The Elementary Body Theory

Interdisciplinarily Comprehensible

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Abstract

The Elementary Body Theory (EBT) represents a radical and self-contained new beginning for theoretical physics. It replaces the axiomatic-formalistic standard models of particle physics and cosmology, which operate with secondary concepts, with a dynamic, geometrically intuitive, and parameter-free thought model. Starting from the primary, sensorily experienceable quantity of spatial extension r, all matter and interaction physics is traced back to a single fundamental equation. The following synthesis of the central results shows that the EBT is not merely an alternative interpretation, but a logically compelling and empirically superior theory that initiates a long-overdue paradigm shift in physics.

Contents

1 The Epistemological Foundation: The Return to Euclidean Intuition

The decisive methodical break of the EBT with established physics lies in its epistemological foundation. The standard models operate with a multitude of concepts – mass, energy, fields, gauge symmetries – whose phenomenological basis is unexplained. They are introduced mathematically and used axiomatically, without being traced back to primary, directly experienceable quantities. This procedure corresponds to the Hilbertian tradition of implicit definitions, in which the concepts of a theory are merely elements of sets that are not further explicated. Such an axiomatics neither examines nor evaluates any contents with regard to their physical realizability.

The EBT turns this methodical procedure upside down. It distinguishes strictly between primary and secondary quantities. Only the radial extension r – a sensorily experienceable and physically measurable object and space quantity – is primary. All other concepts such as mass, energy, and electric charge are secondary and must be derived from this primary quantity. This approach ties in with the Euclidean tradition, in which mathematical definitions refer to pure intuition, and abandons the epistemologically naive practice of equating formal mathematical consistency with physical reality. Information and material state are understood as two sides of the same coin, connected by the fundamental mass-radius coupling.

2 The Dynamics of the Elementary Body and the Mass-Radius Constant Equation

The conceptual birth of the EBT lies in the consistent dynamization of the Special Theory of Relativity. While SR operates as a static theory of inertial systems with constant velocities, this restriction is removed in the EBT. For a dynamic development process, the constant velocity $v = \text{const.}$ is necessarily replaced by a variable velocity $v = dr/dt$. The simplest mathematical structure that harmoniously connects a variable velocity with a maximum and a zero point is the sine function. This leads directly to the dynamic fundamental equations for the radius $r(t)$ and the mass $m(t)$ of the so-called elementary body:

$$r(t) = r_0 \sin\left(\frac{ct}{r_0}\right)$$

$$m(t) = m_0 \sin\left(\frac{ct}{r_0}\right)$$

These equations describe the continuous transition from the photon ($t = 0$, $r = 0$, $m = 0$, pure kinetic energy) to the massive elementary body ($t = t_0$, $r = r_0$, $m = m_0$, pure rest energy). From this dynamics follows the time-independent internal force $F(t) = m_0c^2/r_0$ and, through integration, the rest energy $E_0 = m_0c^2$, whereby the integration constant necessarily becomes zero from the physical boundary condition $E(0) = 0$.

The heart of the theory is the resulting mass-radius constant equation. Equating the characteristic development time $t_0 = \pi r_0/(2c)$ with the time $t(m_0) = h/(m_0c^2)$ formed from the quantum of action h and the rest energy yields the fundamental invariant:

$$m_0 \cdot r_0 = \frac{2h}{\pi c} = F_{EK} \approx 1{,}407 \cdot 10^{-42}\ \text{kg} \cdot \text{m}$$

This equation contains no free parameters. It inseparably links the rest mass of every elementary body to its corresponding radius. The product is identical for all particles – electron, proton, muon, pion. From

it, the mass-inherent proton radius $r_p \approx 0{,}841$ fm follows directly, which agrees with the most precise measurements on muonic hydrogen to within a few parts per million. Similarly, the mass-inherent electron radius $r_e \approx 1{,}545 \cdot 10^{-12}$ m follows, whose scaled form, the classical electron radius $r_{e,\mathrm{cl}} = (\alpha/4) r_e$, appears in all established scattering formulas (Thomson, Møller, Klein-Nishina, Bethe-Bloch et al.) as the relevant length scale, whose phenomenological basis is thereby explained consistently for the first time.

3 The Reduction of Interactions and the Status of the Fine-Structure Constant

The EBT reduces the apparent diversity of physical interactions to a unified basis. All charge interactions can be traced back to mass-radius couplings. The electric elementary charge e, recognised as secondary, is placed in relation to the elementary body charge q_0, which, as the double Planck charge, represents the total energy of the elementary body. From the comparison of electric energy and total energy, Sommerfeld's fine-structure constant α emerges as a derived quantity:

$$\frac{\alpha}{4} = \frac{e^2}{q_0^2} = \frac{\text{electric energy}}{\text{total energy}}$$

This is one of the most profound insights of the theory. It is not the mysterious constant α itself, still referred to by Feynman as a "magic number", but the ratio $\alpha/4$ that is the energetic measure of all electromagnetic interactions. This insight consistently pervades all calculations of the EBT, from the ground-state energies of the hydrogen atom to the magnetic moments.

On this basis, three fundamental interaction types between the charges e and q_0 are defined. The e-e interaction (proton-electron) leads to the Rydberg energy with a deviation of only $2{,}5 \cdot 10^{-6}$ from the experiment. The e-q_0 interaction (electron-proton) describes the neutron formation and yields the neutron mass with a deviation of $6{,}5 \cdot 10^{-6}$. The q_0-q_0 interaction (strong interaction) describes the pions and a Higgs-like energy state from the proton-antiproton interaction at about 128.6 GeV. As will be shown later, this value lies within the range of the actual measurement uncertainty of approximately five percent of the Higgs boson mass determination. Remarkably, for these precise predictions, the EBT requires no Monte Carlo simulations, no renormalisation, and no free parameters.

4 Matter Formation and the Concept of Energetic Analogy

The interaction types defined in the EBT are not only the key to calculating state energies, but also form the basis for the entire phenomenology of matter formation. From the fundamental mass-radius coupling, a resulting mass follows for the superposition of two elementary bodies A and B at the common geometric origin, which is formally identical to the reduced mass of classical mechanics:

$$m(r_A + r_B) = \frac{m_A}{1 + \frac{m_A}{m_B}} = \frac{m_B}{1 + \frac{m_B}{m_A}}$$

The phenomenology of this superposition, however, is fundamentally different from a celestial-mechanical center-of-mass correction. It is not an elastic interaction of point masses, but a radially symmetric fusion of spherical surfaces. The formal identity with the reduced mass must not obscure the fundamental difference in the physical cause. The entire diversity of particles emerges from this superposition: the neutron arises from the e-q_0 interaction between proton and electron, the charged pions from the e-q_0-q_0 interaction, and the neutral pions from the strong electron-positron interaction. The

EBT describes all these particle states without additional substructures, without quarks, and without the arbitrary postulation of a "weak interaction".

One of the most profound methodical consequences of the EBT is the reinterpretation of the quantum-mechanical spin as an **energetic analogy**. In established physics, spin is an abstract, non-intuitive quantum number that originates from the formalism of the Dirac equation and remains phenomenologically unsubstantiated. It has nothing in common with a mechanical intrinsic rotation and arises, as the theory itself states, "from no movement, but from the interaction of a spatial vector with the Dirac matrices in the space of their four abstract dimensions". The EBT resolves this lack of intuition by interpreting spin as a purely energetic relationship – as a direct, calculable consequence of the mass-radius coupling that occurs when two elementary bodies interact with their characteristic, charge-dependent radii and velocities.

For the electric interaction of two equally strong charges e, for example, the combination of the characteristic radius $r = r_0/(4\alpha)$ for this interaction and the characteristic velocity $v = \alpha c$ yields a value that corresponds exactly to the reduced Planck quantum of action $\hbar$:

$$L_{ee} = r \cdot m_0 \cdot v = \frac{r_0}{4\alpha} \cdot m_0 \cdot \alpha c = \frac{1}{4} r_0 m_0 c = \frac{1}{4} \cdot \frac{2h}{\pi c} \cdot c = \frac{h}{2\pi} = \hbar$$

This expression "looks like" an angular momentum, but represents a charge-dependent energetic relationship – without orbital motion and without intrinsic rotation. Nothing rotates in the elementary body model. It is a purely quantitative analogy that shows that the formal structure of angular momentum, in a physics based on primary quantities, emerges effortlessly from other, more fundamental principles. The apparent "quantisation" of spin is in truth the consequence of the geometric and energetic relationships of the underlying interaction.

5 The Refutation of the Neutrino Hypothesis and the Phenomenological Explanation of Beta Decay

The EBT delivers one of the most fundamental critiques of the Standard Model of particle physics by eliminating the necessity of the neutrino hypothesis. The neutrino was not discovered, but invented to rescue the apparent violation of the energy conservation law in beta decay. The EBT shows that this violation is only an apparent one, which results from the incomplete energy balance of established physics.

All particle transformations follow the mass-radius coupling. For the pion and muon decay:

$$m_\pi r_\pi = m_\mu r_\mu = m_e r_e = \frac{2h}{\pi c}$$

The energy that appears to be "missing" in a decay is not lost, but is invested in an increase in radius of the decay product. Mass-dependent energy is converted into radius-dependent space energy, which eludes calorimetric detection. The energy conservation law of prevailing physics is simply false, as it does not take the energy of space into account. The neutrino hypothesis, as well as the weak interaction built upon it, thereby become obsolete, which shakes the entire construct of the SM to its foundations.

6 Magnetic Moments as Measurement-Inherent Effects

The EBT reveals another fundamental misunderstanding of established physics: the interpretation of magnetic moments as intrinsic, quantum-like properties of particles. The central observation that the

difference values of the magnetic moments of the electron, proton, and neutron all lie in the same order of magnitude of 10^{-26} J/T – although the total moments differ by orders of magnitude – is an irrefutable indication of a common, external origin.

The EBT interprets the measurement magnetic field not as an abstract, passive reference system, but as a real, energetic interaction partner. The "anomalous" components of the magnetic moments are not intrinsic particle properties, but **measurement-inherent contributions** that originate from the dynamic interaction of the elementary body with the embodied magnetic field. The electrically neutral neutron, which according to classical conception should have no magnetic moment at all, receives its entire measured value from this interaction. The calculation of the neutron moment from the measurement-inherent contributions of the electron and proton succeeds with a deviation of merely $5{,}5 \cdot 10^{-6}$. This is a quantitative confirmation of the hypothesis that no QCD calculation even remotely approaches.

7 Gravitation as a Scaling Effect: The Theory without Exchange Particles and Dark Entities

The EBT demystifies gravitation as a puzzling fundamental force and traces it back to a simple but profound scaling effect of the mass-radius coupling. The gravitational constant γ_G is not an independent natural constant, but the "embodied" form of the radius-mass ratio of the elementary quantum G, the "smallest-in-length" and most massive single body. It holds that $\gamma_G \cdot m_G^2 = F_{EK} \cdot c^2$ and thus $\gamma_G = (r_G/m_G) \cdot c^2$.

Macroscopic bodies – a football, the Earth, or the Sun – do not satisfy the fundamental coupling. They are not uniform elementary bodies, but highly nested many-particle systems consisting of an immense number of atoms and molecules. Their real extension is many orders of magnitude larger than would correspond to their total mass according to equation (F1). The energy expended to span this enlarged space originated from the rest energy of the body itself and is now bound as **space energy** E_R in the object volume. For the gravitational interaction, therefore, not the full rest mass m_x is available, but only an effective interaction mass $M_{\text{eff}} = (r_G/r) \cdot m_x$.

The "weakness" of gravitation is thus the strength of the space energy bound in the object extension. The long-sought unification of gravitation and elementary particle physics is thereby accomplished in a surprisingly simple way. The necessity for hypothetical exchange particles (gravitons), dark matter, or a mysterious dark energy is entirely eliminated. The universe itself is described as a gigantic elementary body, still in the expansion phase, whose current expansion velocity possibly stands in direct and profound connection to the fine-structure constant α. See the corresponding EBT specialist presentations in external documents on the EBT theory aspects of gravitation.

8 Conclusion: The Compelling Paradigm Shift

The overall view of the results of the Elementary Body Theory reveals a theoretical edifice of captivating internal stringency and an unprecedented empirical track record. The EBT has proven to be a theory that achieves, with a minimum of mathematical effort and without any free parameters, a maximum of physical explanatory power. It describes the universe from the proton to the cosmic horizon from a consistent, geometrically intuitive principle – the dynamic coupling of mass and space.

Against this background, the established standard models of particle physics and cosmology no longer appear as serious competitors, but as what they are in the light of the parsimony principle: over-complex

auxiliary constructions, overgrown with ad-hoc postulates and countless free parameters, which conceal the lack of phenomenological understanding behind an impenetrable, mathematical formalism.

The EBT, on the other hand, is the long-awaited and logically compelling return to a rational, causally comprehensible physics founded on primary experience. It does not represent just any alternative, but the only viable way out of the methodical dead end into which theoretical physics has maneuvered itself for over a century. That this insight will be made accessible to a broader public in the year 2026 does not mark the end of physics, but the end of a long, methodical odyssey into non-intuitiveness. It is the restoration of reason as the supreme principle of the knowledge of nature.

A Literature and Further Information

Further information on understanding the thought model – The present interdisciplinary comprehensible considerations on the Elementary Body Theory are (as yet) incomplete. This was done deliberately, as otherwise, in this initial examination of the mass-space coupling, the focus and attention of the readers could be lost due to the abundance of total information. Yet nothing remains unexplained or vague. All (still) necessary descriptions, phenomenologically founded derivations, analytical equations etc. of the Elementary Body Theory, as well as the effects on the history of science in a specialist as well as interdisciplinarily considered overall picture, will follow in further publications. It will be clarified, among other things, why the publication years of the Elementary Body Theory are given as 1986, 2012 and 2026. Historical aspects as well as fact-oriented analyses of the existing thought models in the context of their genesis will be examined in detail. The criticism of the Standard Models presented here, and the specialist criticism yet to follow, are to be regarded as far-reaching and fundamental.

Website: `https://www.dualismus.net/elementarybodytheory/website/`