Electric charge and electric field of elementary particles.

Abstract. The inaccuracy of the modern view of the electric charge and the electric field is shown. The whole theory of Maxwell, Coulomb and other giants of physics, is valid only for macroscopes, on the order of more than 100 sizes of elementary particles. In the microscale there are completely different laws. Including the field of a single charge does not have spherical symmetry and the Coulomb dependence is inverse to the radius.

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1. Introduction. The more mankind goes deeper into the knowledge of Nature, the more difficult it is to move. The concepts and mathematical formulas become more difficult. The lower the confidence of scientists to the published results.

The theory of the Elastic Universe gave an answer to the origin of the mass of particles, the angular momentum of the particles. But in the matter of electric charge there was a delay. Mainly due to the distrust of scientists to our theory.

What to take for the main axioms? Scientists proceed from generally accepted postulates. If we start from traditional physics, then Gauss's law is valid:

$$q = \int_0^{\infty} \int_0^{\pi} \int_0^{2\pi} \mathrm{div}(E(r, \theta, \phi)) r^2 \cdot \sin(\theta)\, d\phi\, d\theta\, dr \quad (1)$$

That is, the charge is equal to the integral of the divergence of the electric field. According to Maxwell’s equations:

$$\mathrm{div}E = 4\pi\rho \quad (2)$$

And since there are no charges inside the wave vortices (locks), we will always get zero. What checked our analytical calculations. This is a mandatory procedure. Trust but check. We started from the equation:

$$E = \frac{-1}{c} \cdot \frac{dA}{dt} \quad (3)$$

Where ***A*** - electromagnetic vector potential obtained from our unified theory of all fields. All this we have long found, published in our previous articles. Further ***W*** – смещение в гукууме.

As is known from mathematics, for any vector field ***W*** there is such a Helmholtz decomposition:

$$W = A + G \quad (4)$$

what:

$$\mathrm{div}A = 0 \quad \mathrm{rot}G = 0 \quad (5)$$

According to our earlier conclusions, ***A*** – this is the electromagnetic vector potential, and ***G*** gravitational field strength.

According to the textbook Landau - Lifshits

$$\frac{-1}{c^2}\cdot\frac{d^2A}{dt^2} = rot(rotA) \quad (6)$$

But given (5), you can write:

$$\frac{-1}{c^2}\cdot\frac{d^2A}{dt^2} = rot(rotW) \quad (7)$$

Thus, we can express the charge of any wave vortex through displacements ***W*** which we previously calculated and published 15 years ago. The charge is expressed as an integral over space-time.

$$q = \int_0^{\infty}\int_0^{\pi}\int_0^{2\pi} div\left(\int rot(rotW(r,\theta,\phi,t))\,dt\right) r^2\cdot\sin(\theta)\,d\phi\,d\theta\,dr \quad (8)$$

We have done all calculations for lok (0,0), (1,0) and (1,1). And as expected, they got zero everywhere.

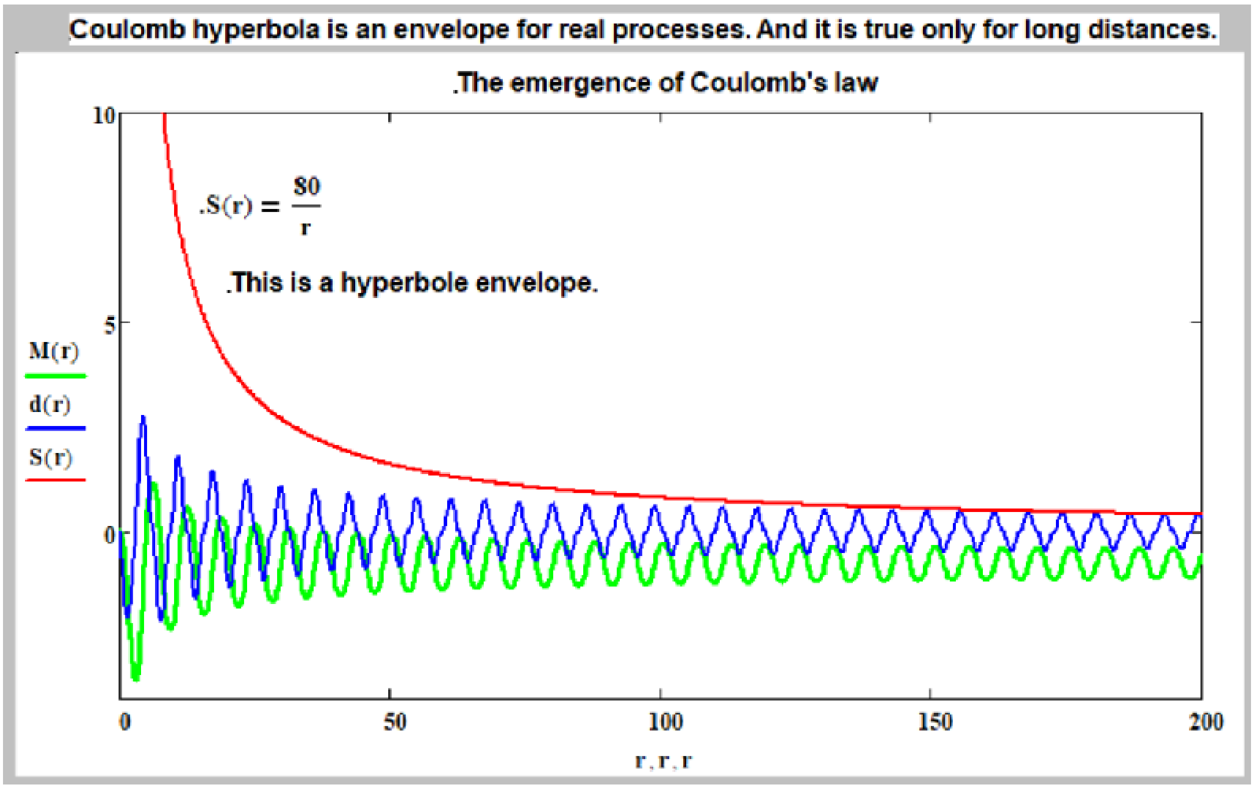
q=0 (9)

There was a similar story with the moment of particle rotation. The moment of rotation of the locks during formal integration also gave zero. However, after we took into account the direction of rotation of the elements of lok, the result was non-zero and meaningful integrals.

What does this result mean? It means that physicists currently do not know what a charge is and what an electric field is. The basis for the description of the electric field and charge is taken simple, beautiful, idealized mathematical model. Model of Maxwell, Coulomb, and Gauss equations. In which, as it were (formula 2), the charge is separate, and the electric field is separate. The story, which was fixed and continued with the Higgs boson, when all the elementary particles are separate, and their masses are separately, like weights in a pocket, in the form of the Higgs boson.

We have long had a question. Physicists, nuclear scientists spend billions on the study of the destruction of protons. On relativistic research. But for some reason, interactions between charged particles at small distances are not investigated. Why? Yes, they are probably being researched, but they are not noisy about this, because all the laws in the microworld are violated and “wave functions”, “probability” and “uncertainty principle”, which violate the whole order, begin to work.

What does it look like in reality? Coulomb dependence arises as an envelope of real processes in a wave vortex. At large distances (about 100 units on the graph) there is a complete coincidence with reality. But neither the Coulomb's law, the Maxwell laws, nor the Gauss formula work at small distances.



(10)

This made us take a new approach to the calculation and description of the electric charge and electric field.

2. Charge dimension. If we compare the dimension of the spin and the dimension of the charge, we get.

$$[Spin]: g^{1} \cdot sm^{2} \cdot sec^{-1} . \quad (11)$$

$$[Charge]: g^{1/2} \cdot sm^{3/2} \cdot sec^{-1} . \quad (12)$$

That is, we see the difference in the mass component and in the linear component. This fact we take further for the basis of the search for charge formulas of elementary particles. If our integral for calculating the spin included the energy density and the radial coordinate in the whole form, then it is very likely that these quantities should be included in the charge in a modified form. In particular, it is highly likely that the degree of the radial coordinate under the integral should be ½ less. This is certainly not the final conclusion. After all, the radial coordinate is included in the energy formula.

What is the reason for the difference between the dimensions of spin and charge? As we have previously stated, based on physical properties, there is much in common between spin and charge. According to the directory Jaworski-Detlaf, close experimental graphs of their distribution inside the particles. The signs of these quantities are close. And the spin and charge of the neutron is zero. At the same time, we explained why an electron so small in mass has such a large spin and charge. This is a consequence of the large size of the electron, its large wave cloud. At the center of the electron, the density is zero, like a donut. The proton is very small and very dense, has a seal in the center of the "core".

That is, comparing spins and charges, we conclude, for example for an electron, that the same elements of a wave vortex (0,0) enter into the formation of a spin and a charge. They come with the same signs, but for the charge these elements are multiplied by some functional coefficient. We will not guess about the exact form of this coefficient, because we do not imagine what is happening there at the micro level. This is a very difficult task for future young people. We will be satisfied with some approximation.

The spins of the particles do not interact at a distance, and the charges interact. This is the important difference between spins and charges. But is it? Why are we so sure that when the two protons approach each other, the charges interact? This does not follow from anywhere. We might as well say that the spins interact. We do not know the processes at the micro level. It is possible that the interaction of the electron and the proton begins with the fact that the proton clings the electron with some of its elements, causes it to turn, and unfolds itself. And only then begins the interaction. Science does not know and does not understand this. This is referred to as “wave functions”, “probability” and “uncertainty principle”.

Some components interact in the strain tensors of wave vortices. That is, in the tensors of Gukuum shifts. Well, the tensors of two electrons are the same, and their interaction is quite natural and understandable. But the interaction of the electron and proton tensors requires the search for some related components of the tensors. The existence of such related components is confirmed by the coincidence (up to sign) of the spins of the proton and the electron. Perhaps the direction of the search for such components. Let's try to compare the formula for the energy of the proton and electron.

Auxiliary formulas:

$$Q = \frac{\cos(q)\cdot q - \sin(q)}{q^2} \qquad R = \frac{2\cdot\sin(q) - 2\cdot q\cdot\cos(q) - q^2\cdot\sin(q)}{q^3}$$

The last stage of the formulas for energy after integration over angular coordinates.

$$E_{(0,0)}(q) = \int_0^{\infty} \frac{2}{3}\cdot\pi\cdot L_1\cdot Q^2\,dq + \int_0^{\infty} \frac{2}{3}\cdot\pi\cdot L_2\cdot Q^2\,dq$$

$q = k\cdot r$ **L1 and L2 - Lame Gukuum**

k - coefficient determined by the mass of the particle. At an electron and a proton differs on orders.

$$E_{(1,1)}(q) = \frac{L_1\cdot\pi}{15}\cdot\left[6\cdot\int_0^{\infty}(R)^2\,dq + 2\cdot\int_0^{\infty}\left(\frac{Q}{q}\right)^2 dq\right] + \frac{L_2\cdot\pi}{30}\cdot\left[8\cdot\int_0^{\infty}(R)^2\,dq + -4\cdot\int_0^{\infty}\frac{Q}{q}\cdot R\,dq + 18\cdot\int_0^{\infty}\left(\frac{Q}{q}\right)^2 dq\right]$$

(13)

As you can see, there are identical elements, this ***Q*** . In this case, the parameter ***k*** in the formula ***q=k*r*** in formulas for (0,0) and (1,1) it is different, it differs by three orders of magnitude (approximately like the mass of a proton differs from the mass of an electron). Therefore, no synchronization of oscillations in the wave (0,0) and (1,1) can be expected. However, since the integral over ***r*** is taken to infinity, it may turn out that the presence of the parameter ***k*** does not matter. Таким образом весьма вероятно предположение, что во взаимодействии зарядов как раз играет параметр ***Q*** .

In addition, this conclusion is valid. Since the experimentally established equality (in absolute value) of the spins and charges of the proton and the electron, we take this fact as a basis. That is, the same should be done according to the formulas. This is exactly what happens for the spins of a proton and an electron, but with a certain error. What formula and what the final result of the calculation of the spin is considered more accurate, for an electron or for a proton? Formulas for the proton are very complex, ambiguous, and cause little confidence. Therefore, it is better to rely on electron data.

Let's try to act the method of selection.

3. Charge interaction. According to our theory of the Elastic Universe, elementary particles are single objects. There is no separation in them: this is a particle, and this is its gravitational field. By analogy with the planet Earth, here is the Earth, but its atmosphere. Or: this is the charge of a particle, and this is its electric field. In our understanding, this is a purely conditional division. In the same way, scientists once believed that "all bodies fall down." But then they found out that the “bottom” is also a body, the Earth. And they came to a more general formulation that “there is a gravitational attraction between all bodies”.

Therefore, we choose a new path. Namely, based on the general formulas obtained by us for wave vortices, we will try to choose the formula of electrical interaction.

So, 15 years ago we received an integral, which we called the "energy integral" of wave vortices (locks). At the same time, we used the “winding law”. We have made this integral, proceeding from traditional representations of physics, as the sum of squares of the elements of the strain tensor.

$$E = \int_0^{\infty}\int_0^{\pi}\int_0^{2\cdot\pi}\left[\frac{L_1}{2}\left[Wrr^2 + (W_{\theta\theta})^2 + (W_{\phi\phi})^2\right] + L_2\cdot\left[(W_{r\theta})^2 + Wr\phi^2 + W\phi\theta^2\right]\right]\cdot\sin(\theta)\, d\phi\, d\theta\, dr \quad (14)$$

We did all the necessary mathematical operations, and found that the energy integrals for the lok (0,0), (1,0) and (1,1) are safely calculated.

Next, we made integrals similar to the rotational moment from traditional physics.

$$M = \int_0^{\infty}\int_0^{\pi}\int_0^{2\pi} \operatorname{sign}(\rho_M)\cdot\rho_M(r,\theta,\phi)\, r^2\cdot\sin(\theta)\, d\phi\, d\theta\, dr \quad (15)$$

Here ρ_M – the density of the torque in the wave vortex, calculated according to standard rules, multiply the mass by the radius of rotation. Mass is energy divided by c^2. Energy is calculated by the formula (14). We have done all these painstaking calculations with the help of Matkad, all the integrals have converged and have quite reasonable values. Matkad is very convenient, because the formulas from it are visual. Look at the formula (15). And if we showed here a formula from Maple, then no one would understand anything.

Thus, based on the internal structure of the wave vortices, we obtained the masses and spins of elementary particles. All this was done 15 years ago and is in excellent agreement with the experiment.

We obtained some integral formulas for wave vortices (14) and (15), which, as it turned out, have real manifestations. Integral (14) appears in the mass of particles. And integral (15) manifests itself in the moment of rotation (back) of the particles. We ask the question: are there any other integral values of the wave vortices besides the mass and the moment of rotation? Which could actually manifest themselves as some physical properties, except mass and back? For example, these integrals could be identified as an electric field, an electric charge, and even some new properties of elementary particles.

As can be seen from the definitions and formulas, the torque is essentially the energy multiplied by the radius of rotation. Nothing mysterious. However, in practice such a simple multiplication adds one more physical property to the particle mass: spin. Why not try other combinations? We have previously established that in many respects the electrical properties of particles correlate with their spins.

From these considerations, we make the assumption that the desired electric charge integral is closely related to the integral for the spin. That is, if the integral for the torque is calculated by the formula

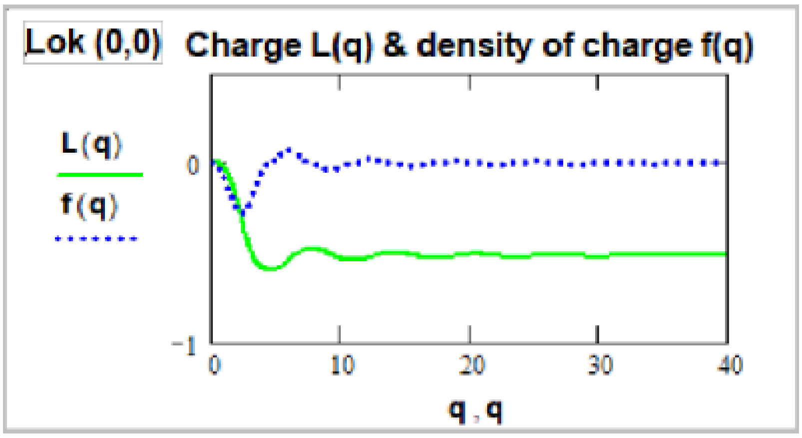
$$M = \int_0^{\infty}\int_0^{\pi}\int_0^{2\cdot\pi} \Phi(r,\theta,\phi)\, d\phi\, d\theta\, dr \quad (16)$$

That integral for electric charge can be calculated by the formula:

$$Q = \int_0^{\infty}\int_0^{\pi}\int_0^{2\cdot\pi} \Phi(r,\theta,\phi)\cdot r^{s}\, d\phi\, d\theta\, dr \quad (17)$$

That is, with the addition of the subintegral expression r^s , where **s** – some number of numbers that have physical meaning. **s**=1, ½, -½, -1. We took such a series of numbers because earlier in the study of the dimensions of spin and charge, we found just the difference on $r^{1/2}$. And values outside this area will give divergent integrals.

We calculated integrals (17) for all three locks (0,0), (1,0) and (1,1). And for all values of ***s*** = 1, ½, -½, -1. And here are the results obtained for ***s*** = -½. The conditionally obtained integrals we called “charges”.



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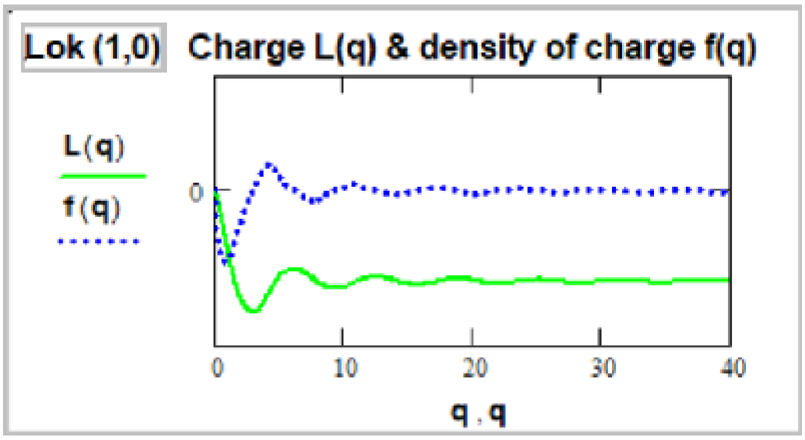

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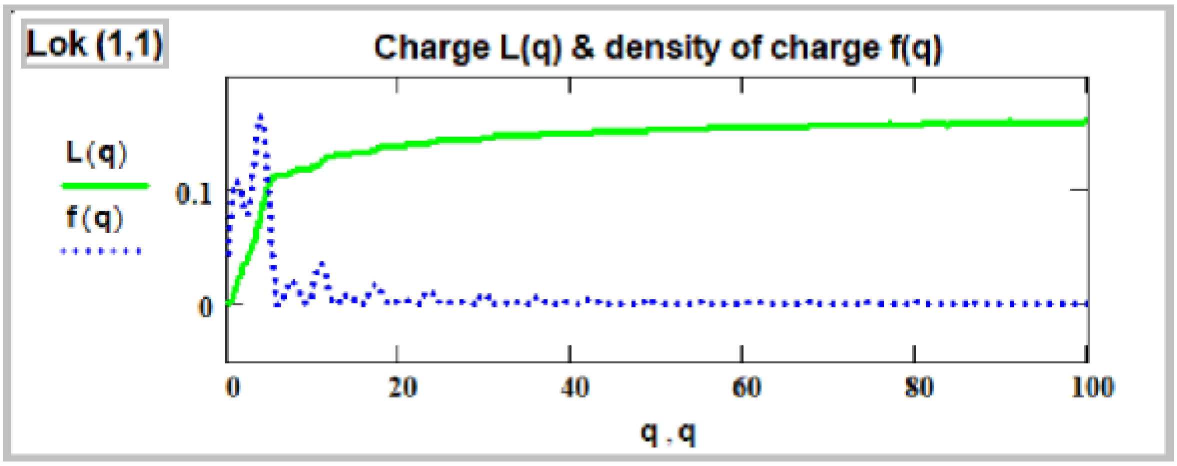

(20)

From these graphs it can be seen that both the electric field and the electric charge are the same graph. They are the same formulas, they are the same phenomenon, they are the same. Only the bulk of the charge is formed in the microscopic region. The electric field is a charge spread in space.

Similar pictures are obtained for all other values **s**=1, ½, -½, -1. True, the convergence and the picture for lok (1,1) are somewhat worse.

What can be said about these graphs?

1. Formulas for torque for lok (1,1) are very complex. And simply multiplying these formulas by $r^{-1/2}$ makes too much error in the result. Therefore, it turned out so broken.
2. The fact that the integrals converge speaks of the existence of some new invariants (except for mass, spin, and electric charge). As we know from physics, such invariants really exist. For example, the magnetic moment, as well as those properties that are now described by quantum numbers. Such as “weak interaction”, “strong interaction”, “baryon number”, “lepton number”, “magnetic moment”, “internal parity”, “isotopic spin”, etc. This also means the existence of real physical properties behind these numbers.
3. From the graphs (18), (19), (20) one can see at what distances the actual charge is formed, and then properties close to Coulomb's law, Maxwell's laws and Gauss's law begin.
4. In principle, these graphs are very similar to the previously studied graphs of spins of elementary particles.
5. The fact that we brought graphics for the amendment to $r^{-1/2}$ does not mean that it forms an electric charge. The case is subtle and easy to make a mistake. This is the work of young physicists of the future, who own Matkad and Maple.

We touched upon a new layer of theoretical research. Physics becomes theoretical and mathematical. Which is better: to contain 100 physicists well mastered in mathematics, or millions of middle-level workers in the construction and maintenance of colliders? Maybe they can better houses or build roads?

Thus, the final form of the charge formulas of elementary particles is as follows. $q=k\bullet r$, magnitudes k for all particles different, depend on mass. L_1 and L_2 – Lame coefficients for Gukuum.

Electron. Formula (up to coefficients) for torque (spin):

$$M_{0,0}(q)=\frac{2}{3c}\cdot\pi\cdot(L_1+L_2)\cdot\int_0^q \operatorname{sign}(\cos(q)\cdot q-\sin(q))\cdot\left[\frac{(\cos(q)\cdot q-\sin(q))}{q^2}\right]^2\cdot q\,dq$$

(21)

The formula for the charge (then we had to change the designation from ***L*** to ***Q***, because ***L_1* и *L_2*** busy under the coefficients of Lame, all the letters are busy, not enough letters) ***$Q_{0,0}(q)$***:

$$Q_{0,0}(q) = \frac{2}{3c}\cdot\pi\cdot(L_1 + L_2)\cdot\int_0^q q^{\frac{-1}{2}}\cdot \mathrm{sign}(\cos(q)\cdot q - \sin(q))\cdot\left[\frac{(\cos(q)\cdot q - \sin(q))}{q^2}\right]^2\cdot q\,dq$$

(22)

That is, the same formula, but the integral expression is multiplied by $r^{-1/2}$.
Similar formulas for the neutron. Spin:

$$Q(q) := \frac{(\cos(q)\cdot q - \sin(q))}{q^2} \qquad R(q) := \frac{2\sin(q) - 2\cos(q)\cdot q - \sin(q)\cdot q^2}{q^3}$$

$$M_{1,0}(q) = \int_0^q \mathrm{sign}(R)\cdot\left(\frac{6}{15}\cdot\pi\cdot L_1\cdot R^2\right)\cdot q\,dq + \int_0^q \mathrm{sign}(Q)\cdot\left(\frac{16}{15}\cdot\pi\cdot L_1\cdot\frac{Q^2}{q^2}\right)\cdot q\,dq - \blacksquare$$

$$\blacksquare - \int_0^q \mathrm{sign}\left(\frac{Q}{q} + R\right)\cdot\left[\frac{2}{15}\cdot\pi\cdot L_2\cdot\left(\frac{Q}{q} + R\right)^2\right]\cdot q\,dq$$

(23)

Charge ***$Q_{1,0}(q)$***:

$$Q(q) := \frac{(\cos(q)\cdot q - \sin(q))}{q^2} \qquad R(q) := \frac{2\sin(q) - 2\cos(q)\cdot q - \sin(q)\cdot q^2}{q^3}$$

$$Q_{1,0}(q) = \int_0^q q^{\frac{-1}{2}}\cdot\mathrm{sign}(R)\cdot\left(\frac{6}{15}\cdot\pi\cdot L_1\cdot R^2\right)\cdot q\,dq + \int_0^q q^{\frac{-1}{2}}\cdot\mathrm{sign}(Q)\cdot\left(\frac{16}{15}\cdot\pi\cdot L_1\cdot\frac{Q^2}{q^2}\right)\cdot q\,dq - \blacksquare$$

$$\blacksquare - \int_0^q q^{\frac{-1}{2}}\cdot\mathrm{sign}\left(\frac{Q}{q} + R\right)\cdot\left[\frac{2}{15}\cdot\pi\cdot L_2\cdot\left(\frac{Q}{q} + R\right)^2\right]\cdot q\,dq$$

(24)

Similar formulas for proton. Spin:

$$Q = \frac{\cos(q)\cdot q - \sin(q)}{q^2} \qquad R = \frac{2\cdot\sin(q) - 2\cdot q\cdot\cos(q) - q^2\cdot\sin(q)}{q^3}$$

$$M_{11}\cdot(q) = L_1\cdot\frac{2\cdot\pi}{15\cdot c}\cdot\int_0^q \operatorname{sign}(R)\cdot R^2\cdot q\,dq - L_1\cdot\frac{2\cdot\pi}{15\cdot c}\cdot\int_0^q \operatorname{sign}(Q)\cdot\left(\frac{Q}{q}\right)^2\cdot q\,dq + \ldots$$

$$\ldots + L_2\cdot\frac{\pi}{30\cdot c}\cdot\int_0^q \operatorname{sign}\left(43\cdot Q^2 - 36\cdot Q\cdot R\cdot q + 8\cdot R^2\cdot q^2\right)\cdot\left(\frac{43\cdot Q^2 - 36\cdot Q\cdot R\cdot q + 8\cdot R^2\cdot q^2}{q^2}\right)\cdot q\,dq - \ldots$$

$$\ldots - L_2\cdot\frac{\pi}{6\cdot c}\cdot\int_0^q \operatorname{sign}(Q)\cdot\left(\frac{Q}{q}\right)^2\cdot q\,dq$$

(25)

Charge $\boldsymbol{Q_{1,1}(q)}$:

$$Q = \frac{\cos(q)\cdot q - \sin(q)}{q^2} \qquad R = \frac{2\cdot\sin(q) - 2\cdot q\cdot\cos(q) - q^2\cdot\sin(q)}{q^3}$$

$$Q_{11}\cdot(q) = L_1\cdot\frac{2\cdot\pi}{15\cdot c}\cdot\int_0^q q^{\frac{-1}{2}}\cdot\operatorname{sign}(R)\cdot R^2\cdot q\,dq - L_1\cdot\frac{2\cdot\pi}{15\cdot c}\cdot\int_0^q q^{\frac{-1}{2}}\cdot\operatorname{sign}(Q)\cdot\left(\frac{Q}{q}\right)^2\cdot q\,dq + \ldots$$

$$\ldots + L_2\cdot\frac{\pi}{30\cdot c}\cdot\int_0^q q^{\frac{-1}{2}}\cdot\operatorname{sign}\left(43\cdot Q^2 - 36\cdot Q\cdot R\cdot q + 8\cdot R^2\cdot q^2\right)\cdot\left(\frac{43\cdot Q^2 - 36\cdot Q\cdot R\cdot q + 8\cdot R^2\cdot q^2}{q^2}\right)\cdot q\,dq - \ldots$$

$$\ldots - L_2\cdot\frac{\pi}{6\cdot c}\cdot\int_0^q q^{\frac{-1}{2}}\cdot\operatorname{sign}(Q)\cdot\left(\frac{Q}{q}\right)^2\cdot q\,dq$$

(26)

The graphs of these integrals (18) - (20). But for now this is only a hypothesis about the coefficient on $\boldsymbol{r^{-1/2}}$ in the denominator. Need to carefully examine the integral expression $\mathbf{r^s}$, где **s** – some series of numbers that have a physical meaning. **s**=1, ½, -½, -1. And maybe some other options.

Findings. We outlined a plan for theoretical studies of the charges of elementary particles. Some preliminary results have been obtained. I, A. Dubinyansky already 66 years old, diabetes, health. Perhaps this is my last scientific article. Next you need funding and connecting a group of good physicists and mathematicians. Of those hundreds of billions of dollars that are wasted on colliders, it is possible and necessary to branch off a trickle of several million to the specification of the theory of the Elastic Universe.

Literature.

1. Yavorsky B.M., Detlaf A.A. Handbook of physics. "Science", 1980.
2. Landau, LD, Lifshits, E.M. Field theory. "Science", 1988.