Facts of Theory of Particles

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ABSTRACT: The supergravity has been composed into the formalism of de Broglie' - Maxwell's equation [1]. It has been evidenced that the poles of charges don't have to be placed at the vertices of the regular polygon on the plane of complex mass [2].
With each member of expansion of exponential potential certain objects have been connected. Morover other facts of theory of particles have been described like: an operator of parity, tunneling, Goldstone's bosons etc.

1. Supergravity

In the work [1] de Broglie's - Maxwell's equation has been deduced:

$$m = \alpha |Q| \qquad (1)$$

where:

$$Q = Q_0 e^{i\left(\frac{2k\pi}{n} + \varphi\right)} \qquad n \in N, \quad k = 0, 1, \ldots, n-1 \qquad (2)$$

The number n describing the number of poles of an interaction is simultaneously the number of this interaction so as atomic numbers of chemical elements in the Mendeleev's system.
The problem arises, how to compose the supergravity in this program of interactions. But the answer is easy. The supergravity corresponds with $n = 0$ (while gravity with $n = 1$). It means that for the supergravity the condition $0 \leqslant k \leqslant n - 1$ corresponds with $k = 0$, so $\frac{k}{n} = \frac{0}{0}$. We have so an indeterminate symbol which can be any number.

2. Equation of field

This equation has been written in the form [2]

$$\sum_{n\in N} a_n g^n + \sum_{n\in N} \frac{b_n}{g^n} + \sum_{n\in N\cup\{0\}} \underbrace{\int\ldots\int}_{n} \ln g \underbrace{dg\ldots dg}_{n} =$$

$$= \text{const} \qquad (3)$$

It has been assumed that the fields and their sources are equivalent, what is the consequency of unification of interactions.
The equation of the regular polygon corresponds with the situation, when the equation (3) is reduced to $x^n = \text{const}$ or $\frac{1}{x^n} = \text{const}$ (only one nonzero coefficient)
Taking under consideration other coefficients in the equation of fields leads to the arrangement of the points on the plane.
When, for example, the equation (3) is reduced to:

$$\sum_{n=1}^{N} a_n x^n = \text{const} \;; \quad \text{for each } n \; a_n \neq 0 \;; \; n < N \qquad (4)$$

or

$$\sum_{n=1}^{N} \frac{b_n}{x^n} = \text{const}; \quad \text{for each } n \; b_n \neq 0 \;; \; n < N \qquad (5)$$

The equation (4) and (5) described another, generalized equation, which is written however with the number n. So the suspection is valid , that not only the vertix point of the regular polygon describes the pole of charges (what would be the result of (2)), although this fact is a concequence of another equation.

3. Consequences of binding potential

Let's analyse the exponential potential

$$V(x) = A_0 e^{kx} = A_0 \sum_{n=0}^{\infty} \frac{(kx)^n}{n!} \qquad (6)$$

Each member corresponds with the certain degree of binding and the corresponding with it level of bound objects. These objects differ less and less with the change of n.

In the equation [3]

$$p = \pm i \left| \sqrt{2mW_H} \right. \qquad (7)$$

the sign minus means (in the equation $A \sim e^{ipx}$) an arising with x. It is the next example of the arising of the potential with x, besides the confinement of quarks. The effects of this kind exist in the world of atoms too. The forces of inertia increase with the distance, becouse the number of interacting particles increases with the distance and it is an interaction with unempty vacuum. These interactions don't countermand, because in the case of the rectilinear motion there exists a distinguished sense of an axis and in the case of rotation movement - the distinguished sense of an axis of rotation. The unification of interactions implcates that the forces of inertia are connected with each interaction. So, the typical forces of inertia correspond with gravitational forces and the potential of the confinement of quarks corresponds with the strong interactions. Both types are connected with the superconductivity. The gravitation is connected with cosmological constant and Londons' equation, strong interactions with Londons' equation [4].

4. Parity

We have an operator

$$P|\psi\rangle = e^{i\delta}|\psi\rangle$$

If the parity is concerved , then $e^{i\delta} = 1$ or $e^{i\delta} = -1$. If the parity isn't conserved then it is any number and $e^{i\delta}$ is any complex number.

Let's consider the equation:

$$e^{i\delta} = e^{i\left(\frac{2\pi M}{N} + \varphi\right)} \tag{8}$$

$$\delta = \frac{2\pi M}{N} + \varphi \qquad M,N - \text{natural} \quad M = 0,1,\dots N-1 \tag{9}$$

The equation (8) is an analog of the equation (2). For each n the interactions exist with the broken and unbroken parity. For n = 2 we have an electromagnetic and weak interaction.

We postulate the existence of the version of interaction with conserved and unconserved parity for gravitation and strong interactions.

There are generalized interactions with broken parity, which don't correspond with the vertices of the regular polygon, so which aren't described by the formula (9).

5. Other facts

The tunneling isn't connected with the probability, but with the motion in the additional, perpendicular dimensions.

The unifcation of interactions and singularities in different types of interactions mean that the existence of black holes is connected with different types of interactions.

We may analyse the situation, in which the particles repulse the antiparticle [5,6]. It is the kind of the superconductivity in which the nontypical effect is connected with the unepty vacuum.

Each Feynman's propagator creating the closed loop is the loop of ghosts with complex mass.
The massless Goldstone's bosons like the new solutions of the classical Yang-Mills' equations [7] - instantons - are real existing physical objects.
In the process of the transfer of the string interactions apart from the triad of particles π^0, π^+, π^- the fourth neutral particle exists in the analogy to the tetrady transfering the electro-weak interactions.

References:

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[6] Dyson F.J., Phys. Rev. 85, 631 , (1952)

[7] Leader E. , Predazzi E. , 'An Introduction to Gauge Theories and the New Physics'