

Convergence of Fictive Physics and Reality

Natural Constants Explained with a new Electron Model

The science is concentrated on atomic relations to describe the electron. So obtained results are often unsatisfactory. The particularly relativistic interpretation attempts introduce terms and mathematical methods which often must accepted without understanding.

Here compared with this will be an electron model introduced, which was found at the analysis of the free electron. This with that developed model is surprising simple, evident and intrinsic decided and supplies for the physics also in general remarkable solutions. From the classical model remains a radial symmetrical electrostatic field, which moves cyclic with an empty room in its centre. The mathematical view of this model leads to astonishing results: For the first time there are relations and explanations shown for natural quantities as *Planck* and *Dirac* constants, electron spin, *Bohr* magneton, *Bohr* radius and fine-structure constant! Furthermore the inside the electron existent energy reveal, that the electron against the dogma probably does not spin and without mass is!

In the examined elementary system, exist for more than 30 natural quantities - now partly much plainer - relations, amongst them 18 constants. The suggested electron model makes it easier to understand some physical phenomena - such as the results of the double-slit experiment.

Aspects of atomic physics will not be debated at that here first of all isolated shown model.

The two fundamental laws of electrolysis (*Faraday* in 1834) say the deposited amount of material is proportional to the amount of electric charge.^[1] Thanks to *Loschmidt*'s trustworthy data in 1865 (atomic mass and spatial extent) he confirmed the hypothesis of *Avogadro*.^[2] Therewith it was shown, that every transported charge of ions is an indivisible elementary charge. This „atom of electricity“ (*Helmholtz* in 1881)^[1] *Stoney* has designated Electron in 1894.^[3]

In according with classical view, the electron e^- is a spherical corpuscle and carries on its surface a negative electric elementary charge. The fictive lines of force of its radial symmetrical electrical field \hat{E}_e show determinative to the electron centre. The sphere spins therefore around the own axis with an electron spin S_e . The supposedly turned / moved field \hat{E}_e generates a magnetic field \hat{B}_e with a magnetic moment μ_e .

Well-known quantities of the electron are, for example, the in *Millikan*'s oil-drop experiment in 1909 ascertained elementary (point) charge e_0 ,^[4,5] measured rest mass m_{e0} (Teltron diffraction tube) and calculated classical radius r_e of the rest mass volume. Furthermore is well-known, at the latest since *Einstein*,^[6] the electron rest energy W_0 [= 8.187 104 38(41) · 10⁻¹⁴ J].^[7] From this, the electron field \hat{E}_e includes as potential energy W_{e0} the half. The other half has destined for a self-energy.^[8]

In classical physics, **self-energy** is a potential energy of the charge distribution in its own field.^[9] The self-energy corresponds to the interaction of the charge with its own induced electric field.^[10] They say it needs self-energy to separate field from charge.

To get no diverged term for the self-energy, in electrodynamics it has to deviate from the idealistic point charge.^[11] In quantum electrodynamics, the difficulties with the self-energy of the electron are solved by covariant renormalisation of charge and mass, which in unambiguous form lead to finite terms for charge and mass and then are identical with observed values. Accordingly is the procedure with the self-energy of protons (*Feynman* diagram).^[12]

Attempts to explain the fictive self-energy raise more questions than they supply comprehensible answers.

Remarks to the above model:

- 1 Well-known values are in addition for example **electron spin** $S_e = \frac{1}{2} \hbar = 5.272\ 858\ 14(27) \cdot 10^{-35} \text{ J}\cdot\text{s}$ ^[7] and sphere angular momentum $L_{ei} = 2 S_e = 1.054\ 571\ 628(53) \cdot 10^{-34} \text{ J}\cdot\text{s}$ ^[7] (= *Dirac* constant \hbar).
For the at all spinning sphere of mass there is with above values $L_{ei} = \frac{2}{5} m_{e0} r_e^2 \omega_{ei}$ (with angular velocity ω_{ei}).
As $m_{e0} = 9.109\ 382\ 15(45) \cdot 10^{-31} \text{ kg}$ ^[7] and $r_e = 2.817\ 940\ 2894(58) \cdot 10^{-15} \text{ m}$ ^[7], ω_{ei} would calculated to
 $\omega_{ei} = \frac{5}{2} L_{ei} / (m_{e0} r_e^2) = 3.644\ 715\ 196 \cdot 10^{25} \text{ s}^{-1}$ ($f_{ei} = 5.800\ 744\ 396 \cdot 10^{24} \text{ s}^{-1}$; a frequency in the range of gamma rays).
From it results a electron spinning energy $W_{ei} = \frac{1}{5} m_{e0} r_e^2 \omega_{ei}^2 = 9.609\ 033\ 0920 \cdot 10^{-9} \text{ J} = 1.173\ 679\ 076 \cdot 10^5 W_0$.
This high measure of energy **is nowhere contained** or to put in. Alone electric field energy and implied self-energy in their sum already are the rest energy.
- 2 Doubts about the electron model are increased: A supposedly intrinsic spin of the electron does not interfere with its surroundings, because either the electric field does not follow this rotation anyway or an at all spinning radial symmetrical electric field **no magnetic field** generates: Field energy density in space doesn't change there.^[13]
- 3 The present model explains neither results respectively relations for instance of **double-slit experiment**, *EPR* effect, *Dirac* constant, fine-structure constant nor *Planck* constant.

A tendency for explanations of above contradictions, undecided questions anyhow furthermore up to now unexplained, but in values, precisely determined physical quantities could yield an on the contrary other electron model:

- 4 The radial symmetrical electric **field** is represented by its in the whole room existing field density $\hat{\sigma}_*(r_*)$ respectively field strength $\hat{E}_*(r_*)$ [= $\hat{\sigma}_*(r_*) / \epsilon_0$]. It is in interaction with its surroundings by means of the density (or strength). The in area $A_*(r_*)$ of any sphere radius r_* present field density $\hat{\sigma}_*(r_*)$ sums to elementary charge e_0 [= $4 \pi r_*^2 \hat{\sigma}_*(r_*)$]. The lower the radius r_* the higher the density $\hat{\sigma}_*$ will be. At limit $r_* \rightarrow 0$ the density is concentrated in a point, to the point charge.

To characterize the electron a **charge** is not necessary. This is not additional existent. Linguistic and mathematical advantage of this analytical quantity is its constant value. Nevertheless, a **self-energy** is in consequence of a just mathematical charge dispensable. What will be, when the half of the rest energy attached to the self-energy – getting symmetry with the potential field energy – **kinetic** energy is?

5 Existence in absolutely immobility is a paradox. Presence is moved being – otherwise it is unreality. (*Einstein*: „All in life is oscillation.“) The electron is long-lived^[5] (annihilation neglected): averaged lifetime $>10^{24}$ a (compare the surmise: „big-bang“ has been before $<10^{11}$ a). Thus, it should not be in repose, because it otherwise would decay (up to now there are no experimental hints). Since most of the elementary particles are electrons, an electron should go around on a circle. To get answers for electron questions in quantum physics zitterbewegung and hyperzitterbewegung are invented.^[14,15]

6 At photons, with speed of light in vacuum c_0 moved, **Planck** constant h composes with excitation frequency f a physical (outer) **linkage**.

What will be, so **Planck** constant h describes at the electron an (inner) linkage?

7 The quotient of rest energy W_0 and **Planck** constant h results in a frequency f_e . It is manifest, that the electron will cyclic move with this frequency. Would the speed be c_0 , rotation radius r_E is adequate to **Compton** wavelength λ_{c_e} .

Under adoptions **4 ... 7** are remarkable results obtained:

8 In the electric field there is a potential energy W_{e0} of $W_{e0} = 1/8 e_0^2 / (\pi r_e \epsilon_0) = 4.093\ 552\ 188\ 48 \cdot 10^{-14}$ J = $1/2 W_0$.
(Note: The electron is an elementary particle. Its „rest“ and field energies are constant - so e_0^2/r_e too.)

The second half of the rest energy is given as a result from the rotating „corpuscule with mass m_{e0} “ and its speed c_0 as system orbit energy W_{sb} to

$$W_{sb} = 2 m_{e0} (\pi r_E f_e)^2 = 1/2 m_{e0} \cdot c_0^2 = 1/2 h \cdot f_e = 1/2 W_0.$$

9 According to *Einstein*'s SRT, with c_0 moved objects are **without mass**. Thus, the rotating electron itself is without mass. Hence, no centrifugal forces pull on it during the revolution. Also mass is, at least here, just a mathematical quantity.

10 According to *Einstein*'s SRT, inert energy and mass are comparable,^[16] energy and mass are equivalent.^[17]

11 The cyclic moved electric field generates a toroidal whirl magnetic field. Its energy W_{em} ^[18]

$$W_{em} = 2.647\ 569\ 413\ 76 \cdot 10^{-16}$$
 J = 0.006 467 657 65 W_{e0} = 0.003 233 828 26 W_0

is part of potential energy W_{e0} . Therefore, there remains kinesio field energy W_{ek} ^[19]

$$W_{ek} = W_{e0} - W_{em} = 4.067\ 076\ 494\ 34 \cdot 10^{-14}$$
 J = 0.993 532 342 35 W_{e0} = 0.496 766 171 17 W_0 .

12 This formation „moved elementary electric field eEF with secondary elementary magnetic field eMF“ could be named **elementary system ES**; but to avoid confusion the better way is to use the noun **electron** furthermore.

13 Its (symmetrical) energy sum is $W_{ek} + W_{em} + W_{sb} = W_{e0} + W_{sb} = 2W_{e0} = W_0 = h \cdot f_e$.

14 In the elementary system is no more energy included. From an eventual spinning electron mass calculated gyro-energy W_{ei} is not to insert (see **1**). Therefore, electrons **do not spin!**

A spinning radial symmetrical electric field would anyhow no magnetic field generate (see **2** as well as^[13]).

15 With above relations you will find for **Planck** constant h for instance the equation $h = 1/2 r_E e_0^2 / (r_e \epsilon_0 c_0)$.^[20]

16 If we insert h in formulas of quantities, which are expressed by h , we get striking equations, for instance

$$\text{for } \mathbf{Sommerfeld} \text{ fine-structure constant } \alpha \quad \alpha = r_e / r_E \quad [21]$$

$$\text{moreover for } \mathbf{Bohr} \text{ radius } a_0 \quad a_0 = r_e / \alpha^2 = r_E^2 / r_e. \quad [22]$$

Now *Feynman* at the end could rest and he would no longer be humiliated.^[23]

17 Under the above assumed motion the electron „spin“ S_e is calculated to

$$S_e = 1/4 \mu_0 r_E^2 e_0^2 f_e / r_e. \quad [24]$$

Bohr magneton μ_B results from the rotating field to

$$\mu_B = 1/2 r_E e_0 c_0. \quad [25]$$

It is consequently possible – against the dogma – to derive it from the elementary system.

Analytic field calculations show, that local field density motions alone for magnetic field values are of no importance.^[26] Decisive is the speed of the causing total-field, for radial symmetrical fields their field centre. Field calculations for single „charges“ with *Maxwell*'s equations are fit for certain duties only^[27] and the *Biot-Savart* law is then modified applicable,^[28] because they are drawn up for EM wave propagation respectively charge frequency averaged over time.

From field relations of the elementary system emerges the characteristic impedance of vacuum Z_0 too, which is not only important in the electromagnetic radiation field.^[29]

The *Von-Klitzing* constant R_K (*Hall* resistance) is an electric field resistance.^[30]

The introduced model submits to the following:

The electron is no corpuscle with charge and mass, but („just“) a radial symmetrical electric field \hat{E}_e . Its centre is a field-free spherical room with radius r_e . The field moves with speed of light in vacuum c_0 – under uninfluenced conditions cyclic with radius $r_E = \lambda_{Ce}$. Because of this, a toroidal magnetic field \hat{B}_e with electron magnetic moment μ_e is secondary generated. This rotation system – formed by two fields only – includes the „rest“ energy W_0 . For an outer observer it looks because of its inertia and gravitation^[31] like a corpuscle with mass m_{e0} and spin S_e . There is no (point) charge. The place, allocated for the electron, gapes an empty room that not spins.

If it is approved that an electron moves on principle intrinsic cyclic, arises an elementary system, which includes more than 30 physical quantities (amongst them 18 constants)^[32], of which origin and / or meaning partly up till now could not explained, for example the **Planck** constant h and the fine-structure constant α . However, the electron itself gets an explanation, which could make the results of the double-slit experiment and the behaviour of the photons plausible.

Planck's hint in 1900, that the classical physics fail at thermal radiation, **Einstein**'s reflections in 1905 on photon and for instance **Louis de Broglie**'s tried explanations of the results at double-slit experiments in 1924 lead to the at first vehement disputed, until today maybe scarcely understood quantum physics.^[33,34]

The new electron model may probably show a way out of this unsatisfactory situation:

If at the **double-slit experiment** with electrons (or photons, from electrons removed excitation energies, with energy lever^[35] h reproduced multiple amounts of the rest energy) is fired, then in accordance with the above (in the infinite stretched) fields will be moved. The through the slits transmitted, if occasion arises partitioned and bended fields (passing fields at the slit-rims) correlate still after the passage, also then if one slit is covered afterwards. What is mysterious on it?

The by **Einstein** discovered **photoelectric effect** was one of the occasions, to invent the quantum theory. Perhaps, the **EPR**-paradox may be, based on elementary system and its coupling of its remote effective fields and their „Verbundenheit-in-der-Trennung“ (interconnection at the separation) of two particles^[36] (after **Pauli**'s exclusion principle), logical explained.

Perhaps, the seeming conflicting **behaviour of the photon**, its wave-particle-dualism, is to replace by neither-nor; the photon is, like the electron, a moving double field. Are probability amplitudes obsolete now?

Since the electron with speed of light in vacuum moves, there is neither a longitudinal nor a transversal speed modulation imaginable. Can it oscillate?

Is not its energy hf probably just that, what the **hit target incite to oscillate**?

All electric fields exist already (up to the infinite). They have not to build up first and they can / must not spread out first. Because of superposition with others, they are in case latent (neutron).

At „transmission / radiation“ a field displaces, and regarding the especially high density in its centre the shifting there is observed soonest. A distinct „wave front“ of one field **is not recognizable**.

The at shifting the electric field generated magnetic field exists incommunicable up to the infinite, because the electric field reaches so far. Thus, also a single magnetic field (from a single electric field) does not build up delayed.

Needs it lend energy to explain tunneling of a potential barrier as in quantum mechanics?

Where are infinite fields localized? Has **Heisenberg**'s uncertainty principle to be modified?

The results with the cycling electron give the idea that all subatomic objects move in a circle – at least the proton with its more than 10^{31} years average lifetime.^[37] At last, nucleons have spin and orbital angular momentum too.

May the model „elementary system (without mass!)“ moreover the understanding of weak and strong interaction facilitate? Do we come closer to the world-formula with this model?

The hypothesis of an elementary system instead of a classical electron or hazy clouds of electron presence should have in way of thinking / explanation of many physical reactions very extensive consequences. However, quantization – if wanted, not at least because of factor h – will overcome so as pi as circular number continues.

If for interpretations parallel or many worlds are needed, is here undecided left.

Will physics after all answer the purpose possibly without mystification? Will **Schrödinger**'s cat not die in multiversum? Is it allowed to apply for **Newton** in subatomic range too? Will tempers be flared again as at the beginning of 1900?

Howsoever, new answers produce new questions.

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Note: **After elaboration** of the above-introduced model, the author discovered **other** electron models.^[38,39] According to these the electron moves also intrinsic. But no model of these delivers - more impressive defining - relations for perhaps constants of **Planck** h , **Von Klitzing** R_K , **Rydberg** R_∞ , fine-structure α as also **Bohr**'s magneton μ_B and radius a_0 as well as characteristic impedance of vacuum Z_0 – just to enumerate some.
Gauthier's model starts with the zitterbewegung, said of the behaviour of atomic bonded electrons.
Kanarev's model is a modified **Parson** Magnetron model of atoms and electrons in 1915.^[40]

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- [19] *ibid.* p 30, equation (1.3.28)
- [20] *ibid.* p 42, equation (1.4.8)
- [21] *ibid.* p 47, equation (1.5.2)
- [22] *ibid.* p 50, equation (1.5.27)
- [23] **Fritsch**, *ibid.* p 64: „... jeder theoretische Physiker solle sich in seinem Büro an die Wandtafel schreiben: 137 - wie wenig wir doch wissen.“
Translation: „... every theoretical physicist should write in his bureau on the blackboard: 137 – after all, how little we know.“
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- [27] *ibid.* p 66
- [28] *ibid.* p 61
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