The Standard Model is not correct and Large Hadron Collider is not too needed.

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Abstract:

The fundamental flaws of the Standard Model are considered.

Unstable short-lived particles discovered at colliders, are not the fundamental elementary particles, i.e. particles of which matter is consist. If the energy of the colliding particles is increased, then, perhaps, new, more massive, unstable, short-lived particles may be found.

"Total with antiparticles opened more than 350 elementary particles. Of these are stable photon, electron and muon neutrinos, electron, proton and their antiparticles. Other elementary particles spontaneously decay over time from about 1000 seconds (for a free neutron) to negligible small fractions of a second (from 10-24 to 10-22 for resonances)." [1]

There are quite enough candidates for a variety of theories of the structure of matter, if not follow to a strict approach. How did we come to this?

I briefly expound the history of the issue. In the 20-ies of the last century, Schrodinger proposed the hypothesis of the structure of elementary particles of the wave packets (groups of waves of different frequencies, Einstein and De Broglie supported this idea. But it was rejected, as these packages fade away due to the different phase velocities of waves of different frequencies in a dispersive medium, it is really so. At that time this hypothesis has not been adequately improved and developed. Theorists were limited to the recognition of wave-corpuscle duality of particles, which of course exists, but it does not cancel the wave nature of elementary particles, and is its consequence.

So in the 20 years of the last century this error was born. The result was the emergence in the 60-s of the last century the so-called Standard Model. Briefly about it.

1). Free (external) parameters of the Standard Model.

"Number of parameters – the standard model depends on 19 numerical parameters. Their values are known from experiment, but the origin of the values is unknown. Some theorists have tried to find relations between different parameters, for example, between the masses of particles in different generations." [2]

2). Very easy are introduced new not observed particles and fields. To justify unobservability of quarks and gluons, was introduced another new physical concept – color confinement. Others unobservable in nature particles (and fields) the Standard Model is called virtual and transmits them to the so-called quantum vacuum. It is extremely handy thing for the theorists of the

Standard Model. When they need to, these virtual particles (quanta of action) suddenly becomes real when it is not necessary again disappear, dissolve in the quantum vacuum.

“There is not yet an analytic proof of color confinement in any non-abelian gauge theory. The phenomenon can be understood qualitatively by noting that the force-carrying gluons of QCD have color charge, unlike the photons of quantum electrodynamics (QED). Whereas the electric field between electrically charged particles decreases rapidly as those particles are separated, the gluon field between a pair of color charges forms a narrow flux tube (or string) between them. Because of this behavior of the gluon field, the strong force between the particles is constant regardless of their separation.

Therefore, as two color charges are separated, at some point it becomes energetically favorable for a new quark–antiquark pair to appear, rather than extending the tube further. As a result of this, when quarks are produced in particle accelerators, instead of seeing the individual quarks in detectors, scientists see "jets" of many color-neutral particles (mesons and baryons), clustered together. This process is called hadronization, fragmentation, or string breaking.

The confining phase is usually defined by the behavior of the action of the Wilson loop, which is simply the path in spacetime traced out by a quark–antiquark pair created at one point and annihilated at another point. In a non-confining theory, the action of such a loop is proportional to its perimeter. However, in a confining theory, the action of the loop is instead proportional to its area. Since the area is proportional to the separation of the quark–antiquark pair, free quarks are suppressed. Mesons are allowed in such a picture, since a loop containing another loop with the opposite orientation has only a small area between the two loops.” [3]

“Vacuum state

In quantum field theory, the quantum vacuum state (also called the quantum vacuum or vacuum state) is the quantum state with the lowest possible energy. Generally, it contains no physical particles. Zero-point field is sometimes used as a synonym for the vacuum state of an individual quantized field.

According to present-day understanding of what is called the vacuum state or the quantum vacuum, it is "by no means a simple empty space". According to quantum mechanics, the vacuum state is not truly empty but instead contains fleeting electromagnetic waves and particles that pop into and out of existence.

The QED vacuum of quantum electrodynamics (or QED) was the first vacuum of quantum field theory to be developed. QED originated in the 1930s, and in the late 1940s and early 1950s it was reformulated by Feynman, Tomonaga and Schwinger, who jointly received the Nobel prize for this work in 1965. Today the electromagnetic interactions and the weak interactions are unified in the theory of the electroweak interaction.

The Standard Model is a generalization of the QED work to include all the known elementary particles and their interactions (except gravity). Quantum chromodynamics is the portion of the Standard Model that deals with strong interactions, and QCD vacuum is the vacuum of quantum chromodynamics. It is the object of study in the Large Hadron Collider and the Relativistic Heavy Ion Collider, and is related to the so-called vacuum structure of strong interactions.” [4]

3). A stable proton consists of a mixture of quarks and gluons, at that the number and parameters of gluons (the number of particles inside the proton, and not the number of types) are practically not found.

“Quarks and the mass of a proton

In quantum chromodynamics, the modern theory of the nuclear force, most of the mass of protons and neutrons is explained by special relativity. The mass of a proton is about 80–100 times greater than the sum of the rest masses of the quarks that make it up, while the gluons have zero rest mass. The extra energy of the quarks and gluons in a region within a proton, as compared to the rest energy of the quarks alone in the QCD vacuum, accounts for almost 99% of the mass. The rest mass of a proton is, thus, the invariant mass of the system of moving quarks and gluons that make up the particle, and, in such systems, even the energy of massless particles is still measured as part of the rest mass of the system.

Two terms are used in referring to the mass of the quarks that make up protons: current quark mass refers to the mass of a quark by itself, while constituent quark mass refers to the current quark mass plus the mass of the gluon particle field surrounding the quark. These masses typically have very different values. As noted, most of a proton's mass comes from the gluons that bind the current quarks together, rather than from the quarks themselves. While gluons are inherently massless, they possess energy—to be more specific, quantum chromodynamics binding energy (QCBE)—and it is this that contributes so greatly to the overall mass of protons (see mass in special relativity). A proton has a mass of approximately 938 MeV/c2, of which the rest mass of its three valence quarks contributes only about 9.4 MeV/c2; much of the remainder can be attributed to the gluons' QCBE.

The internal dynamics of protons are complicated, because they are determined by the quarks' exchanging gluons, and interacting with various vacuum condensates. Lattice QCD provides a way of calculating the mass of a proton directly from the theory to any accuracy, in principle. The most recent calculations claim that the mass is determined to better than 4% accuracy, even to 1% accuracy. These claims are still controversial, because the calculations cannot yet be done with quarks as light as they are in the real world. This means that the predictions are found by a process of extrapolation, which can introduce systematic errors. It is hard to tell whether these errors are controlled properly, because the quantities that are compared to experiment are the masses of the hadrons, which are known in advance.

These recent calculations are performed by massive supercomputers, and, as noted by Boffi and Pasquini: "a detailed description of the nucleon structure is still missing because ... long-distance behavior requires a nonperturbative and/or numerical treatment..." More conceptual approaches to the structure of protons are: the topological soliton approach originally due to Tony Skyrme and the more accurate AdS/QCD approach that extends it to include a string theory of gluons, various QCD-inspired models like the bag model and the constituent quark model, which were popular in the 1980s, and the SVZ sum rules, which allow for rough approximate mass calculations. These methods do not have the same accuracy as the more brute-force lattice QCD methods, at least not yet.” [5]

4). Why is it so complicated? Remember the Occam's razor. Many claim that the Standard Model is the least complex of all known.

But this is not so, there is a more simple consistent model "Solitonic Model of the Electron, Proton and Neutron." Schrödinger's hypothesis that the elementary particles are wave packets has been modified as follows: "The electron, proton and neutron are monochromatic (single frequency) rotating electromagnetic waves, for each of them (of these particles) frequency – its own." It was confirmed by obtaining the strict solution of Maxwell's equations in the form of rotating monochromatic electromagnetic wave (for a spherical region with spatial dispersion and anisotropy strictly defined type). From the expressions for which (of this wave) is directly obtained all the basic parameters and properties of electron, proton and neutron. According to this model, matter is composed of 5 elementary particles: electron, proton, neutron, photon, and electron neutrino. At the same time instead of 4 fundamental interactions of the Standard Model remain 3: electromagnetic, gravitational and weak and instead of 12 quantum (virtual) fields remain 3 real: electromagnetic, gravitational and weak. Also in the introduction is given the analysis of the experiment on the finding of quarks. This analysis refutes the fact that they (quarks) were detected. You can read it for example here [6], peer-reviewed journal [7].

References

[1] https://ru.wikipedia.org/wiki/Элементарная_частица

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[3] https://en.wikipedia.org/wiki/Color_confinement

[4] https://en.wikipedia.org/wiki/Vacuum_state

[5] https://en.wikipedia.org/wiki/Proton

[6] http://vixra.org/pdf/1712.0124v1.pdf

[7] https://www.omicsonline.org/open-access/solitonic-model-of-the-electron-proton-and-neutron-2090-0902-1000193.pdf