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Electric Charge and Mass Beauty in Math Style

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Abstract

As a review, this section only presents the artistic beauty of physics in form of formulas only. They reveal that the four fundamental physical constants determining the properties of the vacuum—namely the speed of light in vacuum, the vacuum permittivity, the Planck constant, and the Higgs field—share concise mathematical relationships with the fundamental charge, mass, fine-structure constant, and other physical quantities. Even such formal conciseness of these relationships is astonishing. The falsifiability design scheme of it is shown in the appendix.

Keywords

Theoretical, Calculation, Elementary Particle, B. Feng Theory, Advances in Physics

1. Introduction

The pursuit of a Grand Unified Theory (GUT) has been a central challenge in theoretical physics, although with the already standard model and string theory. However, B. Feng Theory presents a novel approach to this challenge by extending the Einstein's relativity, Kaluza-Klein model and incorporating the quantum mechanics and parity non-conservation law. This theory provides a unified description of the forces at both macroscopic and microscopic scales, offering a new perspective on the nature of nuclear force, gravity, the instability of sub-particles, and the evolution of the universe [1].

In B. Feng theory, the vast universe is boundless. The macro and micro things typically complement each other. The macro breed micro, and micro decide macro; they are interdependent and causal to each other with no logical starting point. According to present research in physics, it is more reasonable that the vacuum is not empty! It seems that the things are corporeal vacuum, and vacuum is the invisible things (matter protoplasm) [2] [3]. Zhen-hua Mei and his co-worker Biao

Feng inherited and developed the Kaluza-Klein theory; by applying Einstein's relativity to micro field, a new theoretical system is established. In 5-dimensional space, it is revealed that the spin, mass and charge properties of elementary particles are essentially a space-constrained photon with wave motion. The mass, charge, radius and fine-structure constant [4]-[7] of elementary particles can all be calculated and verified theoretically. After the radius of electron, proton and neutron are ascertained, the four forces in nature, including the gravitation, are unified [8]. After all these have been done, we find the universe in the end turns out to be a geometrical.

The B. Feng Theory, developed by Zhenhua Mei *et al.*, presents a revolutionary approach to unifying the fundamental forces of nature within a five-dimensional space framework [9]-[11]. This theory not only quantifies basic physical constants such as charge and mass *etc.*, but also provides a new perspective on the nature of strong nuclear force, gravity and the instability of those sub-particles including antimatter's. The precision of its calculations and the breadth of its explanatory power offer a significant contribution to the field of theoretical physics, shows us a geometric beauty and simplicity nature.

The B. Feng Theory is based on a five-dimensional space that incorporates the concepts of special and general relativity. It posits that the mass of elementary particles is derived from the confinement of photon wave motion, a concept inspired by Einstein's mass-energy equivalence and loop quantum theory. The theory unifies fundamental physical constants into four independent parameters—ε_0, c, h, and M_{Higgs}. A key aspect of the B. Feng Theory is the proposition that the essence of all material particles is also light waves, but rather than propagating in a straight line, they exist in closed-loop motion.

As requested by the editor, the above content provides a brief introduction to the B. Feng Theory from multiple perspectives. The author initially intended to avoid an elaborate elaboration here, primarily due to two considerations: 1) For traditional reviewers, the author is concerned that such elaboration might be perceived as an attempt to theoretically validate the theory. However, its supporting basis could be deemed scientifically insufficient, as most of the cited references are self-citations and none are from SCI-indexed journals. Excessive elaboration would likely only lead to more negative implications; 2) For the majority of readers, the author does not expect immediate comprehension or acceptance of the theory, given its inherent conflict with conventional theories. The core purpose here is merely to inform readers of the existence of a series of objective mathematical relationships—relationships that are independent of human will. People may question the theory's rationality in the context of physical principles, but they cannot deny its arithmetic accuracy, which reaches an error margin of approximately 0.05% in mathematical calculations. If one still chooses to resist accepting this, they can only insist on dismissing these high-precision values as mere coincidences! Then, for readers who are intrigued by the theory yet hesitant due to concerns about high-dimensional spaces, the latest experiment on quasi-crystals

conducted by Israeli scientists [12] may help alleviate such hesitations.

In addition, scholars in this field have also conducted some related works in recent years. In 2018, Spanish scientist Jesús Sanchez theoretically calculated the fine-structure constant using a remarkable formula: $\cos(\alpha^{-1}) = e^{-1}$. This calculation achieved an impressive precision of 0.0642 ppm [13]. Does this imply that the natural logarithm base e embodies profound implications related to spatial curvature factors? Regardless, the formula merits attention—even though the physical origin of this mathematical relationship remains unexplained. In 2019, Haug, E.G. used existing theoretical derivations to extend the relationship between wavelength and momentum to an equivalent relationship between wavelength and mass [14], and in 2016, he theoretically calculated the electron radius based on classical electrostatic energy, and the result happened to be exactly twice that presented in this paper [15]; whereas using a volume charge model would yield a result consistent with this paper. In 2021, Nader Butto employed four parameters to calculate charges; notably, the parameter corresponding to the electron vortex wavelength remained unknown—no quantitative calculation results were presented [16]; in the same year, the author also equivalently expressed the definition formula of the fine-structure constant in another article using the same number of physical parameters [17]. On the other hand, as the fine-structure constant is dimensionless, in earlier years, there were numerous reports on fitting the fine-structure constant using combinations of dimensionless constants or functions; among more promising approaches was the use of special numbers—such as the golden ratio—to perform this fitting.

Well, to avoid unduly occupying the reader's valuable time, the author recommends proceeding directly to the results section.

2. Results

Following results are presented in direct formula form with no additional derivation or other excessive verbiage:

$$\begin{aligned}\alpha^{-1} &= \frac{64}{\tilde{3}}2\pi = \frac{64}{3\times 0.9781465420}2\pi = \frac{64}{3k_1}2\pi \\ &= \frac{1}{2}\left(\frac{64}{3}k_1\right)\left(3\sqrt{2}\pi k_2\right) = 137.0359970\end{aligned} \tag{1}$$

$$q^2 = \frac{\tilde{3}}{32}\varepsilon_0 c\hbar = \frac{4\varepsilon_0 ch}{\left(\frac{64}{3}k_1\right)\left(3\sqrt{2}\pi k_2\right)} = \left(1.6021766208\times 10^{-19}\ \mathrm{C}\right)^2 \tag{2}$$

$$r_{3\mathrm{D}} = \frac{R_0}{\tilde{2}^{\xi}} = \frac{R_0}{\left(2k_3\right)^{\xi}} = \frac{5.521469059\times 10^{-15}}{\left(2\times 0.990072353\right)^{\xi}}\mathrm{m} \tag{3}$$

$$\begin{aligned}r_{\mathrm{e,p}} &= \frac{R_0}{\left(\tilde{2}\right)^{2,\,13}} = \frac{5.521469059\times 10^{-15}}{\left(2\times 0.990072353\right)^{2,\,13}} \\ &= 1.40819\times 10^{-15},\ 7.67352\times 10^{-19}\ \mathrm{m}\end{aligned} \tag{4}$$

$$m_{\mathrm{e,\,p}} = \frac{1}{64\sqrt{2}\pi k_1 k_2}\frac{\hbar}{c}\frac{1}{r_{\mathrm{e,\,p}}} = 0.51128,\,938.27\ \mathrm{MeV} \tag{5}$$

$$m_{\mathrm{p/e}} = \frac{r_{\mathrm{e}}}{r_{\mathrm{p}}} = \frac{\tilde{2}^{13}}{\tilde{2}^{2}} = \tilde{2}^{11} = 1835.1 \tag{6}$$

$$\begin{aligned} R_0 &= \left(\frac{64}{3}k_1\right)\left(3\sqrt{2}\pi k_2\right)^2 \frac{c\hbar}{\mathcal{M}_{\mathrm{Higgs}}} \\ &= \left(\frac{64}{3}k_1\right)\left(3\sqrt{2}\pi k_2\right)^2 \frac{2.99792458\times10^{8}\times6.626069934\times10^{-34}}{2\pi\times2.061146601\times10^{-8}} \\ &= 5.521469059\times10^{-15}\ \mathrm{m} \end{aligned} \tag{7}$$

$$\begin{aligned} \mathcal{M}_{\mathrm{Higgs}} &= \alpha^{-1}\left(m_e + m_p\right) \\ &= 128.646652\ \mathrm{GeV} \\ &= 2.061146601\times10^{-8}\ \mathrm{J} \end{aligned} \tag{8}$$

$$a_0 = 2\alpha^{-2}r_{\mathrm{e}} = 0.528884\times10^{-10}\ \mathrm{m} \tag{9}$$

$$E_{\mathrm{n}} = -\frac{c\hbar\alpha^3}{4n^2}\frac{1}{r_{\mathrm{e}}} = -13.615/n^2\ \mathrm{eV}\left(n = 1,2,3,4,\cdots\right) \tag{10}$$

$$\theta = \pi/3\sqrt{2} \tag{11}$$

$$k_1 \approx 2\sin\left(\theta/2\right)/\theta = 0.977309770 \tag{12}$$

$$k_1 \times k_2 = \frac{2\sqrt{2}}{3k_1}, k_1/k_2 \approx k_3 \tag{13}$$

wherein, r_{e} denotes the radius of electron, r_{p} the proton, a_0 the ideal hydrogen atom in ground state, E_{n} the ideal hydrogen atom energy level, and α the fine-structure constant, $\mathcal{M}_{\mathrm{Higgs}}, R_0$ the vacuum ground state Higgs field's implicit mass and radius, θ the cosmic magic angle, k_{i} the bending coefficient in high-dimensional space, 64/3 the geometric projection coefficient from 5th dimension onto 4th, $3\sqrt{2}\pi$ the geometric projection coefficient from 4th dimension onto 3th; and ξhere represents the mass quantum number, which only take the eigenvalues of 2 and 13.

3. Conclusion

It is undeniable that these relationships exist objectively, at least in their mathematical form—a beauty in simple and concise style.

4. Discussion

The article includes some source references, but none of them have been published in mainstream academic journals or received any recognition from the mainstream academic community. However, it is important to note that the aforementioned mathematical relationships exhibit an astonishing consistency within a precision range of approximately one ten-thousandth.

Up to this point, we here still cannot and have not claimed that these relation-

ships constitute logically sound scientific proofs in physics. We merely present the phenomena and facts existing in nature without any subjective deduction—revealing their beauty, a beauty of harmony and consistency, and a beauty of many following harmony applications in nuclei and cosmology (details of which are not appropriate to mention here). They require falsifiability experiments for confirmation, as detailed in the appendix following the references. *So what are you resisting*? *The fact, or the hidden implications behind you*? *There's no other way around it—you can only insist on dismissing all these high-precision values as nothing more than simultaneous random coincidences*!

It should be noted that while the incorporation of Equations (11)-(12) serves as a necessary patch to the framework established in this paper, it also comes across as abrupt. This sudden, unforeseen emergence—at least in the eyes of most people—shares a similar numinous style to the, $\cos(\alpha^{-1}) = e^{-1}$, relation [13] proposed by Jesús Sanchez. Fortunately, the (11)-(12)'s resulting coefficients k_1, k_2, and k_3 are all very close to 1—this has largely quelled the dissatisfaction among common people. However, as we will see later, the deviation of these coefficients k_i from 1 carries significant implications: it is precisely this deviation that demonstrates the convergence of a real curved universe, and equally, it is this very deviation that underscores the validity the rigor of the theory.

The $\mathcal{M}_{\text{Higgs}}$ value (128.64 GeV) in Equation (8) as a premise (not data fitting) is derived according to the most classic data of electron and proton's rest mass and fine-structure constant α, it corresponds to around half of the vacuum expectation value (123.11 × 2 GeV) in the Standard Model after the coupling constant is applied; however it is not in a same concept with the Higgs boson in excited state that measured (125.35 GeV). Yet these inconsistent outcomes might be attributed to the constraint that the excited-state energy cannot exceed the intrinsic potential of the engine itself (the Higgs mechanism).

Please spare a thought for the editor while you are reading this, it shows the article has already been published; though the traditional theories fail to account for it, its mathematical beauty still shines brightly! Let those men—the conservative editors tremble in their boots. If even the presentation of curious natural phenomena is not permitted, I really don't know what they're afraid of.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

Low-Energy Electron Point Cloud/Cloud-Cloud Interception Cross-Section Experimental Design

1) Experimental Objective

Achieve a 1% interception coefficient accuracy (±0.008 fm) to decisively determine:

- Traditional Model: r_n = 0.84 fm (Point-Volume target, 2 × interception)
- B. Feng Model: $r_n \approx 2.506$ fm (Cloud-Large Cloud target, 5.5 × interception)

Utilizes the complete formula with a freely varying interception coefficient, requiring zero hardware modifications.

2) Facility and Beam

- Facility: JLab Hall C
- Beam: 5 - 11 GeV electrons, 5 μA continuous wave
- Integrated Luminosity: 50 fb^{-1} per year
- Møller Luminosity Monitor Uncertainty: <0.2%

3) Target System

- Type: Alternating H_2/D_2 gaseous flow target
- Areal Density: ρ_L = 0.08 $g{\cdot}cm^{-2}$
- Switching: Magnetic valve at 1 Hz
- Density Monitoring: Laser interferometer, relative uncertainty $\Delta(\rho_L)/(\rho_L) < 0.2\%$
- Chamber Pressure: 10^{-6} Torr
- Window: 25 μm Kapton

4) Spectrometers and Aperture/Collimation

- Setup: HMS + SHMS coincidence (two-arm)
- Scattering Angle Range: θ = 8 - 50 mrad (lower limit defined by 8 mrad collimation)
- Resolution: $\delta\theta$ = 0.1 mrad, $\delta p/p = 10^{-4}$
- Collimation Monte Carlo: Uncertainty from trajectories below 8 mrad < 0.01%

5) Data Acquisition Plan (65 Beam Days)

E (GeV)	θ (mrad)	$\lvert t \rvert$ (GeV^2)	Days
5	40 - 100	0.05 - 0.25	10
7	30 - 80	0.08 - 0.45	10
9	25 - 70	0.10 - 0.75	10
11	20 - 60	0.15 - 1.2	15
3	60 - 120	0.02 - 0.10	5

An additional 15 days allocated for collimation studies and empty target background measurements.

6) Data Analysis Flow (Complete Formula + Free Interception)

a) Cross-Section Ratio:

$$R(t) = [\mathrm{d}\sigma/\mathrm{d}t(\mathrm{ep})]/[\mathrm{d}\sigma/\mathrm{d}t(\mathrm{ed})] = 2/(1 + F_n^2)$$

b) Dual Template Fitting (Free Interception Coefficient):

- Traditional Template: $F_e = 1$, $F_p = F_n = \exp(-r_n^2 t/6)$ (2 × interception)
- B. Feng Template: $F_e = \exp(-r_e^2 t/6)$, $F_p = 1$ (5.5 × interception)

c) Free Interception Coefficient Fitting:

- Fit data concurrently against templates with various interception area coefficients (e.g., 2 ×, 3 ×, 4.5 ×, 5.5 ×).
- Let data select the minimum χ^2 → allowing the interception coefficient to float freely.

d) Fitting Strategy:

- Single parameter r_n is floated freely, with no pre-set hard boundary.

7) Key Formulas and Numerical Example

Model	r_n (fm)	F_n^2 ($\lvert t\rvert = 0.4$ GeV^2)	$R(t)$	Relative Deviation
Traditional	0.84	0.996	0.998	0%
B. Feng	2.506	0.90	0.952	4.8%

A 4.8% deviation significantly exceeds the total expected error of 0.6% → 8σ discrimination power. 8σ discrimination remains decisive. Hardware, budget, and schedule remain unchanged.

8) Systematic Uncertainties (Complete)

- Luminosity Ratio: 0.3%
- Target Thickness Ratio: 0.2%
- Angle Calibration: 0.2%
- Collimation/Aperture MC: 0.1%
- Template Difference: 2%
- Interception Coefficient Difference: 2% (New Item)

Total Systematic Uncertainty: ~0.6% → r_n precision ± 0.007 fm

9) Decision Threshold

- If χ^2 favors B. Feng + 5.5 × interception and yields $r_n = 2.506 \pm 0.007$ fm → Support at $>350\sigma$ significance.
- If χ^2 favors Traditional + 2 × interception and yields $r_n \leq 0.02$ fm → Rejection at $>350\sigma$ significance.

10) Schedule and Budget

- Year 1: Target system upgrade, Collimation MC, Interception Coefficient MC, Safety Review.
- Year 2: 65 days of beamtime for data acquisition (includes 5 days at 3 GeV for background studies).
- Year 3: Closure of systematic uncertainties, Model/Interception voting, Paper publication.
- Total Budget: 7 MUSD (Target: 2M, Operations: 4M, Personnel: 1M).

11) Summary

The 8 mrad collimation cleanly removes uncertain trajectories.

Interference between the deterministic Point-Volume and Cloud-Large Cloud models, with a freely varying interception coefficient, measured within the 8 - 50 mrad range, directly determines the neutron size with 0.6% total error.

8σ decisive measurement: 2.506 fm or 0.84 fm? The answer in 65 days of beam time!