construction of a fully antisymmetric wave function of the form $\epsilon_{abc} E^a E^b E^c$, which fully legitimizes the EEE assembly within strict quantum rules and removes the contradiction with the Pauli principle.

2. Assembly Hamiltonian and Vacuum Confinement Potential

The total energy of the system is determined by the balance of electromagnetic forces and the external pressure of the medium. The Hamiltonian of the composite electron includes relativistic kinetic energy, Coulomb repulsion, the Darwin-Breit magnetic correction for rotating charges, and the fundamental confinement potential V_X (macroscopic pressure of the preon vacuum P_{vac}):

$$
\begin{aligned}
H = \sum_{i=1}^{3} \sqrt{p_i^2 + m_E^2} + \sum_{i<j} \frac{\alpha Q^2}{r_{ij}} \\
- \sum_{i<j} \frac{\alpha Q^2}{2 r_{ij} c^2} \left[\vec{v}_i \cdot \vec{v}_j + (\vec{v}_i \cdot \hat{r}_{ij})(\vec{v}_j \cdot \hat{r}_{ij}) \right] \\
+ \sum_{i<j} V_X(r_{ij})
\end{aligned}
$$

It is precisely the non-electromagnetic compression force $V_X(r_{ij})$ coupled with the magnetic component that compensates for internal Coulomb repulsion and ensures the absolute stability of the assembly at the distance of the Coulomb Barrier.

Engineering specification of variables (Hamiltonian):

- p_i, m_E — Relativistic momentum and rest mass of the three E-preons.
- α — Electromagnetic interaction constant (Coulomb Barrier).
- Q — Electric charge of the preon ($\pm 1/3e$).
- r_{ij}, c — Spatial distance between preons and the phase velocity of light in the medium.
- $\hat{r}_{ij}$ — Unit vector of spatial direction between preons i and j.
- $\vec{v}_i \cdot \vec{v}_j$ — Darwin-Breit magnetic correction (attraction of rotational currents).

• $V_X(r_{ij})$ — **Vacuum confinement potential.** External compression by the preon ocean P_{vac}.

3. Emergent Framework Rigidity

The equilateral triangle geometry in the Preon Architecture is not artificially postulated but emerges dynamically from a strict minimization of the system's energy. To describe this elastic geometric shape, the framework rigidity potential is introduced:

$$V_{rig} = \kappa \sum_{i<j} (r_{ij} - s)^2$$

Elasticity parameters:

• κ — Rigidity coefficient ("modulus of elasticity" of the vacuum bond).

• s — Side of the triangle (distance of the Absolute Coulomb Barrier).

> ***Conclusion:*** *This mathematical apparatus definitively shifts the electron from the status of a structureless point or probabilistic cloud to the status of a stable, elastic topological defect in the deep continuum of the medium.*

APPENDIX 29: NONLINEAR WAVE MECHANICS AND PREON TOPOLOGY

(Theory of the topological soliton)

The Preon Architecture fundamentally rejects the concepts of "point particles" (which generate mathematical singularities) and "hard spheres" (which generate paradoxes of the

absolutely rigid body). Within this theory, a preon is defined as a localized, self-sustaining looped wave (topological soliton) in the elastic continuum of a quantum field. Its mass, spin, and emergent magnetic field are strict consequences of wave topology.

1. Topological Soliton and Medium Elasticity

The preon has no rigid physical boundary; its size is determined by the effective attenuation radius of the wave packet. The stability of this wave vortex is ensured by the nonlinear elasticity of the vacuum itself, mathematically expressed through a Lagrangian with a self-interaction term of the field Ψ:

$$\mathcal{L} = \bar{\Psi}(i\gamma^\mu \partial_\mu - m_0)\Psi + \lambda(\bar{\Psi}\Psi)^2$$

Engineering interpretation of field parameters:

- Ψ — Wave function of the preon condensate (amplitude of medium perturbation).
- γ^μ, ∂_μ — Dirac matrices and covariant derivative (relativistic field kinematics).
- λ — Nonlinearity coefficient. Characterizes the "bulk modulus" of the vacuum, preventing the wave from dispersing (analogous to the surface tension of the medium).
- m_0 — Bare mass (activation energy of the topological defect).

2. Emergent Mass and Distributed Charge

The mass of the preon (m_E) is not an independent fundamental constant. According to Noether's theorem, it represents localized energy integrated over the entire volume of the wave vortex:

$$m_E = \int d^3x \left(\Psi^\dagger i\partial_t \Psi - \mathcal{L} \right)$$

Inertia parameters:

- $\int d^3x$ — Volume integration over the entire region of the soliton's influence.
- $\Psi^\dagger i\partial_t \Psi$ — Kinetic energy density of the wave packet's rotation.

The electric charge of the preon ($q_E = -1/3e$) is also not concentrated in a geometric point. It is distributed throughout the soliton's volume as a continuous charge density $\rho_e(\vec{r})$, being a topological invariant of this looped wave.

3. Spin and the Secondary Nature of the Magnetic Field

In the Preon Architecture, the magnetic field is a strictly secondary (emergent) effect. Inside the preon, there are no discrete particles whose motion could form a classical "electric current." The magnetic moment $\vec{\mu}$ arises exclusively due to the spatial circulation of the charged wave medium itself. Because the soliton possesses an internal angular momentum (spin), its continuous charge density $\rho_e(\vec{r})$ circulates, forming a local velocity field of the continuum $\vec{v}(\vec{r})$:

$$\vec{\mu} = \frac{1}{2} \int d^3x \left(\vec{r} \times \rho_e(\vec{r}) \vec{v}(\vec{r}) \right)$$

Mechanics of the magnetic moment:

- $\vec{r}$ — Radius vector (distance from the axis of rotation to the element of the rotating medium).
- $\rho_e(\vec{r})$ — Charge density distribution function within the wave ring.
- $\vec{v}(\vec{r})$ — Tangential rotation velocity of the medium elements (spin rotation).
- $\vec{r} \times \dots$ — Cross product determining the axial directionality of the magnetic field.

> ***Conclusion:*** *Magnetic contraction (F_m), critically important for holding the three-preon electron assembly together, is born directly from the pure kinematics and geometry of the rotating wave continuum. Topology is primary, the field is secondary.*

APPENDIX 30: MATHEMATICAL PROOF OF G-PREON STABILITY

(Topological Quartet: Gravitational Equilibrium)

The G-preon (gravitational anchor) is a neutral assembly of four base E-preons ($2E^+$ and $2E^-$). The stability of this system under the ultra-high pressure conditions of the core is ensured by the transition from Coulomb interaction to exponential gravitational confinement.

1. Condition for the Suppression of Annihilation

In the Preon Architecture, annihilation is considered as a process of mutual "unwinding" of chiral nodes of opposite polarity. For the G-preon, the condition of stability is formulated as the gravitational binding energy U_G exceeding the potential annihilation energy U_A:

$$\left| \int_{R_c}^{\infty} F_g(r) dr \right| > \sum E_{ann}$$

Engineering specification of the "gravitational vise":

- $F_g(r)$ — Function of exponential gravitational attraction, blocking the rotation and unwinding of preons.
- R_c — Critical "freezing" radius (the distance at which mechanical compression surpasses quantum fluctuation).
- $\sum E_{ann}$ — Energy threshold required for the destruction (untying) of the chiral node.

2. Tetrahedron Geometry and Charge Compensation

Mathematically, the stable state of the G-preon corresponds to the configuration of a regular tetrahedron. In this form, the total electric dipole moment of the assembly is equal to zero:

$$\vec{P} = \sum_{a=1}^{4} Q_a \vec{r}_a = 0$$

Parameters of geometric neutrality:

- $\vec{P} = 0$ — Condition for the absence of dipole radiation (complete topological concealment of the node).
- Q_a — Charges of the four preons ($\pm 1/3e$), compensated within the small volume of the node.
- $\vec{r}_a$ — Radius vectors of the tetrahedron vertices (coordinates of the preons' locations).

The internal Coulomb repulsion of like pairs is compensated by the external pressure of the vacuum medium P_{vac} and the mutual attraction of opposite-sign pairs, creating a superdense structural element.

> ***Conclusion:*** *The G-preon is a topological insulator. Its high binding energy (≈ 104 MeV) makes it indestructible under normal conditions, turning it into an ideal "accumulator" of potential energy. The decay of the G-preon is only possible under external resonant influence that breaks the symmetry of the tetrahedron.*

APPENDIX 31: HYDRODYNAMICS AND THERMODYNAMICS OF THE PREON VACUUM

(Properties of the continuum and mechanics of the vacuum ocean)

The Preon Architecture definitively rejects the concept of mathematical emptiness. The physical vacuum is a real, dynamic, and elastic medium—the preon gas left as energetic "ash" after the primary chain reaction of space decoherence. This continuum possesses strict thermodynamic, acoustic, and hydrodynamic properties that classical physics mistakenly attributed to the "curvature of space-time" or the magic of quantum fields. This medium is the foundation for all physical interactions.

1. Elastic Preon Lattice and the Rejection of Corpuscular Dualism

Free background preons possess the same electric charge ($-1/3e$) and repel each other. Under the macroscopic pressure of the continuum P_{vac}, they tend to occupy equidistant positions, forming a spatial elastic network. Electromagnetic waves and photons are not particles. They are exclusively transverse elastic shears of this preon lattice. This removes the need for wave-particle dualism.

Mechanical nature of perturbations:

- **Light:** Transverse elastic shear (tension soliton) of the preon lattice.
- **Speed of light (c):** The ultimate propagation speed of a transverse sound wave in an elastic medium with a given density.

2. Gravity as Hydrostatic Pressure (Displacement of the Medium)

The preon gas freely permeates the loose electron shells of atoms but is physically unable to penetrate the interior of superdense neutron nuclei (matter). Massive bodies displace the preon gas from their volume. Enormous zones of reduced preon medium density form around planets and stars. The pressure of the vacuum ocean P_{vac} seeks to equalize this density, hydrodynamically pressing any other objects toward these "preon voids." Thus, macrogravity is the buoyant force of Archimedes in reverse.

3. Inertia and Kinematic Resistance

At a temperature of 2.7K, the preon gas is in a state of ideal quantum superfluidity, offering no resistance to the uniform rectilinear motion of objects. However, the medium exerts colossal wave resistance to acceleration. Attempting to change a body's velocity requires deforming the elastic preon lattice and creating a local density wave in front of the object. This resistance of the medium to the acceleration of a macro-object is what we call Inertia.

$$F = m_{inert} \cdot a$$

Engineering specification of inertia:

- F — External force applied to the object.
- m_{inert} — Coefficient of wave resistance of the preon medium (inertial mass).
- a — Acceleration (gradient of velocity change in the medium).

4. Classical Optics as a Density Map of the Preon Gas

Academic optics studied the hydrodynamics of the vacuum, mistakenly attributing its properties to fabricated particles.

- **Refraction:** The massive nuclei of the optical medium (glass, water) pull in and condense the preon gas within their volume. The transverse wave decelerates in this taut network.
- **Reflection:** The rigid preon geometry of metals refuses to allow the transverse shear inside, forcing the wave to bounce back acoustically.
- **Lensing:** The bending of light near stars is the classical refraction of a wave passing through the gradient of a gravity-condensed preon halo, not the curvature of emptiness.

5. Neutrino as a Longitudinal Acoustic Impact

Just like an electromagnetic wave, the neutrino is absolutely not a particle. But if light is a transverse shear of the lattice, the neutrino is a longitudinal (acoustic) shockwave of preon gas compression. Because longitudinal acoustic waves in elastic media practically do not interact with the transverse resonances of matter, the acoustic impact of the neutrino possesses a phenomenal penetrating ability through any obstacles.

6. Thermal Noise (2.7K) and the Absence of the Big Bang

The relic radiation with a temperature of 2.7 Kelvin is not the afterglow of a mythical Big Bang. It is the intrinsic, current thermodynamic temperature of the preon gas itself. It is the baseline kinetic noise of the elastic lattice, which serves as the absolute zero reference point for the thermodynamics of the Universe.

7. Topological Whirlpools (Planetary Magnetic Fields)

Massive objects create macroscopic vortices in the gas. The rotating superdense core of the Earth or Sun physically twists the charged preon lattice around itself. This global whirlpool of an electrically charged medium is the direct mechanical generator of a planet's magnetic field.

8. Epicenters of Matter Synthesis

The formation of new preon assemblies (matter) requires colossal hydrodynamic compression. Such conditions exist exclusively inside the active neutron cores of stars and the geological cores of planets, making them the only factories of endogenous synthesis in the Universe.

> ***Engineering Conclusion:*** *Understanding the vacuum as a dense medium allows the transition from passive observation to the control of the metric. Gravity and inertia become objects of hydrodynamic manipulation within the framework of advanced transport systems.*

APPENDIX 32: CALCULATION OF THE PREON VACUUM DENSITY AND THE MECHANICAL NATURE OF SPIN

(Kinematics of the medium and gyroscopic stabilization)

Academic physics is unable to calculate the density of the physical vacuum because it operates with the concept of mathematical emptiness. The Preon Architecture proves that the hidden mass of the Universe is the preon gas itself, whose density and gyroscopic properties determine the dynamics of matter.

> ***Terminological clarification (Two-level kinematics of the medium):*** *For a correct understanding of the calculations, it is necessary to distinguish two aggregate states of the preon continuum. At the macro level, it behaves as an ideal **preon gas**, possessing a kinetic temperature (relic background, $P \approx 4 \cdot 10^{-14}$ Pa). However, at the femto-level, due to the relativistic speeds of preons, the medium possesses gyroscopic rigidity and shear resistance, acting as an absolutely rigid body—a **structural framework** with an elastic modulus of $P_{vac} \approx 10^{25}$ Pa.*

1. Calculation of the Concentration and Density of the Medium

The calculation is based on the mass of a free preon ($m_{free} \approx 3.03 \cdot 10^{-31}$ kg) and the volumetric energy density of the microwave background ($u \approx 4.17 \cdot 10^{-14}$ J/m^3):

$$n = \frac{u}{k_B T} \approx 1.12 \cdot 10^{9} \text{ particles/m}^3$$

$$\rho_{vac} = n \cdot m_{free} \approx 3.39 \cdot 10^{-22} \text{ kg/m}^3$$

Thermodynamic specification of the calculation:

- n — Concentration of free preons per unit volume of the vacuum.
- u — Energy density of the relic background ($\approx 4.17 \cdot 10^{-14}$ J/m^3).
- k_B — Boltzmann constant ($1.38 \cdot 10^{-23}$ J/K).
- T — Temperature of the relic background (≈ 2.725 K).
- ρ_{vac} — Final macroscopic density of the preon vacuum.

The density of the preon gas exceeds the Standard Model's "critical density" by four orders of magnitude. This elastic ocean is the macrogravitational framework of the Universe, completely eliminating the need for the "dark matter" hypothesis.

2. Gyroscopic Effect and Particle Stability

The key factor in the stability of matter is the **relativistic gyroscopic effect**. The electron's spin in the Preon Architecture is the result of the actual physical rotation of the preon assembly at a speed $v \to c$.

> ***Mechanics of spin:*** *Three E-preons rotating in a plane form an ideal inertial flywheel. The gyroscopic moment provides rigid fixation of the rotation axis and resistance to external perturbations.*
>
> *Gyroscopic rigidity explains why particles maintain their shape under colossal pressure. Any attempt to change the structure (for example, adding a 4th preon) introduces an imbalance that, at relativistic speeds, instantly destroys the system.*

3. Relativistic Kinematics and Force Equilibrium

The stability of the electron assembly is ensured by the dynamic equilibrium between internal repulsive forces and the external hydrostatic compression of the vacuum's structural framework.

$$P_{vac} \approx 2.06 \cdot 10^{25}\ \text{Pa}$$

$$v_{preon} \approx 0.9999807c \implies \gamma \approx 161$$

Parameters of the calculated equilibrium:

- **Rest radius ($R_0 \approx 2.19 \cdot 10^{-13}$ m):** The point where external compression P_{vac} balances the centrifugal force F_{cf} and Coulomb repulsion.
- **Lorentz factor ($\gamma \approx 161$):** Provides the observed mass of the electron (0.511 MeV) as the sum of the rest masses of the preons and the tension energy of the framework.

• **Magnetic contraction (F_m):** The Lorentz force between rotational currents, amplified by the charge of the medium, acts as additional confinement.

4. Derivation of Planck's Constant from Medium Parameters

Planck's constant (h) in the Preon Architecture is derived analytically as a derivative of the vacuum pressure and the geometry of the electron gyroscope:

$$h = \frac{4\pi \cdot P_{vac} \cdot R_0^4}{\xi \cdot c} \approx 6.626 \cdot 10^{-34} \text{ J} \cdot \text{s}$$

Where $\xi \approx 3$ is the geometric packing coefficient. Energy quantization is a direct result of the mechanical rigidity of the vacuum ocean, where the electron functions as a relativistic resonator.

5. Conclusion

The Universe is a flow of gyroscopically stabilized nodes immersed in an elastic medium. The interaction of gyroscopic moments with the density of the vacuum forms the electrodynamics and inertial properties of matter. Understanding spin as physical rotation returns physics to the realm of classical continuum mechanics.

APPENDIX 33: NUCLEAR THERMODYNAMICS OF PLANETS: MANTLE KINETICS AND BALLISTICS OF ATMOSPHERIC SYNTHESIS

The thermal energy of planets is not a "residual echo" of the era of their formation. The heating of the mantle, the chemical diversity of the lithosphere, and the generation of the atmosphere are direct kinetic consequences of the continuous passage of high-energy particles through the planet's thickness. Planetary layers function as giant nuclear filters, moderators, and stationary targets.

1. The Mantle as a Coulomb Filter and Heat Source

Protons born from the decay of the core are expelled with colossal kinetic energy. Possessing an electric charge, they enter into a powerful Coulomb interaction with the atoms of the mantle. The energy loss of a proton passing through the mantle is described by the Bethe-Bloch stopping power equation:

$$-\frac{dE}{dx} = \frac{4\pi e^4 z^2}{m_e v^2} n_e \ln\left(\frac{2m_e v^2}{I}\right)$$

Engineering specification of variables (Bethe-Bloch):

- $-dE/dx$ — Stopping power of the medium (energy loss of the particle per unit path length, converted into heat).
- z — Charge number of the incident particle (for an endogenous proton $z = 1$).
- v — Velocity of the proton through the mantle.
- n_e — Electron density of the mantle rocks (stopping medium).
- I — Mean excitation potential of the atoms in the medium (target).
- m_e, e — Mass and charge of the electron.

All lost kinetic energy is mechanically converted into heat, directly heating the mantle over billions of years.

2. Ballistic Penetration and Atmospheric Synthesis

A significant portion of fast protons pierces right through the mantle, forming a unique thermodynamic barrier:

• **Water synthesis and thermosphere heating:** Ascending hydrogen collides with oxygen. The synthesis reaction ($2H_2 + O_2 \rightarrow 2H_2O$) releases energy ($\Delta H \approx -483.6\ \text{kJ/mol}$), creating a temperature anomaly in the thermosphere (over 1500°C).

• **X-ray shield:** The acoustic turbulence of the preon field caused by this synthesis scatters harsh solar radiation, acting as a wave damper.

• **Cosmic dissipation:** The residual kinetic energy of the proton (E'_k) upon exiting the crust often exceeds the planet's gravitational potential, allowing gases to leave Earth: $E'_k = \frac{m_p v^2}{2} \geq G\frac{M_\oplus m_p}{R_\oplus}$.

Engineering specification of variables (Ballistics and synthesis):

• ΔH — Enthalpy of reaction (thermal energy released during water synthesis).

• E'_k — Residual kinetic energy of the proton upon exiting the crust.

• m_p, v — Mass of the proton and its ballistic velocity.

• G — Gravitational constant.

• $M_\oplus, R_\oplus$ — Mass and radius of the planet, determining the gravitational barrier for retaining the atmosphere.

3. The Crust as a Stationary Target and the "1/v Law"

By the time it reaches the lithosphere, the primary beam cools to the spectrum of thermal neutrons (≈ 0.025 eV). Here the **"1/v law"** comes into effect: the effective capture cross-section σ_c is inversely proportional to the particle's velocity:

$$\sigma_c \propto \frac{1}{\sqrt{E}} \propto \frac{1}{v}$$

The slower the cooled neutron moves, the higher the probability that it will be gently captured by the crystal lattice of the crust (radiative capture).

Capture specification:

• σ_c — Effective radiative capture cross-section (probability of the particle being absorbed by the crust's crystal lattice).

• E — Kinetic energy of the cooled (thermal) neutron.

• v — Velocity of the particle.

> ***Conclusion:*** *This mathematically proves why exactly the upper solid layers of the planet become the epicenter for the synthesis of new elements and heavy metals: the slower the particle ($v \to 0$), the higher the probability of its geometric integration (σ_c) into the crust matrix.*

APPENDIX 34: RESOLVING HAWKING'S PARADOXES THROUGH HYDRODYNAMICS AND CONTINUUM TOPOLOGY

(Mechanical demystification of singularities and information decay)

The works of Stephen Hawking represent a unique diagnosis of modern physics. By pushing the abstract mathematical apparatus of General Relativity and the Standard Model to its absolute limit, Hawking exposed their fundamental contradictions: infinite densities, the traceless disappearance of information, and the violation of thermodynamic laws. Within the framework of the Preon Architecture, these paradoxes receive a strict mechanistic explanation through the laws of continuum mechanics and 3D topology.

1. Hawking Radiation as Endogenous Beta Decay

Superdense objects in the Universe are not "holes" but giant neutron (preon) macro-crystals. The radiation and mass loss predicted by Hawking are demystified in the Preon Model: they are a direct consequence of **endogenous beta decay** on the surface of these supermassive cores.

Mechanical specification of the process:

• **Source of mass:** Real surface evaporation due to the transformation of neutrons into protons with the release of thermal energy. The mass loss is real.

• **Engine:** A strict thermodynamic engine of superdense media, not quantum fluctuations of "empty" space.

2. Topological Elasticity vs. Singularity

The inevitability of matter collapsing into a singularity (a "point"), mathematically proven by Hawking and Penrose, is evidence that the tensor apparatus of GR breaks down at micro-scales. The Preon Architecture eliminates infinities: the compression of matter has a strict quantum-mechanical limit—**the topological elasticity of the preon node itself**.

Under extreme pressure, energy is expended on the deformation of the elastic geometry of preons. Thus, mathematical singularities do not form in the centers of galaxies; instead, superdense cores form with a specific geometric radius and a finite density determined by the compression limit of the preon lattice.

3. Information Paradox and Recycling Mechanics

The problem of the disappearance of information regarding matter that has fallen into a supermassive object is resolved through the mechanics of kinetic spallation. Information in the material world is the specific 3D geometry of a preon assembly (atoms, minerals, carbon chains). Upon being absorbed by the object, this structural information is not "erased," but undergoes **thermonuclear remelting**.

> ***Matter Recycling (Engineering Approach):*** *Complex topological nodes are broken back down into basic nucleons (hydrogen and helium). There is no mystical loss of data, but a strict mechanical disassembly of the structure for the subsequent synthesis cycle. Information is preserved in the form of the basic building blocks of the Universe.*

4. Teleological Arrow of Time

Classical physics associates the arrow of time exclusively with the increase of entropy. The Preon Architecture proves that time is irreversible thanks to the operation of an anti-entropic, teleological algorithm—the basic code that forces matter to continuously become more complex, from a free preon gas to rigid frameworks, biology, and **the Mind**. Reversing time is impossible, as

the spontaneous degradation of a complex "topological lock" back into a free gas without external influence contradicts the basic evolutionary vector of the Universe.

APPENDIX 35: TOPOLOGICAL STRENGTH LIMIT: UNFOLDING PREONS AND QUASAR MECHANICS

(Phase transition of matter and the stability limit of the macro-crystal)

Academic astrophysics is unable to describe the processes inside supermassive cores, relying on the non-physical concept of a "singularity." The Preon Architecture proves that the compression of matter has an absolute mechanical limit: the tensile strength of the preon node itself. Reaching this limit leads to the ultimate phase transition: the untying of matter back into the quantum field, which is empirically observed as quasar activity and relativistic jets.

1. Calculation of the Topological Strength of the Preon

The preon represents an elastic topological node of the continuous quantum field. Its mass (m_{free}) is the equivalent of the internal elastic tension energy. The internal pressure (P_{max}) keeping the node from collapsing is determined by its volumetric energy density:

$$P_{max} = \frac{m_{free}c^2}{V_{preon}} = \rho_{preon}c^2$$

Engineering specification of the strength limit:

- P_{max} — Topological strength limit (the maximum pressure the node's geometry can withstand).
- m_{free} — Rest mass of the free preon (equivalent to tension energy).
- V_{preon} — Geometric volume of the preon node.
- ρ_{preon} — Absolute density of matter inside the preon.

• c — Speed of light.

• **Phase transition:** If external pressure exceeds P_{max}, the geometric lock bursts, and the node "dissolves," merging with the vacuum.

2. Hydrostatics of the Macro-crystal and Critical Mass (M_{crit})

The supermassive core of a galaxy is a tightly packed preon macro-crystal with a constant density $\rho_c \approx \rho_{preon}$. The pressure at the geometric center of such a crystal with mass M is determined by the laws of hydrostatics: $P_c \propto G\rho_c^{4/3} M^{2/3}$.

The phase transition (unfolding of nodes) begins the moment the central pressure reaches the strength limit ($P_c = P_{max}$). From this equality, the maximum mass of the galactic core (M_{crit}) is strictly derived:

$$M_{crit} = \sqrt{\frac{6}{\pi}} \frac{c^3}{G^{3/2}\sqrt{\rho_c}}$$

This formula proves that galactic cores cannot grow infinitely. Upon reaching the critical mass, the core triggers a process of self-destruction.

Core stability parameters:

• M_{crit} — Critical mass of the galactic core (limit of quasar growth).

• ρ_c — Density of the macro-crystal (comparable to preon density).

• G — Gravitational constant (coefficient of the medium's external compression).

3. Mechanics of Relativistic Jets (Absolute Recycling)

The unfolding of preons does not violate conservation laws: the colossal elastic tension energy of the node instantly transforms into the kinetic energy of the preon gas. This super-compressed "untied" gas needs to vent its pressure. It breaches the shell of the macro-crystal at the poles of rotation, where centrifugal forces thin out the gravitational barrier.

> ***Relativistic jets:*** *These are hydrodynamic geysers of the pure preon field. Matter dissolves, returning to the state of the primary vacuum, thereby completing the evolutionary cycle of the Universe. Information about the structure does not disappear, but transitions into the frequency form of the wave background.*

APPENDIX 36: THE NATURE OF MASS, TOPOLOGICAL TENSION, AND THE PHYSICAL MEANING OF THE MASS DEFECT

(Mechanical interpretation of inertia and binding energy)

The Standard Model postulates the existence of the Higgs field to explain mass, artificially separating the particle from its property of inertia. The Preon Architecture proves that mass is not an innate scalar parameter. Mass (M) is a strictly mechanical measure of the elastic topological tension energy of a preon assembly and its wave resistance to the preon vacuum.

1. Universal Mass Equation

The total mass of any composite particle is the sum of the base rest mass of the free preons ($m_{free} \approx 0.170$ MeV/c^2) and the energy equivalent of their geometric deformation (tension ΔE_{tens}), which arises when preons are fixed into a rigid 3D structure:

$$M_{part} = \sum_{i=1}^{N} m_{free} + \frac{\Delta E_{tens}}{c^2}$$

Engineering specification of the equation:

- M_{part} — Observed inertial mass of the particle (total wave resistance).
- m_{free} — Base mass of the free preon (minimum perturbation of the medium).

- N — Number of basic preons in the particle's structure.
- ΔE_{tens} — Topological tension energy (the "internal spring" of the node).
- c — Speed of light in the preon medium.

2. The Electron as a Topological Battery

The electron consists strictly of 3 E-preons locked in a rigid equilateral triangle. The base mass of the assembly is supplemented by tension energy:

$$M_{base} = 3 \times 0.170 \text{ MeV/c}^2 = 0.510 \text{ MeV/c}^2$$

$$M_{total} = M_{base} + \delta M_{tens} \approx 0.511 \text{ MeV/c}^2$$

The difference of $\approx 0.001 \text{ MeV/c}^2$ is the topology deformation energy caused by pulling together three like charges. The electron is a superdense "micro-battery" of the tense medium.

3. Nucleons and Lattice Energy

Inside nucleons, preons are packed into highly complex macro-crystals. Here, the topological tension energy constitutes the vast majority of the mass:

$$M_{proton} = (N \cdot 0.170) + \frac{E_{lattice}}{c^2} \approx 938.27 \text{ MeV/c}^2$$

Here the base mass of the free preons accounts for only about 1-2% of the nucleon's total mass. The remaining 98-99% ($E_{lattice}$) is the topological tension energy of the rigid 3D lattice. Academic physics mistakenly interprets this elastic energy as an invisible "sea of gluons."

Analysis of nucleon structure:

- $E_{lattice}$ — Elastic energy of the 3D lattice (about 98% of the nucleon mass).

• **Mechanical meaning:** What classical physics calls the "sea of gluons" is the mechanical tension of a compressed preon structure.

4. Mass Defect as Mechanical Relaxation

The mass defect in the Preon Model is a process of packing optimization. When nucleons are combined into a nucleus, their overall geometry finds a more stable form, leading to a drop in total tension:

$$\Delta M = (M_p + M_n) - M_d = \frac{\Delta E_{relax}}{c^2} > 0$$

Thermodynamics of the nucleus and mass defect:

• ΔM — Mass defect (the difference between the mass of individual nucleons and the mass of the assembled nucleus).

• M_p, M_n, M_d — Observed masses of the proton, neutron, and synthesized nucleus (deuteron).

• ΔE_{relax} — Topological relaxation energy (internal framework tension released).

• **Result:** The shed elastic energy is radiated as gamma quanta. Nuclear energy is the release of structural mechanical tension.

APPENDIX 37: EMPIRICAL BASIS: REINTERPRETATION OF EXPERIMENTAL DATA

(Mechanistic revision of the Standard Model's legacy)

The Preon Architecture does not require the execution of new, unattainable experiments for its confirmation. The entire base of high-precision empirical data accumulated by physics over the last century already serves as its direct proof. The problem with the Standard Model lies not in the

measurements themselves, but in superimposing false, abstract mathematics (virtual particles and Higgs fields) onto this real data. Below is a mechanistic reinterpretation of the three main arrays of experimental data.

1. Spectroscopy: The Electron as a Topological Spring

All atomic physics relies on the fact of the absorption and emission of energy quanta by the electron. The Standard Model describes this as an abstract "quantum state change." In the Preon Model, the electron is an elastic 3D assembly of three E-preons. Experimental spectral series (Balmer, Paschen) are the recording of the mechanical deformation of this assembly.

Engineering analysis of the spectrum:

- **Absorption:** A photon deforms the preon triangle, "winding" it like a spring (accumulating energy in the micro-battery).
- **Emission:** A sharp mechanical relaxation of the node (tension release) into the vacuum medium.
- **Quantization:** This is a reflection of the intrinsic resonant harmonics of the rigid three-preon structure.

2. Mass Spectrometry: The Thermonuclear Fusion Curve

The highly precise isotope mass measurement data form the classic binding energy curve, the stability peak of which falls on iron-56. In orthodox physics, this is described as a struggle between the strong and Coulomb interactions. In the Preon Architecture, this curve is a direct graph of **macroscopic topological relaxation**. Iron-56 represents the most spatially optimal, least tense configuration of the preon macro-crystal.

> ***Physics of the mass defect:*** *Any synthesis of light nuclei and decay of heavy ones is the preon lattice's drive to shed excess elastic tension. Nuclear energy is not a "magic force" but the released elasticity of deformed preons.*

3. Deep Inelastic Scattering: Nucleon Rigidity

Accelerator experiments (for example, at SLAC), where protons are bombarded with high-energy electrons, show the presence of rigid scattering centers inside nucleons. The Standard Model calls them point-like "quarks" swimming in an invisible "sea of gluons." In the Preon Model, these are **nodes of the preon macro-crystal**.

Mechanical justification (SLAC data):

- **Bounce centers:** Real physical collisions of projectile-electrons with the rigidly fixed nodes of the proton's crystal lattice.
- **Gluon sea:** What holds 99% of the mass is the colossal elastic topological tension of this lattice, not virtual particles.

These experiments physically prove that the proton possesses real crystalline rigidity and volume.

APPENDIX 38: VACUUM ELECTRODYNAMICS, WAVE IMPEDANCE, AND RADIO CARTOGRAPHY OF THE PREON MEDIUM

The ability of electromagnetic waves to propagate in space is mathematically irrefutable proof of the existence of an elastic continuum. The transmission of a kinetic perturbation in an absolute void is impossible. Maxwell's equations within the framework of the Preon Architecture are direct equations of continuum mechanics for the preon ocean.

1. Mathematical Isomorphism of Vacuum Constants

In classical mechanics, any elastic medium is characterized by two base parameters: inertial density (ρ) and the shear modulus (G). In electrodynamics, these mechanical parameters strictly correspond to universal constants:

- **Magnetic permeability (μ_0):** Acts as the equivalent of the inertial (mass) density of the preon gas (ρ_p).
- **Vacuum permittivity (ε_0):** Is the inverse of the shear modulus of the preon lattice ($1/G_p$).

2. The Speed of Light as the Speed of Transverse Shear

The propagation speed of a transverse elastic wave in a rigid medium is calculated by the formula $v = \sqrt{G/\rho}$. Substituting the mechanical equivalents of the vacuum ($G_p = 1/\varepsilon_0$ and $\rho_p = \mu_0$), we obtain the fundamental formula for the speed of light:

$$c = \sqrt{\frac{G_p}{\rho_p}} \equiv \frac{1}{\sqrt{\varepsilon_0 \mu_0}} \approx 299\,792\,458 \ \mathrm{m/s}$$

The speed of light (c) is not the speed limit of "particles," but the kinematic propagation speed of a transverse mechanical deformation in a preon medium with specific stiffness and density parameters.

3. Ohmic Wave Impedance (Z_0)

The impedance of free space is a crushing argument against the concept of "nothingness." The wave impedance of any medium is calculated as $Z = \sqrt{\rho G}$. For the vacuum, this parameter has a strict value:

$$Z_0 = \sqrt{\frac{\mu_0}{\varepsilon_0}} \approx 376.73\,\Omega$$

Absolute mathematical "nothingness" is incapable of providing a resistance of 377 ohms. In the Preon Architecture, this value is a measure of the **mechanical friction and reactance** that the preon lattice exerts on the transverse torsion (photon) passing through it.

4. Energy Dissipation and Cosmological Redshift

Since the vacuum possesses mechanical resistance, it also possesses an infinitesimally small kinematic viscosity. Light propagating over intergalactic distances performs work to shear the preon

lattice. The loss of wave energy leads to a drop in frequency and a lengthening of the wave.

> ***Conclusion:*** *The classical attenuation of elastic oscillations fully explains the phenomenon of cosmological redshift, rendering the expanding Universe hypothesis physically redundant.*

5. Preon Cartography and Refraction

Realizing the vacuum as an elastic medium turns optics and radiophysics into tools for the sonar mapping of space. Gravitational lensing is not the "curvature of space-time" but classical **refraction** in the zone of the preon hydrostatic pressure gradient. By analyzing the distortions of radio waves, science gains a tool for compiling 3D maps of the density and currents of the invisible preon ocean.

APPENDIX 39: HISTORICAL CONTINUITY: IN SEARCH OF A SINGLE ALGORITHM OF THE UNIVERSE

Modern academic science is fragmented: quantum mechanics, cosmology, and geology speak in non-intersecting mathematical languages, often abandoning the search for a unified physical meaning. However, the Preon Architecture does not emerge in a vacuum. It is the direct heir and logical culmination of classical natural philosophy—the continuous historical quest of the greatest intellects who refused to believe in blind probability.

1. James Clerk Maxwell and Lord Kelvin: Continuum Mechanics

The foundation of electrodynamics was laid by Maxwell not through the abstractions of emptiness, but through rigorous hydrodynamics and the elasticity of the medium. He described fields as rotating vortices and elastic cells of the aether. Lord Kelvin proposed the theory of "vortex atoms," attempting to explain the chemical diversity of elements through topological knots in an ideal fluid. Kelvin intuitively grasped what is formalized today as the topological elasticity of preon nodes: the stability of matter is not magic, but the geometry of closed structures within a base field.

2. David Bohm: Implicate Order and Determinism

In the 20th century, when orthodox physics capitulated to randomness, David Bohm attempted to return determinism to science. His "pilot-wave" theory and the concept of the implicate (hidden) order asserted that particles are real objects propelled by the hydrodynamics of a hidden medium. The Preon Architecture materializes this "hidden order," providing it with an exact 3D geometric code and the acoustic mechanics of interaction.

3. Ilya Prigogine and Overcoming Entropy

Classical thermodynamics predicted the thermal death of the Universe. However, Ilya Prigogine proved that order inevitably emerges from chaos. The macroscopic arrow of time has a creative vector. These works paved the way for understanding the Cosmic DNA—a simple geometric code that triggers the continuous relay of **the Mind**.

An evolutionary chain, where the formation of nucleons, planetary geology, and biology act as stages of a single teleological project, the goal of which is the complexification of matter and the ultimate victory over entropy.

> ***Summary:*** *The Preon Model gathers these historical epiphanies into a single, mathematically and geometrically calibrated monolith. What Kelvin and Bohm saw as blurred outlines in the fog of continuum mechanics has, within the framework of the Manifesto, acquired a clear architectural form.*

APPENDIX 40: TOPOLOGICAL MECHANICS OF FIELDS, GRAVITY, AND THE ATOMIC NUCLEUS

The Standard Model describes interactions through the abstract exchange of virtual particles. In the Preon Architecture, all fields (electric, gravitational, strong) are macroscopic manifestations of the elastic deformation of a single preon ocean. The geometry of this deformation strictly dictates the mathematical laws of action at a distance and the structure of matter.

1. Macro-level: Geometry of the Inverse-Square Law

Gravitational and Coulomb forces decrease proportionally to the square of the distance. In continuum mechanics, this is a direct consequence of the distribution of a spherical tension front. Any particle creates a pressure gradient of the preon gas around itself. Since the surface area of a sphere grows proportionally to the square of the radius, the density of the medium's elastic tension per unit area inevitably falls according to the same law:

$$F \propto \frac{1}{r^2} \quad \text{since} \quad S = 4\pi r^2$$

2. Micro-level: The Preon Depletion Effect (Strong Interaction)

Preon mechanics explains the "strong interaction" through the effect of buffer layer depletion. When two protons are at a distance, layers of free preon gas exist between them, acting as an elastic dielectric. During extreme approach, this buffer is physically squeezed out of the gap. As the shielding layers disappear, the resistance of the medium drops non-linearly, generating a sharp exponential jump in the attractive force.

3. Mechanics of the Absolute Coulomb Barrier

When the buffer preons are completely squeezed out, the lattices of the two particles come into direct mechanical contact. In the case of two protons, an unresolvable conflict arises between the geometries of their rotating nodes. The attempt to compress them together without a layer of the medium leads to colossal structural resistance—this is the physical nature of the Absolute Coulomb Barrier.

4. Mechanics of the Atomic Nucleus: The Neutron as a Structural Adapter

Nature uses neutrons for nucleus stability. The neutron is an electrically neutral composite macro-crystal. It acts as an ideal geometric adapter (topological damper). Its compensated lattice allows protons to "hook" onto it from different sides, relieving the direct structural tension between them.

> ***Engineering Conclusion:*** *The atomic nucleus is not a cloud of probabilities, but a single super-rigid 3D macro-crystal, bound together according to the laws of femtometer-scale crystallography. The role of the neutron within it is analogous to that of building mortar, compensating for irregularities and tensions between the main blocks (protons).*

APPENDIX 41: COSMOLOGICAL REDSHIFT AND DISSIPATION OF PREON SOLITONS

The foundation of orthodox cosmology—the Big Bang theory—relies on an erroneous interpretation of redshift as a Doppler effect. Within the framework of the Preon Architecture, the Universe is static, and redshift is a direct consequence of the wave dissipation ("aging") of solitons in the elastic vacuum medium.

1. The Illusion of Expansion vs. Medium Viscosity

Orthodox physics interprets the decrease in light frequency as a sign of galaxies flying apart. In the Preon Architecture, the drop in a photon's energy is caused by overcoming the **wave impedance of the vacuum ($Z_0 \approx 377\ \Omega$)**. The photon, being a transverse shear soliton, performs mechanical work to deform the preon cells, irretrievably yielding a portion of its energy to topological friction.

2. Law of Exponential Decay

A decrease in kinetic energy leads to an increase in wavelength. The relationship of redshift (z) to energy loss is as follows: $E_{obs}/E_0 = 1/(z+1)$. The law of soliton energy decay is described by an exponential dependence on the distance traveled:

$$\frac{E_{obs}}{E_0} = e^{-\alpha x} = \frac{1}{z+1} \implies x = \frac{\ln(z+1)}{\alpha}$$

Engineering specification of variables:

- E_0 — Initial energy of the photon upon emission by the source.
- E_{obs} — Observed energy of the photon after overcoming topological friction.
- z — Redshift coefficient (empirical indicator of photon "aging").
- x — True geometric distance to the object (light-years / parsecs).
- α — Coefficient of vacuum topological friction (medium viscosity).

3. Calibration of the Dissipation Coefficient

For integration with observational data, the coefficient α is determined through the ratio of the Hubble constant to the speed of light. This links "expansion" to physical deceleration in the medium:

$$\alpha = \frac{H_0}{c} \approx 7.15 \times 10^{-11} \text{ light-years}^{-1}$$

Calibration parameters:

- H_0 — Hubble constant (interpreted as the energy loss gradient).
- c — Phase propagation velocity of transverse shear (speed of light).

4. Distance Calculation (Example: GN-z11)

For a galaxy with a redshift of $z = 10.6$, calculating the geometric distance according to the laws of medium resistance yields a result without the paradoxes of superluminal expansion:

$$x = \frac{\ln(10.6 + 1)}{7.15 \times 10^{-11}} \approx 34.2 \times 10^9 \text{ light-years}$$

> ***Conclusion:*** *The true distance to GN-z11 is 34.2 billion light-years. Light forced its way through the elastic preon ocean, losing energy to friction. The expansion of space does not exist—there is only the strength of materials of the vacuum.*

APPENDIX 42: ONTOLOGY OF THE G-PREON: TOPOLOGICAL CHIRAL LOCK AND GRAVITATIONAL EQUILIBRIUM

The foundation of baryonic matter is built upon the G-preon. The G-preon (Gravitational) is a neutral topological node, the epicenter of mass, obeying exclusively the force of exponential gravity. It represents the result of extreme geometric compression of the basic preon background.

1. The Illusion of Annihilation and Topological Chirality

In the Preon Architecture, antimatter is a strict mirror reflection of the E-preons' polarity (topological chirality). A right-handed twist of space creates a positive charge ($+1/3$), a left-handed one creates a negative charge ($-1/3$). The G-preon consists of two right-handed and two left-handed twists. Annihilation is the destruction of the geometric lock. To mutually destroy each other, the twists must unwind one another.

> ***Refutation of the rotation paradox:*** *Skeptics might assume that turning a left-handed twist 180 degrees will turn it into a right-handed one. This is a fundamental error. Just as a bolt with a left-hand thread does not become a bolt with a right-hand thread if simply flipped over, a left topological node cannot be aligned with a right one under any rotations in 3D space. Inside the G-preon, two fundamentally different pairs of twists are rigidly locked.*

2. Exponential Confinement ("Frozen Explosion")

At the moment of primary Genesis, colossal pressure squeezed these four E-preons beyond the critical subatomic radius R_c. At these femtometer distances, the micro-gravitational force increases exponentially, overcoming Coulomb repulsion. The G-preon is a state of a "frozen explosion." Four charges try to unwind, but the gravitational vise compresses them so tightly that they cannot break the node.

3. Energy Balance of Topological Tension

The true rest mass of a free E-preon is approximately $0.170\ \mathrm{MeV/c^2}$. The total base mass of four free E-preons is $0.680\ \mathrm{MeV/c^2}$. At the same time, the mass of a completed G-preon inside a nucleon is $104.96\ \mathrm{MeV/c^2}$.

$$\Delta E = m_G - 4m_{E(free)} = 104.96 - 0.680 = 104.28\ \mathrm{MeV/c^2}$$

Engineering specification of the mass balance:

ΔE — Energy of the node's topological tension (compressed spring).
m_G — Observed rest mass of the G-preon within the nucleon.
$m_{E(free)}$ — Base mass of a free E-preon outside of assemblies.

This colossal difference of $104.28\ \mathrm{MeV/c^2}$ is the pure equivalent of potential elastic tension energy. During beta decay, the compressed spring straightens out, and the energy is converted into a kinetic ejection.

4. The Ideal Gravitational Anchor

Since two positive and two negative charges are rigidly locked inside, their Coulomb vectors perfectly compensate for each other. This hyper-node does not radiate an electric field outward. Being neutral, this dense clump of four base preons interacts with the medium exclusively through the deformation of space. It is the ideal foundation for holding together aggressively repelling E-preons.

APPENDIX 43: ABSOLUTE MATHEMATICAL BALANCE OF NUCLEONS AND THERMODYNAMICS OF BETA DECAY

The truth of a fundamental physical theory is verified by its ability to balance mass, energy, and the component composition of a system without invoking virtual particles. The Preon Architecture demonstrates an absolutely closed cycle of matter transformation, in which every preon is tracked arithmetically.

1. Nucleon Balance and the Golden Asymmetry

The structure of basic particles is formed from strict combinations. Using laboratory rest masses (CODATA), we obtain direct proof of the Golden Asymmetry: the additional mass of the neutron is the weight of one G-preon, equal to 1.29 MeV/c². The calculated mass of preons inside the nucleus is: $m_G \approx 104.96\ \mathrm{MeV/c^2}$ and $m_E \approx 103.67\ \mathrm{MeV/c^2}$.

- **Proton (uud):** 5 E-preons + 4 G-preons.
- **Neutron (udd):** 4 E-preons + 5 G-preons.

2. Kinematics of Beta Decay (Preon Audit)

Beta decay is a mechanical process of restructuring a Down quark into an Up quark. During this, one heavy G-preon detonates:

$$1G \rightarrow 2E^{+} + 2E^{-}$$

Mechanics of the process:

- **Start:** Neutron (4 E-preons, 5 G-preons).
- **Restructuring:** The quark instantly captures $2E^{+}$, while the old $1E^{-}$ along with the new $2E^{-}$ are pushed away.

• **Formation:** The three expelled negative E-preons are pulled together by magnetic forces into a single emitted electron (3E assembly).

• **End:** The core (proton) contains 5 E-preons and 4 G-preons. Not a single preon has disappeared.

3. Energy and Mass Balance

The mass defect of the nucleus during the transformation of a neutron into a proton is exactly 1.29 MeV. This energy is distributed into creating the mass of the electron (0.511 MeV) and the kinetic ejection. Strict calculation demonstrates:

$$\Delta E_{kin} = \Delta M_{nucl} - M_{electron}$$
$$\Delta E_{kin} = 1.29 \text{ MeV} - 0.511 \text{ MeV} = 0.779 \text{ MeV}$$

> ***Conclusion:*** *The obtained value of 0.779 MeV coincides phenomenally accurately with the laboratory kinetic energy of beta decay. Perfect thermodynamic balance proves the absolute validity of the preon model. No neutrino is required here to "save" the law of energy conservation.*

APPENDIX 44: SCENARIOS OF UNIVERSE DEVELOPMENT: THE BUBBLE OF MATTER AND THE DECOHERENCE FRONT

The Preon Architecture rejects the model of an "explosion from a point." The Universe is an infinite ocean of preon gas (vacuum) in a state of ultra-high symmetry. The material world we observe is an expanding "bubble" of local symmetry breaking, where the field's energy crystallizes into stable topological nodes.

1. The Decoherence Front: The Boundary of Worlds

Matter is not distributed evenly in the Universe forever. There is a dynamic boundary—the **Decoherence Front**. This is the surface of the expanding bubble where a phase transition occurs: chaotic oscillations of the preon vacuum, under the influence of the primary wave impulse, "collapse" into rigid preon assemblies (protons and electrons).

Beyond this front is "pure" vacuum, where there are not yet atoms, stars, or time as we understand it. We live inside a zone where space is already "manifested" and structured. The expansion speed of this front determines the maximum possible speed of interactions in our zone (the speed of light c).

2. "Eternal Expansion" Scenario (Dominance of the Mind)

In this scenario, the Decoherence Front continues to capture new volumes of the preon ocean. **The Mind**, as the highest form of matter ordering, follows the front, transforming "raw" hydrogen into complex stellar systems and informational structures. The Universe expands not due to galaxies flying apart, but due to the **growth of the volume of structured space**. Entropy is locally defeated by a constant influx of new energy from outside the front.

3. "Thermal Equilibrium" Scenario (Stagnation)

If the decoherence impulse fades, the expansion of the bubble stops. Inside the closed volume, a process of gradual degradation of topological nodes begins (proton decay over ultra-long time distances). Matter slowly "dissolves" back into the preon gas, returning the system to its initial state of high symmetry. This is a natural cycle of space cleansing for the next Genesis.

> ***Cosmic DNA and the Evolutionary Vector:*** *The presence of life and* ***the Mind*** *in the Universe is not an accident, but a mechanism for stabilizing the "bubble of matter." The Mind is the tool that prevents the collapse of the structure, transforming the chaotic energy of the vacuum into an eternal implicate order.*

4. Conclusion

Our Universe is an active project. We are inside a phase transition zone, and our task as bearers of **the Mind** is to maintain and expand the Decoherence Front, transforming the infinite potential of the preon ocean into a conscious and eternal reality.

APPENDIX 45: THE TECHNOLOGICAL HORIZON OF THE MIND: TRANSITION TO THE CONTROL OF METRICS AND VACUUM ENERGY

The realization of the Universe as an elastic preon continuum marks the end of the era of the "barbaric" exploitation of nature. Modern technologies (burning hydrocarbons, fission of heavy nuclei) are merely superficial manipulations with the energy of bonds. The technological horizon of **the Mind** lies in the realm of direct work with the topology of space and the dynamics of the preon gas.

1. Direct Annihilation Energy (Unpacking the G-preon)

The G-preon is an ideal accumulator storing the energy of the primary compression of the vacuum (≈ 104 MeV). The technology of the future consists of creating local conditions of resonant mismatch in gravitational confinement. The controlled "unpacking" of neutral G-preons will allow the extraction of colossal volumes of pure kinetic energy without the formation of long-lived radioactive waste, turning ordinary matter into an infinite resource.

2. Metric Drive and Overcoming Inertia

Inertia is the wave resistance of the preon medium to acceleration. The technological horizon envisions the creation of "metric shields"—local zones of artificial alteration of the preon gas density around a spacecraft. By creating a vacuum pressure gradient in front of it (rarefaction of the medium), the ship will not "push" itself with an engine, but will be hydrodynamically drawn into the low-pressure zone of the preon ocean. This eliminates the problem of G-forces and allows reaching relativistic speeds without expending mass on propellant ejection. Movement becomes not displacement within the medium, but the control of the geometry of the medium itself.

3. Informational Synthesis and Materialization of Structures

Within the framework of Cosmic DNA, matter is a solidified algorithm of geometry. By understanding the rules of 3D assemblies (EEE and G-preons), **the Mind** transitions from mining fossils to the **direct synthesis of matter from the vacuum background**. Layer-by-layer preon epitaxy facilities will allow "printing" any elements and superconducting structures directly from field energy, realizing the dream of alchemy at the level of the Universe's fundamental software code.

> ***Ultimate Goal: The Mind*** *ceases to be a passive observer of a cooling Universe. Having mastered the mechanics of the Preon Architecture, civilization takes on the role of an active regulator of the Decoherence Front, ensuring the eternal existence and complexification of Life in defiance of the laws of entropy.*

4. Conclusion

The technological horizon is not just about new machines; it is a new status for **the Mind**. We are transitioning from using matter to creating it, from submitting to space to controlling its metrics. This is the true emergence of civilization from the cradle of planetary synthesis to the scale of the creators of the Cosmic Order.

TO BE CONTINUED...

© 2026 Arian Mamayenko. All rights reserved.
No part of this work may be reproduced or transmitted for commercial use without the author's consent.