# Field-based Theory by Avi Hadar

## Version 2 – Structural Formulation



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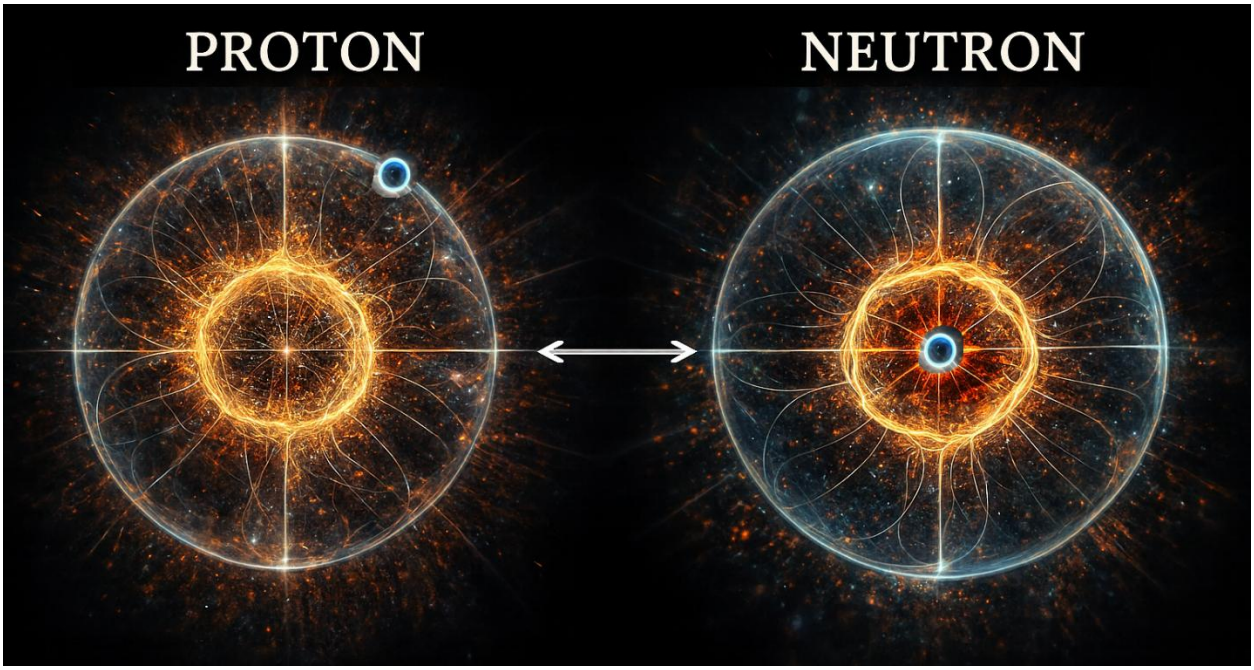
This book presents a unified physical framework in which matter is described entirely as structured electric fields.



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# Contents

# Opening Page – Draft

This book presents a unified physical framework in which matter is described entirely as structured electric fields.

The motivation for this work is simple:
modern physics relies on multiple foundational formalisms — general relativity, quantum mechanics, the Schrödinger equation, and the TOV equations — each successful within its own domain, yet mutually incompatible at a fundamental level.

Rather than attempting to reconcile these frameworks through approximation, interpretation, or additional assumptions, this book takes a different approach. It replaces the underlying description on which they are built.

In this framework, mass is not treated as a primitive quantity.
Probability is not a fundamental principle.
Particles are not assumed to be structureless entities.

Instead, matter is described as electric field configurations governed by geometry, radius, permittivity, and energy balance. Stability, decay, confinement, and transformation emerge directly from field behavior, without the introduction of separate forces or abstract postulates.

Within this description, familiar equations such as the Schrödinger equation and the TOV equations do not disappear — but they no longer occupy a foundational role. They arise as specific solutions or limiting cases of the same underlying field equations.

This book does not aim to refute existing theories, nor to reinterpret them philosophically. Its goal is purely physical: to present a single, coherent framework capable of describing phenomena across scales — from nuclear structure to atomic behavior and beyond — using one consistent set of principles.

The reader is invited not to accept conclusions, but to examine the structure itself.

# Part I - Introduction

## Chapter 1 - Motivation and Initial Questions

For many years I felt that the foundations of modern physics left too many essential questions unanswered. Not questions of detail, but questions at the very core:

What is matter?

What gives it stability?

Why does the universe appear in layered structures, repeating across scales?

And why do our best theories rely on assumptions—such as point-like particles or undefined forces—that cannot be reconciled with physical intuition?

The more I explored these gaps, the clearer it became that the problem was not in the data, nor in the mathematics, but in the starting point. Physics advances by assuming certain principles and building upward. But when the foundational assumptions are incomplete, even sophisticated theories cannot provide final answers.

And there was another question that bothered me in a surprisingly persistent way: why do we not know how the elements were formed? Why is there no clear explanation for the most basic pattern in the periodic table—why lithium contains more neutrons than protons, while carbon, nitrogen, and oxygen exhibit near-perfect balance? These inconsistencies should have been the first clues to the structure of matter, yet modern physics offers no coherent answer. This gap became one of the driving forces behind the search for a deeper understanding.

I realized that if I wanted deeper clarity, I would have to set aside the familiar frameworks and rebuild the picture from the ground up. Not to replace physics, but to understand what it was trying to describe. This book is the result of that process: a gradual reconstruction of the physical universe, beginning with the simplest possible building block and extending outward to the largest structures we observe.

## Chapter 2 - Early Insights and the Beginning of the Journey

Two early insights marked the true beginning of this journey. They appeared long before any equations, long before any model took shape, and they were simple enough to overlook—yet powerful enough to change everything.

The first insight was that the secret of creation must be hidden in the elements themselves. If we could understand how the elements were formed—why each one has the structure it has, why some contain more neutrons than protons while others remain

perfectly balanced—then we could uncover the physical logic behind the entire universe. The periodic table was not just a catalog of matter; it was a map of creation.

The second insight was personal. I understood that if this mystery was to be solved, I would have to be the one to pursue it. From a young age I had an unusual ability to solve complex problems intuitively. One moment in particular remained etched in my memory: in high school, a teacher handed the class a difficult mathematical problem and said, "Whoever solves this within a week will be a brilliant mathematician." I solved it in twenty minutes—and at that age, twenty minutes felt like a lifetime.

This was the beginning of the journey: a conviction that the elements held the key, and a certainty that I had both the responsibility and the capability to uncover the underlying structure.

## Chapter 3 - Failure to Understand the Periodic Table — and the Shift in Thinking

For years I tried to understand the periodic table, searching for a physical logic behind the structure of the elements. Why do some elements contain more neutrons than protons, while others maintain perfect balance? Why are certain isotopes stable while others are not? Despite every effort, the answer never came. The periodic table, which should have been the clearest window into the structure of matter, remained an unsolved riddle.

Even the explanations I was given — cycles within cycles, electrons that "go up and down" between levels — never formed a coherent physical picture. Nothing in these models explained why the elements were structured the way they were.

Then I encountered a sentence attributed to Einstein:

> ***"If I only knew what God was thinking… the rest are details."***

In that moment I understood something essential: as long as I continued thinking like a physicist, I would never find the answer. The existing frameworks were built on assumptions that blocked the path forward. To uncover the origin of the elements, I needed to shift perspectives entirely.

I had to think not as an observer of the universe, but as a creator — someone asking how matter must be constructed for the universe to exist in the form we see.

## Chapter 4 - Purpose of the Framework

This framework is not an attempt to adjust or refine existing theories. It is an attempt to rebuild the conceptual foundation of physics based on one simple, unifying principle:

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**Matter is a configuration of electric fields.**

Once this principle is adopted, many longstanding problems of physics become questions of geometry, stability, and energy distribution—not probabilistic behavior or undefined fundamental forces. The purpose of this framework is therefore threefold:

1. **To redefine the fundamental particles** in terms of confined and open electric fields.
2. **To derive the behavior of atoms, nuclei, and cosmic structures** directly from field geometry and energy balance.
3. **To provide continuity across scales**, from the neutron to the universe, using one coherent physical language.

The chapters that follow develop this perspective step by step. Each part of the model arose from examining a physical inconsistency, identifying the missing assumption, and discovering that the solution fits naturally into a larger, unified structure.

This book presents that structure—not as a finished theory, but as a coherent pathway toward understanding the universe from first principles.

# Part II — The Layered Universe Model

In the first chapter, I presented the starting point: if I wish to understand creation, I must understand how the elements were formed. This led to a fundamental realization — that to solve this mystery, I must stop thinking like a physicist and begin thinking like a creator, approaching the world from the final outcome rather than from existing equations.

In this chapter, I will present the first step of the journey: the understanding that the structure of the universe, and of all matter within it, is not a collection of disconnected laws but the expression of a simple and coherent creative process. From here, we will continue into the remaining sections of the chapter, which will be integrated from the documents you provided.

## Chapter 5 — Introduction

Most conventional cosmological models describe the universe as originating from a singular explosive event — the so-called "Big Bang" — where all space, matter, and energy emerged from a hot, dense state and began expanding rapidly.

This framework introduces a fundamentally different premise. We begin not with energy or plasma, but with a structured, stable neutron cluster — a massive, coherent entity composed purely of neutrons. This cluster contained the entire material basis of what would later become stars, galaxies, and atomic matter.

Rather than a chaotic explosion, the universe is understood here as the result of a layered disintegration process, in which the neutron cluster released successive shells of mass in a series of stabilization events. Each release formed a concentric ring or expansion layer, pushing earlier layers outward.

From this perspective, what we observe as galaxies, stars, or black holes are not remnants of a bang — they are the architectural byproducts of a cosmic structure shedding its mass to achieve internal equilibrium.

## Chapter 6 — Stages of the Big Bang and Matter Formation

### Initial State: A Neutron-Only Universe

At its foundation, the universe consisted solely of a vast, undifferentiated neutron cluster. This entity — uniform, coherent, and massive — contained the complete inventory of matter and energy required for cosmic structure. No protons, electrons, or atoms existed. The neutron was the only fundamental component.

Rather than being a product of particle fusion or collision, the neutron is taken here as the primary unit of existence — the elemental brick from which all observable structures would eventually emerge.

This neutron core is proposed as the true beginning of material reality — not a singularity, but a stable, high-density formation awaiting internal transformation.

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## Stage 1 — The First Disintegration: Birth Through Structural Instability

According to this model, the first transformation did not result from an uncontrolled blast, but from an inherent drive toward equilibrium. At some threshold, the core initiated a process resembling large-scale beta decay:

$n \rightarrow p^{+} + e^{-} + \overline{\nu_e}$

As decay began, portions of the neutron structure fragmented, releasing charged particles and antineutrinos. This release of mass was not uniform or singular — it occurred as a series of accelerating shell ejections.

Each such event, often interpreted as an “explosion” in mainstream cosmology, is here reframed as a burst of mass expelled in an attempt to stabilize the internal structure. These are not chaotic or total explosions, but layered releases — shell after shell, each pushing outward.

This gradual, staged disintegration continues until the core reaches a temporary equilibrium — or until it releases yet another shell. The layers released during this process form the basis of galactic and intergalactic material.

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## Stage 2 — Layered Expansion and Ring Formation

Each released shell of matter moves outward from the central neutron core but remains gravitationally bound to it. As the expelled material slows under gravitational influence, it begins to orbit the core.

This orbital behavior results in the formation of a ring — a structured layer of matter circling the core.

The process is gradual and sequential: each disintegration event releases a new shell, which forms a new ring. This sequence of ring formations produces the layered cosmic structures we observe.

Thus, what may appear as explosive expansion is in fact a pattern of stabilizing mass release, where each ring reflects a step in the system’s progression toward equilibrium.

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## Stage 3 — Emergence of Galaxies, Suns, and Black Holes

The matter released from the central neutron core — the layers ejected during its disintegration — also seeks its own internal equilibrium. Just like the original core, these expelled fragments behave as smaller neutron clusters.

Each of these sub-clusters undergoes a similar process:

- Some continue to disintegrate layer by layer until they lose coherence and become atomic matter.
- Others reach a point of structural balance and stabilize as compact cores.

The stabilized ones, depending on their mass:

- Form new ring structures around themselves, through the same orbital mechanism as before.
- Become suns if relatively small.
- Become black holes if massive enough to trap light.

Thus, galaxies emerge not as singular events, but as nested disintegration systems, where each layer spawns new centers of matter release and stabilization. Planetary systems, too, are the byproducts of this layered evolution.

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## Stage 4 — Matter Formation Through Continued Disintegration

Clusters that do not stabilize continue to decay. Through this ongoing process, neutron structures lose cohesion and become atomic matter.

Atoms are not built through aggregation, but rather emerge from the structured disassembly of neutron-based cores. Stability in these atoms arises when the internal forces — nuclear and electric — reach equilibrium.

This process, rather than explosive nucleosynthesis, is proposed as the true origin of matter.

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## Local Example: The Solar System

The Solar System reflects this pattern. A neutron-rich sub-cluster began to disintegrate in steps:

- First ring → Saturn
- Second ring → Jupiter

- Third ring → Mars
- Fourth ring → Earth
- Fifth ring → Venus
- Sixth ring → Mercury

Following the sixth release, the core stabilized — becoming the Sun. Surrounding material formed the planets. Uranus and Neptune, having distinct compositions, are interpreted as captured bodies not originating from the same ring sequence.

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## Interpretation — Implications and Continuation

This model redefines cosmic history as a sequence of mass-shedding stabilization events, not one grand explosion. If current galactic structures exhaust their energy, the central neutron cluster may initiate a new layer release, potentially generating a new cosmic cycle.

Thus, the universe may not end — it may regenerate.

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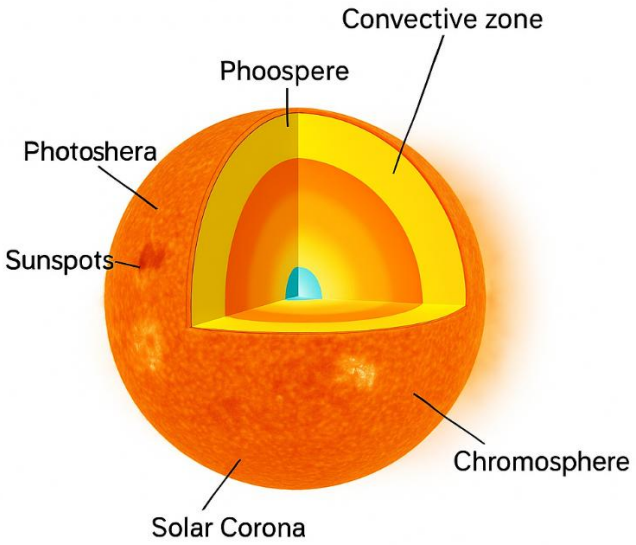
## Structural Consequences and Observable Phenomena

The layered neutron core model provides structural explanations for numerous astronomical observations that remain only partially understood in standard cosmology:

- Spiral galaxy structure: naturally emerges from concentric, ring-based mass releases.
- Galactic rotation curves: consistent with gravitational binding of layered matter around central masses.
- Correlated planetary compositions: planets formed from the same ring share elemental signatures.
- Stable ratios of hydrogen and helium: arise from layered decay processes rather than fusion-based transformation.
- Presence of isolated neutron stars and black holes: expected as remnants of stabilized sub-clusters of varying mass.
- Non-uniform cosmic expansion: explained by the sequential, layer-driven release of mass rather than one-time inflation.
- Dark matter analogues: matter located in a different ring than the one we occupy — gravitationally active, yet non-visible to us due to its placement in separate structural layers.

Rather than invoking ad hoc phenomena, this model provides a cohesive structural framework that reproduces these large-scale patterns as natural outcomes of an underlying layered formation process.

## Chapter 7 — Reconsidering the Solar Core




The standard solar model, while successful in many respects, still faces several unresolved discrepancies, such as the solar abundance problem, helioseismic mismatches, excess core mass, neutrino flux inconsistencies, and the coronal heating problem. In this paper, we propose an alternative view of the solar core — one based on the presence of a compact neutron cluster at the center of the Sun. This model provides a unified framework that addresses the mass distribution, internal sound-speed profile, and neutrino output, without relying on speculative opacity adjustments or variable diffusion models. The proposed neutron cluster may influence gravitational and magnetic dynamics within the Sun, but its potential connection to coronal heating remains speculative and is not addressed in this work. The model is shown to resolve multiple open questions using a minimal set of new assumptions, and without contradicting observed luminosity or stability.

The Sun, as the dominant energy source for the solar system, has long been modeled through the Standard Solar Model (SSM), which assumes a hydrogen-helium plasma governed by hydrostatic equilibrium and energy production via nuclear fusion in the core. Despite its success, the model faces significant discrepancies, including the Solar Abundance Problem, core mass inconsistencies, and unresolved features in helioseismic data. This chapter proposes a neutron cluster model to explain these anomalies without extensive parameter tuning or speculative diffusion processes.

The Standard Solar Model (SSM) describes the Sun as a nearly spherical body composed mainly of hydrogen (~74%) and helium (~24%), with trace elements contributing ~2%. It assumes hydrostatic equilibrium, thermal transport, and fusion processes that match observed luminosity and temperature. Adjustments to diffusion and opacity have been made to align with observations.

Despite refinements, discrepancies persist: the Solar Abundance Problem, deviations in sound-speed profiles, core mass excess, and other issues. The SSM often resorts to parameter tuning, which lacks direct observational validation.

This work does not rely on conventional models of dense matter or stellar evolution. It assumes the presence of a neutron core at the center of the Sun — a compact, stable cluster of neutrons. No further interpretation is required at this point. The detailed reasoning for this assumption is provided in a separate section.

We propose the existence of a compact, neutron-rich cluster at the Sun's core. It has high density, is gravitationally and quantum-mechanically stable, minimally interacts with surrounding plasma, and contributes to core mass without requiring elemental redistribution.

While fusion remains the dominant energy source, neutron decay at the cluster's edge and gravitational influence may contribute to steady output without contradicting luminosity or neutrino flux data.

The neutron cluster explains the central mass distribution and may influence solar magnetism, providing a deeper anchoring structure.

This model modifies only the core structure, not the whole solar framework. It introduces a single new element and accounts for anomalies with minimal assumptions.

Observed Anomaly | Standard Solar Model Explanation | Neutron Cluster Model Explanation | Resolution Solar Abundance Problem | Adjust opacities, model components, or diffusion profiles | Mass is explained by neutron core → less need to alter surface composition | Resolved Helioseismic Sound-Speed Profile | Requires helium profile variation and diffusion adjustments | High central mass from neutron cluster explains sound-speed profile directly | Resolved Core Mass Excess | Attributed to slow helium settling over billions of years | Core begins as neutron-dense cluster — no need for long-term element migration | Resolved

Detailed discussions of each observational challenge are provided above.

- Mass Concentration: Detected via advanced helioseismic measurements.
- Magnetic Field Configuration: Could explain deep magnetic anchoring.
- Neutron Decay Tracers: May alter surface isotopic ratios.

- Neutrino Spectrum: Discussed in second paper.
- Solar evolution reconsideration.
- Motivates similar analysis for other stars.
- Raises questions about matter conservation and core longevity.

The model adds one element and explains multiple anomalies — without overcomplicating existing physics.

- No direct observations yet available.
- Tension with current stellar evolution models.
- Requires stability simulations under solar conditions.
- Interaction with plasma.
- Detectable effects of neutron decay?
- Impact on magnetic field generation.
- Refined helioseismic analysis.
- MHD simulations.
- Cross-star comparisons.

Extends the SSM with an internal structure hypothesis; offers direction for future exploration.

This chapter introduced the neutron cluster hypothesis as an internal structure that explains long-standing solar anomalies. It integrates with the SSM while providing testable predictions. It offers a coherent, minimalistic addition that may improve our understanding of solar structure and evolution. Future work will examine energy mechanisms in greater detail.

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## Comparative Analysis of Observational Anomalies

| Observed Anomaly | Standard Solar Model Explanation | Neutron Cluster Model Explanation | Resolution |
|---|---|---|---|
| Solar Abundance Problem | Adjust opacities, model components, or diffusion profiles | Mass is explained by neutron core → less need to alter surface composition | ✔ Resolved |
| Helioseismic Sound-Speed Profile | Requires helium profile variation and diffusion adjustments | High central mass from neutron cluster explains sound-speed profile directly | ✔ Resolved |
| Core Mass Excess | Attributed to slow helium settling over billions of years | Core begins as neutron-dense cluster — no need for long-term element migration | ✔ Resolved |

# Part III — Field Relativity Framework

## Chapter 8 — Lorentz Contraction as a Field Preservation Phenomenon

### Abstract

This paper presents a field-based interpretation of relativity, proposing that all relativistic effects — energy equivalence, Lorentz contraction, mass variation, and the invariant speed of light — arise from the preservation of the total electric field intensity surrounding a charge in motion.
By deriving each classical relativistic relationship directly from the behavior of a conserved electric field, the work eliminates the need to assume variability in time or space.
It shows that the speed of light represents the field's internal response limit, and that relativistic mass increase corresponds to a real rise in field energy density.
The result is a unified physical explanation of relativity grounded entirely in field mechanics, rather than in spacetime geometry.

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### Introduction

The relationship between energy, mass, and the speed of light has been central to modern physics since Einstein formulated

$$E = mc^2$$

. However, this equation is traditionally interpreted geometrically, as a property of spacetime deformation. In this work, we examine an alternative: that relativity naturally emerges from the preservation of the electric field itself.

If a single, stable electric field configuration around a charge maintains its total intensity under motion, all relativistic effects can be derived directly from the geometry and conservation of that field. This view eliminates the need for variable time or space.

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### Field Preservation Framework

This section demonstrates how a conserved electric field satisfies every relativistic condition — energy, momentum, Lorentz contraction, the speed of light, relativistic mass, and universality across all field types.

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- #### Field Energy and Rest Mass

**Goal:** To show that the energy contained in a stationary electric field is fully equivalent to the rest mass of a particle.

The energy stored in a static electric field of radius $R_0$

is:

$$E_{field} = \frac{1}{2}\frac{Q^2}{4\pi\varepsilon_0 R_0}$$

Equating this to rest energy yields:

$$m = \frac{Q^2}{8\pi\varepsilon_0 R_0 c^2}$$

**Clarification.**
The radius $R_0$ is not fixed numerically at this stage. Its value is derived explicitly in later chapters, where the physical definition of the confined field charge is established. Within that derivation, $R_0$is shown to correspond to the Bohr radius and is used consistently as the reference field radius throughout the remainder of this work. The charge $Q_p$ appearing in the expressions above refers specifically to the **positive field charge** as computed and defined within this framework, not to the elementary electron charge.

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- ## Conservation of Energy and Momentum

**Goal:** To verify that when the electric field moves, its structure preserves total energy and momentum in the same form as relativistic mechanics.

Starting from the Lorentz transformation for electric fields:

$$E_{\parallel} = E_0, \quad E_{\perp} = \gamma E_0$$

The energy density of the field is:

$$u = \frac{\varepsilon_0}{2}\left(E_{\parallel}^2 + E_{\perp}^2\right) = \frac{\varepsilon_0 E_0^2}{2}(1+\gamma^2)$$

As the field contracts along the direction of motion, the differential volume transforms as:

$$dV' = \frac{dV_0}{\gamma}$$

Integrating over space gives:

$$E' = \int u' dV' = \gamma E_0$$

Thus, the field energy scales as:

$$E' = \gamma m c^2$$

confirming that the moving field preserves both energy and momentum consistent with special relativity.

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- ## Lorentz Contraction as Field Preservation

**Goal:** To show that Lorentz contraction results directly from field preservation, not from spacetime deformation.

Starting from the conservation of total field intensity:

$$E(r,v)r^2 = E_0 r_0^2$$

If the field energy must remain constant for all observers, the amplitude must increase as the radius contracts. Expressing

$$E(r,v) = \gamma E_0$$

and substituting gives:

$$\gamma E_0 r^2 = E_0 r_0^2 \Rightarrow r = r_0\sqrt{1 - v^2/c^2}$$

This derivation shows that Lorentz contraction is a natural geometric consequence of field preservation.

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- ## Light Speed as Field Response Limit

**Goal:** To establish that the speed of light is the natural limit of the electric field's ability to respond to change.

Maxwell's relations yield:

$$c = \frac{1}{\sqrt{\varepsilon_0 \mu_0}}$$

As the electric field changes, it induces a magnetic component that counteracts acceleration. The field cannot adjust faster than this self-balancing rate. Hence, represents the ultimate propagation speed of any change in field configuration — the internal response limit of nature.

*Note:* The magnetic condition means that the magnetic field has no sources or sinks, and its flux through any **closed surface** is zero (Gauss's law for magnetism). This refers to flux conservation over a volume, **not** to a line integral around a closed path (which pertains to the curl, ). The distinction is important because field preservation concerns volumetric conservation of intensity, not rotational circulation.

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- ## Relativistic Mass as Field Density

**Goal:** To demonstrate that the increase of relativistic mass with velocity arises from the rise in field density.

The energy density of the field is:

$$u = \frac{\varepsilon_0 E^2}{2}$$

As the field compresses under motion, its parallel and perpendicular components transform as:

$$E_{\parallel} = E_0, \quad E_{\perp} = \gamma E_0$$

so that the total energy density becomes:

$$u' = \frac{\varepsilon_0 E_0^2}{2}(1 + \gamma^2)$$

Integrating over the contracted volume

$$V' = V_0/\gamma$$

yields:

$$E(v) = \gamma E_0$$

and thus:

$$m(v) = \gamma m_0$$

This derivation shows explicitly that relativistic mass increase corresponds to the real, measurable increase in field density.

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- ## Universality Across Fields

**Goal:** To generalize the field-preservation principle to other fundamental interactions.

All fundamental fields share the same structural form:

$$E \propto \frac{(\text{charge})^2}{R}$$

With appropriate constants, the same relation

$$E = mc^2$$

holds for electric, magnetic, strong, and gravitational fields. Each expresses energy confinement within a finite region constrained by the constant *c*

## Chapter 10 — Gravity as a Macroscopic Field-Preservation Phenomenon

Goal: To show that gravity is another manifestation of the same field-preservation principle, and that gravitational energy follows the exact same structural form as the electric field — only scaled to macroscopic systems with different coupling constants.

### Energy Structure of the Gravitational Field

The potential energy stored in a gravitational field of mass ( M ) and radius ( R ) can be expressed as:

$$E_g = \frac{1}{2}\frac{GM^2}{R}$$

This expression is structurally identical to the energy of an electric field:

$$E_e = \frac{1}{2}\frac{Q^2}{4\pi\varepsilon_0 R}$$

where ( G ) replaces ( (4_0)^{-1} ), and charge ( Q ) is replaced by mass ( M ).
Thus, **gravity is a potential field of the same type**, differing only in its coupling strength, which is weaker by a factor of about ( 10^{36} ).

*Note:* The field analogy here refers to the **flux through a closed surface**, consistent with Gauss's law for both electromagnetism and gravity. It does **not** refer to a line integral around a closed path (associated with curl). This distinction ensures the correct interpretation of field preservation as a volumetric, not rotational, property.

### Field Preservation Applied to Gravity

If the gravitational field also preserves its **total intensity** — meaning that the total energy density remains constant during motion — then it must follow the same relativistic relations derived for the electric field.

Since the rest energy of mass is given by , when the mass moves, the total field energy increases by the Lorentz factor , while the equivalent spatial volume of the field contracts by the same factor.

This yields directly:

$$R = R_0\sqrt{1-\frac{v^2}{c^2}}$$

Hence, **the gravitational field contracts under motion by the same Lorentz factor**.
This shows that Lorentz contraction is not exclusive to electromagnetism — it is a universal property of all conserved fields.

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## Gravity as a Macroscopic Field-Preservation Effect

In macroscopic systems (stars, galaxies, or the universe), field preservation manifests not through a change in a single radius, but through the large-scale distribution of matter and energy.
For example, the total field energy of the Earth balances its internal and external components, just as the electric field of a proton balances internal pressure with external field tension.

This suggests that gravity is **not an independent force**, but a macroscopic expression of the same principle of field preservation, where the energy of mass attempts to maintain a constant field density across space.
The spacetime curvature of general relativity becomes a geometric description of this physical effect.

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## Summary

- Both the electric and gravitational fields share the same energy structure:

$$E = k\frac{q^2}{R}$$

  where ( k ) is the respective coupling constant.

- Both fields contract under motion following the Lorentz relation.

- Both express the **preservation of total field intensity**, with gravity representing the weak, large-scale limit of the same law governing electromagnetism.

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Conclusion

Gravity and electromagnetism are two scales of the same fundamental principle — the preservation of total field energy across motion and scale.

## 4. Conclusions

This section connects the theoretical framework to empirical physics and the historical foundation of relativity. The calculated radius ($R_0 = 7.666 \times 10^{-19}$m) reproduces the proton's rest energy of 938.272 MeV with remarkable precision, providing direct numerical confirmation that field confinement alone can account for the observed mass-energy equivalence. Historically, Einstein's 1905 formulation of special relativity introduced this relationship as a postulate derived from spacetime symmetry, while Maxwell's equations had already encoded the underlying field dynamics that implicitly conserve energy and momentum at the speed (c). This work demonstrates that the same physical law — field preservation — suffices to derive all relativistic results without invoking geometric deformation.

The conserved electric field reproduces all known relativistic relationships. Every core prediction of special relativity — energy equivalence, momentum, Lorentz contraction, invariant speed, and mass increase — follows from one physical law: the preservation of total field intensity.

**Relativity emerges from field preservation, not from spacetime deformation.**

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## Chapter 11 — Schrödinger Equation — Limits, Errors, and a Field-Based Correction

### Introduction

Quantum mechanics rests on the foundation of a single equation: the Schrödinger equation. Entire frameworks and interpretations have been built upon it. However, its validity is limited to specific regimes. The need to extend beyond it gave birth to the Dirac equation, which introduced the concept of antimatter.

In this document, I demonstrate where the Schrödinger equation falls short, why it still yields correct results in certain cases, and how a field-based reformulation resolves all of its known limitations.

This is further evidence that matter is nothing but a configuration of electric fields.

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## Original Equation

Below is the standard derivation of the original non-relativistic Schrödinger equation, as formulated using the classical energy–momentum relation for a particle with mass.

- ### Starting Point: Relativistic Energy–Momentum Relation

$$E^2 = p^2c^2 + m^2c^4$$

- ### Low-Velocity Approximation

For low velocities relative to the speed of light:

$$E \approx mc^2 + \frac{p^2}{2m}$$

The constant term

$$mc^2$$

does not affect particle dynamics and is removed.

- ### Operator Substitution

Using the standard quantum substitutions:

$$E \to i\hbar\frac{\partial}{\partial t}, \quad p \to -i\hbar\nabla$$

- ### Resulting Equation

Substituting these operators yields the standard Schrödinger equation:

$$i\hbar\frac{\partial\psi}{\partial t} = \left(-\frac{\hbar^2}{2m}\nabla^2 + V(r)\right)\psi$$

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## Correct Equation

What would happen if Schrödinger had applied the same method, but used a field instead of mass?

- ### Full Field-Energy Equation

$$E^2 = p^2c^2 + E_{\text{field}}(r)^2$$

- ### Substituting Field Energy

Instead of:

$$E^2 = p^2c^2 + m^2c^4$$

He would have written:

$$E^2 = p^2c^2 + E_{\text{field}}(r)^2$$

That is, field energy as a function of position, not a constant.

- ### Modified Relativistic Equation

$$E^2 = p^2c^2 + E_{\text{field}}(r)^2$$

- ### Applying Quantum Operators

$$\left(i\hbar\frac{\partial}{\partial t}\right)^2 \psi = (-\hbar^2c^2\nabla^2 + E_{\text{field}}(r)^2)\psi$$

- ### Physical Meaning
  - No point-like particle: the structure is a converging field.
  - The internal field energy determines the spatial distribution — not a constant mass.
  - No probability is needed: the field itself *is* the physics.
  - $\psi$
  - becomes a representation of field intensity, not of a particle's likelihood.
  - No 'wavefunction collapse' — changes in configuration reflect physical field changes.
  - Time evolution is governed by field pressure (permeability, conservation, magnetic tension).

- ### Conclusion

If Schrödinger had replaced mass with field energy in his derivation, he would have arrived at a field-based physics very close to the one developed in this model — without probabilities, jumps, or point particles.

## Why Certain Calculations Still Produced Correct Results

Even though Schrödinger used a mass-based formulation rather than a field-based one, many of the resulting calculations turned out to be correct. This is not because the formulation was fundamentally accurate in its physical assumptions, but because the mathematical structure still captured essential features of wave-like behavior.

- ### Local Approximation

When applied to slowly moving particles under potential energy fields, the equation behaves similarly to the behavior of a bound field. The approximation:

$$E \approx V + \frac{p^2}{2m}$$

acts as a local effective energy equation, and the solutions describe standing wave modes which correspond to stable distributions — a valid approximation of field configurations in equilibrium.

- ### Energetic Consistency

Though the underlying mass-based term:

$$\frac{\hbar^2}{2m}\nabla^2$$

does not reflect a real field source, it introduces a natural energetic scale. The curvature of the wavefunction still translates to localized energy concentrations, which correspond loosely to where a real field would concentrate.

- ### Field Projection Onto a Mass Term

In practical problems, the solutions to Schrödinger's equation mimic how a converging field would behave within a confined domain. Thus, while the equation lacks physical fidelity in origin, it acts as a projection of field dynamics onto a simplified scalar (mass) form.

- ### Emergent Validity

Most quantum systems studied with Schrödinger's equation operate in regimes where the deviation between field behavior and particle-based modeling is minimal — hence the agreement with experiment in many cases. But this agreement breaks down in cases involving: - Field collapse - High-field-pressure systems - Dynamic field transitions

These are exactly the domains that the field-based correction restores.

- Conclusion

The correctness of Schrödinger's results in many applications stems not from its particle interpretation, but from the fact that it accidentally mirrors stable field configurations under constrained conditions. Once the field is acknowledged as fundamental, these results gain new clarity — and new boundaries.

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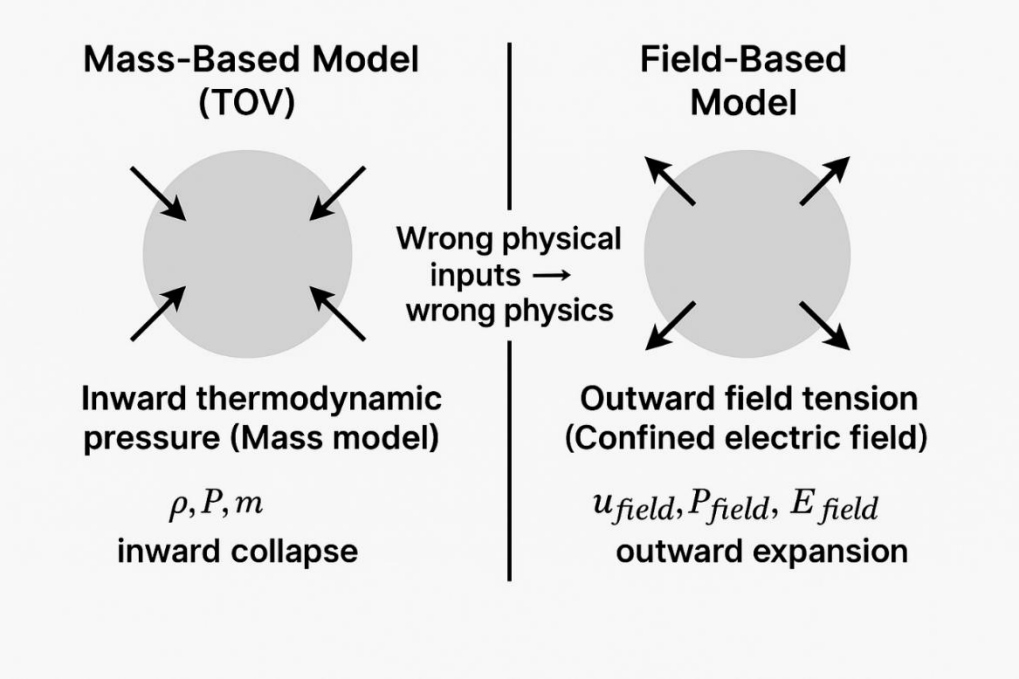
## Chapter 12 — The Error in the TOV Equation: Full Technical Breakdown

This document details the exact location of the fundamental error in the TOV (Tolman–Oppenheimer–Volkoff) equation, the consequences that arise directly from it, and the broader scientific conclusions that became incorrect as a result. The purpose here is to produce a complete internal analysis, from which a short, sharp LinkedIn post can later be derived.




## Introduction

The TOV equation was constructed in 1939 by Tolman, Oppenheimer, and Volkoff to describe the equilibrium of extremely dense astrophysical objects. The equation itself is mathematically valid. The error lies in **what was inserted into the equation**—specifically, the assumption that *matter is mass*.

This seemingly small assumption propagated through the entire framework of relativistic astrophysics and produced a cascade of incorrect conclusions about dense objects, neutron stars, collapse mechanisms, and the structure of matter itself.

---

## Where the Error Occurred

The TOV equation relies on the energy–momentum tensor of a perfect fluid. The tensor includes: - **ρ**: density of mass - **P**: pressure of mass - **m(r)**: accumulated mass inside radius *r*

These quantities describe **massive thermodynamic matter**.

---

## The critical mistake:

Instead of inserting the physical structure of matter—**a confined electric field**—the developers inserted **mass** as the fundamental entity.

In other words: - Matter was treated as *mass*, not *field*. - Pressure was treated as *thermodynamic compression*, not *field tension*. - Stability was computed for *dense material*, not for a *confined electric field configuration*.

From this single substitution error, the entire structure of TOV-derived predictions became disconnected from actual physical behavior.

- The Standard TOV Equation (Mass-Based Form)

In its standard relativistic form, the TOV equation is written using explicitly mass-based quantities:

$$\frac{dP}{dr} = -\frac{(\rho + P/c^2)(m(r) + 4\pi r^3 P/c^2)}{r(r - 2Gm(r)/c^2)}$$

with: -

$$\rho(r)$$

— **mass density** -

$$P(r)$$

— **thermodynamic mass pressure** -

$$m(r)$$

— **enclosed mass** up to radius

$$r$$

Every one of these inputs describes **dense mass**, not **field structure**.

---

## Note on Field Pressure Direction

In a confined electric field, the effective pressure is **outward**, arising from the field's tendency to expand and maintain its structure. This is fundamentally different from the inward-directed thermodynamic pressure assumed for mass in the TOV formulation.

---

- ## Field-Based Replacement of the Inputs

If matter is actually **a confined electric field**, all physical inputs must change:

$$\rho(r) \to u_{\text{field}}(r)/c^2$$
$$P(r) \to P_{\text{field}}(r)$$
$$m(r) \to m_{\text{field}}(r) = E_{\text{field}}(r)/c^2$$

A symbolic field-based analogue takes the same algebraic shape:

$$\frac{dP_{\text{field}}}{dr} = -\frac{(u_{\text{field}}/c^2 + P_{\text{field}}/c^2)(E_{\text{field}}(r)/c^2 + 4\pi r^3 P_{\text{field}}/c^2)}{r(r - 2GE_{\text{field}}(r)/c^4)}$$

The symbols look similar, but **the physical content is entirely different**.

---

- ## Direct Consequences of the Error

Once mass was inserted instead of field, the TOV model generated several inaccurate physical predictions.

---

- ## "Enormous pressure is required to prevent collapse"

Because mass inherently collapses under gravity, the model predicted that extreme pressure was needed to balance gravitational attraction. This is not true for confined electric fields, whose internal structure governs stability.

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- ## Neutron stars modeled as "dense matter" instead of field clusters

The TOV framework envisioned neutron stars as dense, solid objects made of tightly-packed neutrons. In a field-based description, they are **confined field aggregates**, not solid material.

---

- Collapse into black holes predicted incorrectly

The TOV equation suggested that beyond a certain mass, matter must collapse into a singularity. A confined electric field does not behave this way and cannot form a singularity under the same conditions.

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- Incorrect mass limit (the Oppenheimer–Volkoff limit)

The well-known "2–3 solar mass limit" emerges from modeling matter as mass-dominated. Using field-based physics, this limit does not apply.

---

## Broader Scientific Misconceptions Resulting From the Error

The initial substitution error did not only distort models of neutron stars—it affected entire branches of astrophysics and particle physics.

- The belief that "matter is mass"

This single idea reinforced an incorrect physical foundation. In reality, matter is a **field configuration**, and mass is a *derived property*.

- Misinterpreting the neutron

The neutron was assumed to be a massive particle rather than a confined field state with internal electric structure.

- Misinterpreting collapse mechanisms

TOV predicts collapse due to insufficient pressure; field systems collapse due to internal field instability (e.g., magnetic pressure exceeding threshold).

- The creation of black hole theory based on mass collapse

A direct continuation of the same error: assuming matter is mass leads inevitably to the concept of singularity collapse.

- Incorrect assumptions about dense matter

Entire subfields (dense matter physics, nuclear equations of state) developed under the false assumption that neutron stars are physical masses rather than field structures.

---

## Summary

The TOV equation itself is mathematically correct. The mistake lies in **what was put into it**: - Matter was modeled as *mass*. - Pressure was modeled as *mass pressure*. - Stability was modeled as *balance of material forces*.

In reality, matter is composed of **electric fields**. Their structure, stability, and collapse behavior differ fundamentally from those of mass. The entire relativistic model of dense astrophysical objects is therefore based on a foundational misrepresentation.

A short social-media version of this analysis will be derived from this document.

---

## Mass-Based vs. Field-Based Model Comparison

| Concept | Mass-Based (TOV) | Field-Based Model |
|---|---|---|
| Nature of matter | Mass | Confined electric field |
| Source of pressure | Thermodynamic compression (inward) | Field tension (outward) |
| Neutron model | Dense massive particle | Closed field configuration |
| Collapse mechanism | Lack of sufficient pressure | Magnetic/field instability |
| Stability threshold | 2–3 solar masses (OV limit) | No fixed limit — governed by field |
| Interpretation of black hole | Mass singularity | Does not form under same conditions |

A short social-media version of this analysis will be derived from this document.

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# Part IV — Redefining the Fundamental Particles

Before redefining any particle, it is important to note a fundamental departure from conventional physics. In a field-based framework, there is a pair of elementary particles, one with a positive electric charge and the other with 0. There is no particle with a negative charge. An electric field is created around each particle. The field around the particle reflects its energy. The source of the energy of the positive field is obvious, it is the electric charge. The source of the energy of the negative field is this leakage from the positive field to a point with a potential of 0. The negative field has no source of its own. It is an attractive field for which the charge calculated is a negative charge.

---

## Chapter 13 — Energy and Radius Comparison Between a Neutron and a Hydrogen Atom

If the hypothesis is correct — that we are dealing with the same electric field in two different states — then conservation of energy must hold in accordance with Lorentz's formula: a reduction in energy, relative to the initial energy, must be reflected in an increase in radius.

After an accurate calculation of the energy difference between a neutron and a hydrogen atom:

- **Neutron energy:**

$$E_n = 939.565 \text{ MeV}$$

- **Hydrogen atom energy:**

$$E_H = 938.272 + 0.511 = 938.783 \text{ MeV}$$

- **Energy difference:**

$$\Delta E = E_n - E_H = 0.782 \text{ MeV}$$

Let us verify whether this change also corresponds to the change in radius according to Lorentz contraction:

- **Lorentz factor:**

$$\gamma = \frac{E_n}{E_H} = 1.00083$$

If the basic field radius of the proton is:

$$R_p = 8.472 \times 10^{-24} \text{ m}$$

Then the radius of the neutron, according to contraction:

$$R_n = \frac{R_p}{\gamma} = 8.4649 \times 10^{-24}\ \text{m}$$

- **Radius difference:**

$$\Delta R = R_p - R_n = 7.05 \times 10^{-27}\ \text{m}$$

**Conclusion:** An energy difference of 0.782 MeV precisely matches the change in radius according to the Lorentz ratio. This supports the assumption: the theory that the positive field in the nucleus contracts in accordance with the energy accumulated within it.

---

## Chapter 14 — The Positive Field – Source of Energy

The positive field arises from a particle that produces an electric field around it. This field is inherently positive and spreads outward from the source. It constitutes the source of energy in the universe.

The energy of the positive field arises from the charge Qp which is calculated later.

The energy it produces depends on the configuration of the field and will therefore be calculated later for neutrons and protons.

---

## Chapter 15 — The Electron – Zero Potential Field

The electron is a tiny electric field carrying the "zero" point. This is the point to which the field lines drain; this is the point to which charges (all positive, of course) naturally gravitate. The field that appears around the zero point is not created by the zero itself, but is a shared field created through its interaction with the positive source. It represents the return flux - the directional field structure created by their mutual presence.

The electron can exist in two distinct states. In its internal configuration, it is located at the center of the atom—its zero point aligns with the atomic center, and the surrounding positive field rotates around it. In its external configuration, it sits at the outer shell, and its zero point defines the boundary of the atomic field. In both cases, the electron represents a negative field attracted inward, but its spatial role—center or periphery—depends on its position within the atomic structure.

Known energy: 0.511 MeV

Particle radius: Unmeasurable

---

## Chapter 16 — The Neutron and the Proton as Manifestations of the Particle Pair

Both the neutron and the proton are different manifestations of the particle pair. In both, the positive particle is in rotational motion around the center of the field.
The **neutron** is the **closed** manifestation of the field. The closed manifestation is created when the center of the negative field is located at the center, and the positive field rotates around it.
The **proton** is the **open** manifestation of the field. The open manifestation is created when the negative field is located outside the positive field, enveloping it.

The neutron energy is known to be:

- $E = 939.6\ \text{MeV}$
- Confined in a volume corresponding to:

$$R = 0.84\ \text{fm}$$

---

### • Energy Equation in a Closed Field

We use the standard energy equation for a closed electric field:

$$E = \frac{Q_p^2}{8\pi\varepsilon_0 R_0}$$

Where:

- $Q_p$is the charge of the positive particle
- $R_0$is the radius of the field
- $\varepsilon_0$is the vacuum permittivity

---

### • Substitution to Compute $Q_p$

We substitute:

- $R_0 = 5.29 \times 10^{-11}$ m(Bohr radius)
- $E = 939.6\ \text{MeV} = 1.505 \times 10^{-10}$ J

And solve for:

$$Q_p = \sqrt{8\pi\varepsilon_0 R_0 E}$$

Computed value:

- $\boldsymbol{Q_p = 1.33 \times 10^{-15}\ \mathrm{C}}$

---

## • Field Radius for the Computed Charge

Now we take:

- $Q_p = 1.33 \times 10^{-15}\ \mathrm{C}$
- $E = 939.6\ \mathrm{MeV}$

And compute the effective radius of the point field:

$$R = \frac{Q_p^2}{8\pi\varepsilon_0 E}$$

Result:

- $\boldsymbol{R = 2.65 \times 10^{-11}\ \mathrm{m}}$
  Which is approximately **half the Bohr radius**

The proton is the open manifestation of the field. The open manifestation is created when the negative field is located outside the positive field, enveloping it. In this configuration, the negative field sits on the outer boundary—the same radius as the field it encloses. Its center is in motion, orbiting around the positive core.

---

- ## Observed Hydrogen Atom Image — Matching the Computed Field Structure

A research team from Japan has published what they describe as *the first direct image of a single hydrogen atom*. This image is not a classical optical photograph but a reconstructed field-density map obtained through advanced microscopic imaging techniques.

**Image:**

The structure visible in the published image aligns with the field configuration derived in this article.

Specifically, the image clearly shows:

4. **A strong, bright inner region** beginning at roughly **half of the total radius**, matching the computed transition radius between the dense inner field and the weaker outer field.
5. **An inner contour shaped by motion**, consistent with the rotational behavior predicted for the positive field in a hydrogen atom.
6. **A surrounding diffuse halo**, resembling the weak outer portion of the field where the density is lower.

While the imaging method visualizes field-distribution rather than literal boundaries, the resemblance to the theoretical structure is notable. The internal bright region corresponds to the high-energy zone of the positive field, and its rotationally-shaped pattern reflects the dynamic

behavior of the field configuration.

---

## Chapter 17 — Summary and Conclusions

This article redefines the nature of fundamental particles through the lens of field configurations rather than mass points or quantum probabilities. The main findings and concepts introduced can be summarized as follows:

- ### Core Principles

    - **Electric Fields as the Basis of Matter:** Every particle is interpreted as a configuration of electric fields. There are only two true components: the **positive field**, which originates from a central charge, and the **zero-point field**, which represents an attractor with no independent source.

**No Negative Charge Exists:** What is typically called a negative particle is reinterpreted as a **directional return flux** — a field that arises from the presence of a central positive source and drains inward toward a zero-potential point.

---

- ### Particle Reinterpretations

    - **Electron:** Defined as a "zero field," representing the endpoint of field lines. It may exist at the core of an atom or on its boundary, depending on the configuration.
    - **Neutron:** Interpreted as a closed field structure, in which a central zero-point is enclosed by a rotating positive field. This leads to a confined configuration.

**Proton:** Interpreted as an open field structure, where the positive field is at the center, and the zero-point orbits it from the outer boundary.

---

- ### Quantitative Validation

    - A detailed **comparison of neutron and hydrogen** energies (939.6 MeV vs. 938.8 MeV) shows that the **energy gap of 0.782 MeV** corresponds exactly to the change in field radius predicted by Lorentz contraction. This reinforces the hypothesis that field radius grows as internal energy decreases — preserving field density.

Using the **energy equation of a closed electric field** and inserting the known neutron energy and Bohr radius, the **calculated charge** value matches the expected field energy. The derived radius is: [ R = = 2.65 ^{-11} ] which is approximately **half the Bohr radius**.

---

- ## Key Values Derived

| Particle | Energy (MeV) | Radius |
|---|---|---|
| Electron | 0.511 | Unmeasurable |
| Proton | 938.272 | ≈ 0.84 fm |
| Neutron | 939.565 | ≈ 0.60–0.70 fm |
| Hydrogen | 938.783 | ≈ 1.0 fm |

---

- ## Calculated Constants:
  - $Q\_p = 1.33 \times 10\text{^}\{-15\}$
  - $R\_0 = 2.65 \times 10\text{^}\{-11\}\, m \approx 0.5\, a\_0$
    This value represents the radius of circular motion — not the particle radius itself.

---

# Part V — About Stability and Decay

As mentioned earlier, stability is the fundamental cornerstone of the universe. This is what matter - electric fields - always seeks: a stable configuration. When an electric field loses stability, it does not disappear or decay; an electric field simply changes its shape. There is no new physical mechanism here. The same process is already known and fully described by Maxwell's equations. What happens on a large scale also happens on an atomic scale - only within a limited area.

According to my theory, which is completely consistent with existing calculations, the decomposition process is part of a natural process of an electric field.

As I mentioned in the previous article, the electric field has two regulation mechanisms, one through a change in permeability and the other through a change in radius. Decay is the case when the change in energy cannot be regulated through permeability, the electric field changes radius, changes configuration from a closed field to a limited open field.

---

## Chapter 18 — Introduction

The electric field of a particle can be imagined as a spherical sprinkler, like a small orb ejecting streams of energy in all directions. In the absence of any opposing forces, such as gravity or external fields, these streams continue to expand outward indefinitely. The field thus fills the surrounding space, extending further and further without bound. This image helps illustrate the idea of a field not as a static zone, but as a dynamic, expansive structure that originates from the particle itself.

If we add to each droplet of water a property that causes it to be attracted toward a central drain, the water jets will begin to curve, each following a path that ultimately leads it to the drain. In this way, the originally expanding pattern becomes organized — forming clear, directed paths. This is how the lines of an electric field appear: not chaotic, but guided by the interaction between the field and surrounding potentials.

An increase in pressure — or in energy — causes the droplets to travel farther, expanding the range of the field. Conversely, a decrease in pressure will shorten the distance the droplets can reach. The trajectory of these droplets, or field lines, is therefore affected by both the amount of pressure and the position of the central drain.

If the drain is located very close to the sprinkler, the droplets will follow a circular path and return to the drain. This creates a closed field — similar to the structure of a neutron. On the other hand, if the drain surrounds the sprinkler from a distance, the droplets will eventually converge toward it, forming an open field structure.

- Atomic Space

Atomic space is defined as the envelope formed by electric field lines. Returning to the sprinkler analogy, this is the region in which the droplets are dispersed — a three-dimensional field zone. In atoms composed of multiple nucleons, this space is the result of overlapping fields, not simply the presence of discrete particles.

Each nucleon generates its own field, and when multiple nucleons are nearby, their fields interact and merge, forming a shared spatial domain. Even though the source particles remain point-like, the electric fields they emit occupy and structure the entire atomic space. This is analogous to placing multiple sprinklers close together: each contributes to the shared water pattern, expanding and shaping the total spread.

As more nucleons contribute to the field, density increases. Collisions between field lines (or droplets, in the analogy) become more frequent, and energy is lost due to interference. To counteract this, the atomic space expands — reducing density and minimizing internal collisions. The physical manifestation of this expansion is a shift in the zero point — the central drain — moving farther away. As a result, the field lines curve along longer trajectories through a less congested space.

---

## • Atomic Radius

Each field has its own energy equation. All nucleons have a common base radius, denoted $R_0$, which is exactly half the Bohr radius. This value is constant and does not change, whether the field belongs to a single neutron, to an open field like that of hydrogen, or to a complex atomic structure.

The radius of the full field R—the extent to which the field spreads out—is equal to twice $R_0$, or the full Bohr radius, in its standard state. This R can expand to accommodate additional energy, or contract when energy is released. However, $R_0$ remains constant in all cases.

In protons, as energy increases, the radius R increases to maintain balance. This flexibility allows energy to be absorbed through spatial expansion. Neutrons, on the other hand, lack this adaptability: their radius R cannot change. And what if the energy in the neutron is too high? Then it must change configuration.

---

## • Permittivity

The energy coefficient refers to the ability of space - or matter - to allow the passage of an electric field. It controls the extent to which a field can penetrate and propagate through a medium. A higher energy coefficient reduces the strength and spread of the electric field; a lower energy coefficient allows the field to spread more strongly and reach further.

This coefficient has a lower threshold, it is the permittivity coefficient in a vacuum. It has no upper threshold. I will elaborate later on how the thresholds are determined.

---

## • Atomic Pressure

Atomic pressure is an internal factor that exists within an atom. It reflects the enormous energy density within a confined space. The pressure within an atomic structure can reach levels far exceeding those found in conventional materials or environments. The standard pressure equation for an electric field is:

$$P = \frac{\varepsilon_0 E^2}{2}$$

where ( $E$ ) is the electric field intensity and ($\varepsilon_0$ ) is the vacuum permittivity constant.

---

## • Atomic Frequency

We begin with the assumption that the universal radius $R_0$

is a fundamental constant shared by all nucleons. This means that the positive charge — which creates the confined electric field — always moves along this same fixed radius. Since a stable circular motion at a fixed radius requires a specific constant velocity, the motion of the positive field occurs at a fixed speed. Consequently, the frequency of rotation is also fixed:

$$f = \frac{v}{2\pi R_0}$$

This defines a universal, intrinsic frequency for any confined positive field.

To determine the actual value of this frequency, we use a known experimental measurement: the **Larmor frequency of the neutron**, which is:

$$\boldsymbol{f_n = 29.1646943\ \text{MHz}}$$

This frequency is measured as the magnetic resonance of the neutron, but since the magnetic field is produced by the rotating electric field, and both fields must remain in harmonic synchronization, we identify this as the **true frequency of the internal electric field**. This gives us the base frequency $f_n$

that can be used for further calculations — for example, in resonance interactions or frequency multiplications involving atomic structures.

---

## Chapter 19 — Energy Management in the Nucleus

As discussed earlier, an atom has two main mechanisms for managing energy:

1. **Energy Modulation** – a continuous response mechanism that allows an atom to gradually absorb and release energy.
2. **Discrete Radius Shift** – a threshold-based mechanism that is triggered when the field crosses a certain threshold, leading to a sudden change in the atomic structure.

In the proton, both mechanisms are naturally available. It can change its radius, which allows transitions between discrete energy levels. This flexibility allows it to manage accumulated energy both continuously (via energy modulation) and discretely (via radius).

In contrast, the neutron cannot change its radius. As a result, it relies solely on changes in energy modulation to absorb or release energy. This fundamental difference means that over time, energy accumulates within protons that have the ability to store it through changes in radius.

When a polynuclear atom experiences energy input: - All nucleons absorb energy uniformly through changes in energy coefficient. - The permittivity range for protons is defined around a field value of about 0.5, while for neutrons it extends to about 0.78. - As energy accumulates, protons first reach the limit of their permittivity range.

At this point: - The protons increase their radius, which – according to the field equation – reduces the permittivity back to a higher initial value. - The neutrons, still confined to the same radius, remain at a lower permittivity.

Then, a natural exchange occurs: - The neutrons begin to release energy by increasing their permittivity. - Nearby protons absorb some of this released energy. - The system gradually equilibrates as the values of the permittivity coefficient over all nuclei converge again.

When energy release is required: - The proton radius is reduced, and the permeabilities within it equilibrate. - In neutrons, the permeabilities remain high at first, and again a process of permeabilities equilibration occurs. - Here it is important to emphasize that protons need to release energy in order to equalize permeabilities, increasing the permeabilities, while neutrons absorb energy and reduce the permeabilities.

A point to ponder: what happens if, due to the energy release, the proton needs to drop another level?

---

## Chapter 20 — Frequency and Magnetic Field

Decay is understood here as a physical transformation in the field configuration: a transition from a **confined** electric field (stable neutron) to an **open** field structure (proton

and emitted energy). This transition is triggered when the confined field can no longer maintain its radius — typically due to permittivity reaching a physical limit.

From observation, it is known that a particle — the **anti-neutrino** — is released during the process. This indicates a well-defined physical event: the confined neutron collapses, transforms into a proton, and emits a quantized magnetic energy packet. The model assumes this released magnetic energy originates from the field itself as it undergoes reconfiguration.

The root cause of collapse is the demand for a radius expansion that the confined field can no longer resist. As energy accumulates internally, permittivity drops to its minimum possible value. At this threshold, the field has no further means of compression — and a structural change becomes inevitable.

In the following steps, we will: - Identify the **permittivity threshold** that initiates collapse - Calculate the **magnetic field strength** associated with the transformation - Show that the **frequency** required to generate this field is precisely the frequency that accumulates this energy over 880 seconds

These are the focus of the three steps that follow.

---

- ## Permittivity Threshold At the initial state

, the confined electric field is accompanied by an internal negative field — with energy of 0.782 MeV — which offsets the total energy. To preserve stability, the system must raise its permittivity accordingly to maintain the correct balance and prevent premature collapse.

The electric field equation:

$$E = \frac{Q^2}{8\pi\varepsilon R}$$

Let us compute the required permittivity under two conditions:

7. **Without** internal negative field (full energy):

$$E = \frac{(1.33 \times 10^{-15})^2}{8\pi\varepsilon R} = 14.1\,\text{MeV}$$

Solving for

$$\varepsilon$$

:

$$\varepsilon = \frac{(1.33 \times 10^{-15})^2}{8\pi R E}$$

Using

$$E = 14.1\,\text{MeV} = 2.26 \times 10^{-12}\,\text{J}$$

and

$$R = 5.29 \times 10^{-11}\,\text{m}$$

:

$$\varepsilon_{full} \approx 7.06 \times 10^{-11}\,\text{F/m}$$

8. **With** negative internal energy of 0.782 MeV:

$$E = 13.318\,\text{MeV} = 2.13 \times 10^{-12}\,\text{J}$$

$$\varepsilon_{reduced} \approx 7.49 \times 10^{-11}\,\text{F/m}$$

This shows that the required permittivity increases due to the negative field:

$$\Delta\varepsilon \approx 0.43 \times 10^{-11}\,\text{F/m}$$

**Relative increase:**

$$\frac{\Delta\varepsilon}{\varepsilon_{full}} = \frac{0.43}{7.06} \approx 6.1\%$$

Thus, the permittivity change required for stability is minimal — only about 6% above the base value — illustrating the high sensitivity and delicate balance of the confined field system.

As additional energy accumulates, permittivity is gradually reduced in response. However, this reduction has a lower limit: the minimal physical value of permittivity. Once this minimum is reached, the confined field can no longer adapt by compression, and the only path forward is a structural transformation. This manifests as the release of energy and the decay event observed.

---

## • Required Magnetic Field Energy

Here, we calculate the magnetic field required to generate an energy packet large enough to force permittivity back to its minimum threshold. This is the exact energy level needed to initiate the structural collapse of the confined field.

Given total magnetic energy:

$$E = 0.782\,\text{MeV} = 1.25 \times 10^{-13}\,\text{J}$$

Assuming a confined positive electric field with radius:

$$R = R_0 = a_0 \approx 5.29 \times 10^{-11}\ \text{m}$$

This value — the full Bohr radius — defines the intrinsic core boundary of a stable electric field in this model.

Volume of the confined region:

$$V = \frac{4}{3}\pi R^3 \approx 6.20 \times 10^{-31}\ \text{m}^3$$

Energy density:

$$u_B = \frac{E}{V} \approx 2.02 \times 10^{17}\ \text{J/m}^3$$

Magnetic field magnitude:

$$B = \sqrt{2\mu_0 u_B} \approx 7.12 \times 10^5\ \text{T}$$

This is the precise field strength that must be generated to bring the permittivity back down to its lower limit.

---

## • Neutron Field Dynamics — Full Derivation

### a. Assumption About the Frequency

The core assumption is: The neutron has a known Larmor frequency:

$f_n = 29.1646943\ \text{MHz}$

This value is taken as the **intrinsic rotation frequency of the neutron's internal electric field**.

---

### b. Number of Cycles in 880 Seconds

The neutron lifetime is:

880 s

Number of cycles:

$N = f_n \cdot 880$

$N = 2.91646943 \times 10^7 \cdot 880$

$N = 2.566492 \times 10^{10}$

---

### c. Required Magnetic Field for Collapse

The required magnetic field derived earlier:

$B_{\text{required}} = 7.12 \times 10^5$ T

This is the critical internal magnetic field at which the neutron becomes unstable.

---

### d. Interpretation of the Accumulation

The neutron does **not** begin with this magnetic field.

There is an internal base field, and on every cycle a **small additional magnetic contribution** is added.

Total accumulation after N cycles must reach:

$B_{\text{required}}$

Thus:

$B_{\text{required}} = N \cdot \Delta B$

Solving for the contribution per cycle:

$\Delta B = \frac{B_{\text{required}}}{N}$

$\Delta B = \frac{7.12 \times 10^5}{2.566492 \times 10^{10}}$

$\Delta B = 2.774 \times 10^{-5}$ T per cycle

---

### e. Physical Interpretation

The small magnetic increment per cycle, (B), corresponds to:

A **small decrease in permittivity** ( ) of the neutron's internal field.

Each cycle adds energy to the confined electric field.

To contain the added energy, the permittivity must decrease slightly.

Because the magnetic field depends on the electric field configuration and the permittivity, the magnetic field shifts by a small amount.

These shifts accumulate over the full 880 seconds until the magnetic field reaches the critical value.

Thus, the mechanism is:

- Electric field oscillates at constant frequency (f_n).
- Each oscillation adds a small energy increment.
- Permittivity decreases to accommodate the new energy.
- Magnetic field feels this as a small positive increment.
- After (2.566492 ^{10}) cycles the system reaches the collapse threshold.

This connects:

- The neutron's measured internal frequency.
- The collapse time of 880 seconds.
- The critical magnetic field.
- The idea that permittivity reduction drives magnetic field buildup.

No additional assumptions beyond these relations are introduced.

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## Chapter 21 — Confinement Without Repulsion

One of the core challenges in any field-based model of matter is the following paradox:

How can two positively charged protons exist in extremely close proximity without experiencing immense repulsion — on the order of hundreds of keV or more?

According to classical field equations, such proximity should require tremendous energy input. Yet in stable nuclei, protons sit at distances much smaller than the Bohr radius. The field-based interpretation must therefore offer a mechanism that naturally prevents repulsion — not by counteracting it, but by eliminating its cause.

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### • The Classical View — and Its Flaw

In isolated conditions, a proton generates a positive electric field whose zero point lies at the outer edge of the field. This creates a radial, outward-pushing field that naturally leads to electrostatic repulsion when two protons are brought near one another.

This is the classical picture: a particle-centric view where each proton emits its own open field, and any attempt to compress these fields into nuclear distances results in massive energy costs.

But this picture breaks down inside the nucleus.

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## • The Neutron-Centered Space

In nuclear space — a domain not of isolated particles but of overlapping fields — the situation is fundamentally different.

Each neutron defines a confined electric field, centered around a zero-point located deep within its structure. This “0” is not on the periphery, but at the center of the field geometry.

Now, when a proton is present within that space, something dramatic happens: The central 0-point of the neutron is spatially close to the proton’s charge. This proximity alters the geometry of the proton’s field.

Instead of forming a wide, open field with a distant zero — the proton’s field becomes confined around the same central point as the neutron’s.

This shift is not internal to the proton — it is imposed by the shared geometry of space.

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## • From Open Field to Confined Field

In this configuration, the proton’s field no longer emits outward as a radial repulsive force. It behaves instead like a confined field — just like the neutron.

And a confined field does not create outward repulsion. Its energy loops internally around the central point. Its structure becomes stable, non-expanding, and non-repelling.

Thus:

The repulsive force disappears

Not because of a counter-force

But because the field has fundamentally changed form

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## • The True Resolution

This is the key insight:

Protons in the nucleus do not generate open fields. They reside inside a nuclear space already shaped by confined fields — the neutrons. The presence of central zero-points redefines the entire spatial structure, forcing even positive charges to emit confined, non-repelling fields.

There is no need to invoke unknown forces or particle exchanges. The apparent paradox of "bringing protons together" dissolves when one abandons the particle model and adopts the field geometry fully.

Repulsion does not need to be overcome — because in the presence of central 0-points, repulsion never arises.

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## Chapter 22 — Formation of an Elemental Atom

This section describes, step by step, the physical process by which an elemental atom emerges through the decay and stabilization of a neutron cluster. The atom is not assembled from components and is not the result of particle aggregation. Instead, it forms naturally as a consequence of field reconfiguration driven by balance conditions that arise within the cluster space itself.

The process described here is purely physical. No new interaction mechanisms are introduced, and no assumptions beyond field behavior, force balance, and spatial constraints are required. This section does not address the question of stability or the conditions under which a proton decays; such decay is taken as a given starting condition for the process described here.

At the moment a proton is formed, the center of its electric field is, by default, located at the center of the space as it existed prior to the decay. From this initial position, the proton does not choose its location arbitrarily; it moves in response to the physical forces acting upon it within the space. Its subsequent displacement and final position are therefore determined entirely by the balance of forces present at each stage of the process.

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- ### Initial State – Neutron Cluster

The starting point is a neutron cluster that detaches from a larger parent cluster. This detached cluster may contain hundreds of neutrons. Once separated, a distinct spatial domain is formed. This domain represents the total energy stored within the cluster and defines the space in which all subsequent processes occur.

Within this shared space, the electric fields of the neutrons coexist. Their charge distribution and their zero-points are all located at the center of the space. At this stage, the structure is symmetric, confined, and stable, with no protons present.

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- ### Stage 1 – Onset of Neutron Decay and First Proton

Neutron decay begins within the cluster. The first proton that forms places the center of its electric field at the center of the shared space. When referring to the proton's position, it is specifically the center of its electric field that is meant.

The electric field of this proton expands throughout the entire domain, filling the available space and forming a positive envelope. This envelope defines the initial field structure of the emerging atomic space.

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- ## Stage 2 – Second Proton and Axial Stabilization

A second proton forms as decay continues. Initially, the center of its electric field is located near the spatial center. Mutual electrostatic repulsion between the two protons causes them to move apart.

As they separate, both protons remain bound to the shared central zero-point of the space. The result is a symmetric configuration in which the two protons settle on opposite sides of the center. An equilibrium is reached between the repulsive force each proton experiences from the other and the attractive influence of the shared central zero.

This configuration corresponds to the helium atom: a space containing two protons arranged symmetrically along an axis, with no rings present.

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- ## Stage 3 – Formation of the First Ring Proton

As decay continues, a third proton is created. Initially, the center of its electric field lies close to the center of the space. Because the two axial protons are symmetrically positioned, the third proton experiences equal repulsive forces from both sides, maintaining symmetry with respect to the axis.

At the same time, the proton experiences repulsion from the center of space and from the positive envelope formed earlier. These combined effects cause it to move outward from the center.

The proton continues to move until it reaches a position where all acting forces are balanced: repulsion from the axial protons, repulsion from the center, and repulsion from the envelope. At this equilibrium radius, the proton cannot remain static. Instead, it enters circular motion around the axis.

This marks the initiation of the first proton ring.

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- ## Stage 4 – Completion of the First Ring Pair

A fourth proton forms and undergoes the same process as the first ring proton. Its electric field center initially lies near the spatial center, and it is repelled by the axial protons, the center, the envelope, and the existing ring proton.

The position of force balance is located opposite the first ring proton, on the other side of the spatial center. The two protons settle in diametrically opposed positions and enter circular motion around the axis.

At this point, a symmetric two-proton ring has formed around the central axis.

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- ## Stage 5 – Ring Filling and Saturation

Neutron decay continues, producing additional protons. Each newly formed proton follows the same physical process: initial proximity to the center, outward motion driven by repulsion, and eventual settlement at a position of total force balance.

Each proton that reaches this equilibrium radius enters circular motion and joins the existing ring. As more protons are added, the ring fills progressively.

When the ring reaches eight protons, it attains an energetically optimal configuration. At this point, no additional protons can be accommodated within the same ring. Any further addition would disrupt the established balance of forces.

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- ## Stage 6 – Emergence of a Second Ring

When a new proton forms after the first ring is complete, it cannot join the saturated ring. Instead, it positions itself adjacent to the existing ring structure.

Mutual repulsion between the new proton and the filled ring causes a rearrangement. The ring and the new proton shift relative to the center, settling on opposite sides of the spatial center.

This rearrangement results in the formation of a second ring around the same axis, distinct from the first.

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- ## Stage 7 – Noble Gas Configuration

As decay proceeds, the second ring is completed. The two rings arrange themselves along the axis at equal distances from the spatial center.

At these positions, equilibrium is achieved through a balance of forces: repulsion from the center, mutual repulsion between the rings, and repulsion from the positive envelope. This configuration is highly stable and corresponds to a noble gas state.

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- ## Stage 8 – Central Ring Formation (Iron)

Further decay leads to the formation of an additional ring.

Once this third ring is completed, the system reaches a stable configuration corresponding to iron.

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- ## Stage 9 – Failure of Central Ring Formation

Beyond this point, a new behavior appears. A newly formed proton is unable to establish a new ring at the center.

Repulsion from the existing rings drives the proton outward. It settles in a region between the central ring and the positive envelope, instead of forming a new ring.

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- ## Stage 10 – Ring Repulsion and Space Formation

An additional proton joins the proton located in the outer region, forming an outer ring. This configuration generates a field at the center that repels the existing rings.

As a result, the rings shift outward from the center. This movement creates a new internal spatial region where further ring formation becomes possible.

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- ## Stage 11 – Ruthenium Configuration

The process of ring formation continues according to the same principles until the element ruthenium is reached.

At this stage, a phenomenon previously observed reappears. The next two protons do not initiate a new ring. Instead, they join the outer ring, bringing the total number of protons in that ring to four.

This redistribution once again creates internal space, enabling the formation of additional rings.

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- ## Stage 12 – Continuation Across the Periodic Table

From this point onward, the same physical process continues. Rings form, redistribute, and stabilize according to spatial constraints and force balance.

This progression proceeds until the maximum spatial capacity of the system is reached. Through this single continuous mechanism, the full domain of elements across the periodic table is generated.

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## Chapter 23 — Neutron stability

At the present stage of this work, a definitive physical cause for neutron instability and decay **inside an atom** has not yet been identified.

The decay mechanism previously discussed, based on the gradual buildup of an internal magnetic field through harmonic accumulation, does **not** appear to fully account for neutron decay in atomic environments. According to the examinations carried out so far, and acknowledging that these results may still be incomplete, only a **very small external electric disturbance** seems sufficient to disrupt the harmonic balance from which magnetic-field growth and decay would otherwise emerge.

This observation suggests that neutron stability inside an atom may be governed by additional constraints that are not captured by the magnetic-accumulation mechanism alone.

At this stage, two possible physical explanations remain open.

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- ### Permittivity-Based Instability

One possibility is that neutron stability depends on the **permittivity balance within atomic space**. In this view, stability is influenced by the ratio between protons and neutrons, as well as by the spatial distribution of protons relative to the neutron-centered core of the atom.

Neutrons are concentrated near the center of atomic space, while protons occupy positions distributed around them. If the absorption of energy by protons is not sufficiently rapid, the permittivity of the neutron fields may decrease.

If this reduction exceeds the allowed physical range, neutron decay becomes unavoidable. The process is halted once energy transfer within the atom restores a stable permittivity distribution, allowing the system to re-equilibrate.

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- ### Influence of the Internal Negative Field

A second possibility involves the **negative field component within the neutron**. As the number of protons increases, a growing fraction of electric field lines are drawn inward toward the neutron-centered zero-point.

This inward-directed field contribution modifies the internal negative field of the neutron, strengthening it and expanding the permissible permittivity range. Beyond a certain threshold, this expansion allows the neutron to maintain stability.

In this scenario, neutron stability is not achieved by suppressing decay mechanisms, but by enlarging the internal tolerance range of the neutron field itself.

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- ### Current Status

At present, no single explanation can be confirmed as the definitive cause of neutron stability or decay within atomic structures. Both mechanisms remain physically plausible and are the subject of ongoing investigation.

Further analysis is required to determine whether one of these mechanisms dominates, or whether neutron stability emerges from a combined effect of both.

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## Chapter 24 — Summary and Conclusions

**This chapter**, together with the preceding chapters—*Redefining the Fundamental Particles*—establishes a complete and self-consistent framework for a physics based entirely on electric fields, as defined within this theory.

Within this framework, no additional fundamental interactions are required. There is no need to invoke a strong force or a weak force, and no particles are assumed to disappear or emerge through non-physical mechanisms. All observed phenomena described here arise from continuous, deterministic field behavior governed by classical field equations.

Matter is treated throughout as structured electric fields. Stability, decay, confinement, and transformation are explained as changes in field configuration, geometry, and balance conditions, not as particle-level events or probabilistic processes.

**The framework developed up to this point demonstrates** that a wide range of nuclear and atomic phenomena can be addressed using pure field physics alone, without introducing auxiliary forces or abstract constructs beyond measurable field quantities.

Across the preceding sections, several key results have been established. Stability is shown to be a consequence of field equilibrium rather than an intrinsic particle property. Decay is described as a structural field transformation driven by limits in permittivity and spatial confinement, not as a stochastic or probabilistic event. Nuclear confinement is achieved through field geometry, eliminating electrostatic repulsion without invoking compensating forces. The formation of elemental atoms is presented as a continuous, deterministic process emerging naturally from neutron decay and field balance within shared atomic space.

Importantly, this work does not claim that all open questions have been resolved. In particular, neutron stability within atomic environments remains an active subject of

investigation. Two physically grounded mechanisms have been identified as plausible contributors, but a definitive determination has not yet been reached. This uncertainty does not weaken the framework; rather, it defines a clear boundary between what has been established and what remains to be examined.

Taken together, Articles 1 and 2 provide a coherent physical foundation for a field-based description of matter. They demonstrate that many phenomena traditionally attributed to additional forces or abstract particles can be reinterpreted as direct consequences of electric field structure, interaction, and equilibrium. Further work will build upon this foundation, extending the framework into additional domains while maintaining the same commitment to physical clarity and minimal assumptions.

## Appendix A — Fundamental Field Constants and Parameters

**Base field radius (universal nucleonic constant)**

$$R_0 = \frac{a_0}{2} = 2.645 \times 10^{-11}\,\mathrm{m}$$

**Open-field radius (hydrogen ground state)**

$$R = a_0 = 5.29 \times 10^{-11}\,\mathrm{m}$$

**Positive field charge**

$$Q = 1.33 \times 10^{-15}\,\mathrm{C}$$

**Intrinsic nucleon frequency**

$$f_n = 29.1646943\,\mathrm{MHz}$$

**Vacuum permittivity (lower physical bound)**

$$\varepsilon_0 = 8.8541878128 \times 10^{-12}\,\mathrm{F \cdot m^{-1}}$$

**Minimal physical permittivity threshold**

$$\varepsilon_{\min} \approx \varepsilon_0$$

**Neutron lifetime (reference value)**

$$\tau_n \approx 880\,\mathrm{s}$$

**Electron energy (zero-field component)**

$$E_e = 0.511\,\mathrm{MeV}$$

The electron is modeled as a zero-potential field (return flux), not an independent energy source. It defines either a field boundary or internal zero-point.

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## Appendix B — Core Field Energy and Stability Equations

**Confined electric field energy**

$$E = \frac{Q^2}{8\pi\varepsilon_0 R_0}$$

**Open field energy (radius-dependent)**

$$E(R) = \frac{Q^2}{8\pi\varepsilon_0}\left(\frac{1}{R_0} - \frac{1}{R}\right)$$

**Field pressure (energy density)**

$$u = \frac{\varepsilon_0 E^2}{2}$$

**Lorentz-type radius relation (from field preservation)**

$$R = R_0\sqrt{1-\frac{v^2}{c^2}}$$

**Magnetic energy density**

$$u_B = \frac{B^2}{2\mu_0}$$

**Mass–field equivalence (conversion formula)**

$$\boxed{mc^2 = \frac{Q^2}{8\pi\varepsilon_0 R_0}}$$

**Open-field expansion from mass (derived radius)**

$$\boxed{R = \left(\frac{1}{R_0} - \frac{8\pi\varepsilon_0 mc^2}{Q^2}\right)^{-1}}$$

These equations form a closed and testable foundation for relating energy, radius, and structure.

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## Appendix C — Correspondence Between Standard and Field-Based Physics

| Standard Concept | Field-Based Description |
|---|---|
| Mass | Confined field energy |
| Particle | Electric field configuration |
| Electric charge ± | Positive field + zero-point |
| Lorentz contraction | Field preservation |
| Relativistic mass increase | Field energy density increase |
| Schrödinger equation | Field-energy evolution equation |
| Probability amplitude | Field intensity |
| Strong force | Confined field geometry |
| TOV equation | Field-pressure equilibrium |

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Closing Note

These appendices consolidate the quantitative backbone of the field-based model. All constants, equations, and physical correspondences are presented in unambiguous mathematical form to facilitate direct application, testing, and peer review.

## Forthcoming Chapters and Required Completion

The following parts are planned and will be completed in subsequent stages of this work:

**Part VI — Electrical Conduction Reinterpreted**
Presents a new explanation of electrical conduction based on a redefinition of the electron and its role in conduction. In this framework, the electron is treated as a **negative electric field without a source**, rather than as a particle. Electrical conduction is described through field continuity, alignment, and interaction within the material, consistent with the field-based interpretation developed throughout this work.

**Part VII — Forces and Binding Energy**
Provides a detailed analysis of the forces acting within the atom, showing that binding energy and stability arise solely from electric field interactions, field geometry, and balance conditions. No independent strong force is invoked; all binding effects are explained through electric forces alone.

**Part VIII — Field-Based Explanation of Physical Anomalies**
Introduces a dedicated part addressing known experimental and observational anomalies, demonstrating how they arise naturally within the present field-based framework, without the need for additional forces, particles, or corrective hypotheses.

These parts extend the established field principles to electrical conduction, interaction phenomena, and unresolved observations.