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Why is a New Beginning in Physics Necessary?

Sometimes one is faced with the statement that "why questions" are not allowed in physics. However, we have to answer the question of why a new beginning in physics is necessary. Thereby, we must first bear in mind how physics research works.

Using very accurate measurement results, physics tries to explain what the natural world is and how natural processes proceed over time. The first step, determining nature, is the most difficult part of the scientific problem, because totally accurate physical measurements cannot be performed and experimental observations are always localized to finite space-time regions. The second step, to determine the time proceeding of physical processes, depends on the recognition of what nature is, and how the constituents of matter interact. This would finally allow one to derive prognoses for the time developments. In order to solve these connected problems one usually establishes some fundamental physical assumptions, known as the fundamental hypotheses.

The fundamental hypotheses must:

— take into account the measuring procedures,
— be generally valid,
— be able to provide a determination of what matter is and from it, how the time-dependent prognoses can be derived within a mathematical formalism.

For the determination of fundamental hypotheses, the most important stage would be to clarify what constitutes physically constant quantities. The principal task of research physicists must be to find the fundamental natural constants which characterize matter and to derive the time-development of physical processes from those constants.

Established physics has considered energy conservation to be the main fundamental principle for over 400 years, despite the fact that closed physical systems don't exist and that, most probably, physical interactions are non-conservative interactions. The best understood interaction, electromagnetic-interaction, is non-conservative. An overwhelming number of physical theories use energy conservation as a fundamental principle: energetic physics has been broadly established. Researchers have tried to connect all important physical quantities to energy.

At the beginning of the last century, at a time when atomistic and energetic physics were set in a irreconcilable duel, physicists decided to wholly back energetic physics: they quantized energy with $E = h \cdot \nu$, declared the energy-mass equivalence, $E = m \cdot c^2$, and also explained gravitation with a stress-energy tensor. Naturally, researchers have also tried to derive the time-developments of physical processes from energy expressions. Classical physics is only half-heartedly generalized to quantum theories. Many un-physical statements remain: it is assumed that a quantum state is completely known for a fixed time, t. The goal of finding the fundamental natural constants remains unrealized, as are generally valid equations of motion. Nevertheless, researchers remain faithful to their fundamental principle of energy conservation and this has led physics into a deadlock. Even today it is impossible to say what matter actually is, or what the quantized interactions are and how they might look. Researchers have further established several ad-hoc assumptions to describe particles and their interactions, such as the spin of particles and the existence of quarks and gauge bosons. Thus, more than the (3+1)-dimensional space-time continuums are currently discussed. Ultimately, a complete physical explanation of nature has not been reached. Despite the overwhelming conviction of researchers, nature is not sufficiently described by established physics. Gravitation could not be incorporated into the established quantum theories.

These are the mean reasons why I have broken from energetic physics.

Initially, I defined the fundamental physical constants and I derived the time developments of physical processes from these constants. I distinguished between matter and interactions, which are present between all the constituents of matter. According to these assumptions, matter is composed of point-like, localizable, physical objects and the interactions are continuous fields. I have thereby subdivided nature into particles and fields. The constituents of matter are fixed, with conserved physical characteristics. It is these physical properties that generate the fields. A further fundamental constant is assumed—the constant propagation velocity of the interactions, c. Therefore, the space-time continuum is described in Minkowski space. The constant propagation of the interactions is independent of the state of matter at the emission. The interaction fields are assumed to be non-quantized; they are non-conservative and are defined in finite space-time regions. At the generalization of classical physics, the measuring procedures are taken into account: I didn't assume exact knowledge of initial conditions. This means that I don't use the exact positions and exact velocities of particles at a given time. And naturally, I didn't suppose that all bodies move in gravitational fields with the same acceleration. I postulated that the constituents of matter have two kinds of conserved physical characteristics. The physical characteristics of the elementary particles are two kinds of conserved elementary charges. These cause the two fundamental interactions between the particles. The only fundamental physical constants are these two conserved charges, together with the constant propagation of the interactions, c. The gravitational and the electromagnetic fields, caused by elementary charges, always appear together.

This theory is a quantized, unified field theory, where only the sources of the fields are quantized with the conserved elementary charges. The theory is an atomistic theory of matter based on four kinds of stable elementary particles carrying two kinds of elementary charges. The theory is further described at www.atomsz.com.

At the concrete realization, I refer to the stable elementary particles, the electron (e), the positron (p), the proton (P) and the elton (E). The elton is often called "the antiproton" in established physics. For protons, their lifetime is measured to be greater than 10+30 years and no proton-decays have been experimentally observed. The four kinds of stable elementary particles have two kinds of conserved elementary charges: the elementary electric charges $q_i = \{\pm e\}$ and the elementary gravitational charges, $g_i = \{\pm g \cdot m_i\}$. The elementary gravitational charges, g_i, are connected to the universal gravitational constant, $G = g^2/4 \cdot \pi$ and to the elementary masses of the proton and electron, m_p and m_e. The elementary masses are not equivalent to energy; they remain constant and can be neither annihilated nor created by any physical processes. It is further assumed that the elementary particles are not composed of other particles. The main difference to established physics is the consideration that gravitation is caused by elementary gravitational charges, g_i, with two signs for the gravitational interaction between particles. Therefore, attractive and repulsive gravitation exist. Gravitation can no longer be regarded as universal mass attraction, or as being caused by the deformation of space-time around masses.

An action integral for the field and the particles is set up in finite ranges of Minkowski space in a form which is valid for all possible high velocity particles. The action integral contains five natural constants; c, e, m_p, m_e and g. Furthermore, for the fields and particles, subsidiary conditions and boundary conditions must be taken into account at the variation principle. The action integral with the subsidiary conditions is taken for the derivation of equations of motions for field and particles. The subsidiary conditions of particles include the conservation of particle numbers. They also produce Lagrange multipliers in the equations of particle motion. The Planck constant, h, is one such Lagrange multiplier. But, the action integral is not an expression of energy. The action integral also allows the calculation of bound energies and lifetimes for all composite particle systems with the help of Lagrange multipliers. Such mathematical procedures are unknown in established physics. For composite particle systems both masses (the gravitational and inertial masses) can be calculated and they are generally different. The different gravitational and inertial masses of composite particle systems lead to the violation of the universality of free fall. This is the most important deviation from established physics; see lecture online at https://www.youtube.com/watch?v=WsyJjxC7SRc.

These explanations answer why a new beginning in physics must be achieved. The prognoses of the new unified quantum field theory have to be derived for all possible physical processes and controls must be performed with experiments. Only when the prognoses of the new theory are confirmed by the results of experiments for all physical processes, without any new physical assumptions, would we accept the new theory to describe nature completely. In any case, the laws of nature are non-deterministic, however causal.

Even so, some "why questions" remain: Why do the four kinds of stable particles exist, and why are there so few? Why do the elementary particles exhibit the qualities of having two kinds of conserved physical properties? And why do the interactions propagate with c?

However, the solutions of these last "why questions" most probably lie beyond contemporary physics.

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