Theory of interactive geometric particles of the field

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Abstract

This work aims to investigate the exchange particles, photon, W and Z bosons, gluon and graviton which are responsible for fundamental interactions, and other types of elementary particles in terms of crystalline polyhedra of quantum vacuum.

Theory

One of the fundamental concepts of physics is that of particle. The classical or Newtonian mechanics assimilates every object studied to a particle, that is to say to a point mass or a dimensionless material point. Later, in the study of continuous media, the particle is defined as having an infinitesimal elementary volume in order to explore the stresses and strains in the fluid or solid medium. At the same time, the development of physics was confronted with another problem: that of the real nature of light. In 1678, Huyghens described light as a wave which propagates in a medium that will later be known as the vacuum. Two centuries later Maxwell formulated the equations of electromagnetism, thus unifying the phenomena of electricity and magnetism. The vacuum, medium of propagation of light will be described in 1905 by Einstein as a space-time continuum. But previously, in 1900, Planck had already expressed the idea of quanta during the phenomena of absorption or emission of electromagnetic energy by matter. This idea will be extended at the same time by Einstein to explain the photoelectric effect by the concept of wave-corpuscle duality. The light, that is the radiation, has then a corpuscular structure: light is thus a flux of photons, which are engaged in a wave-corpuscle duality. This notion will be generalized to the particles studied in quantum mechanics. But it should be noted that the wave in quantum mechanics is a wave of probability and not an electromagnetic wave. Unlike relativistic mechanics where the position of a particle can be determined by the knowledge of three real numbers for space and a real number for time, the position of a particle in quantum mechanics cannot be determined if the linear momentum is known, due to the Heisenberg's uncertainty principle. In other words, an infinite amount of energy will be necessary to capture a particle. The notion of particle will be subject of another denouement in quantum physics of fields. In this theory, the particle becomes an excitation of the field. In other words, a particle is a quantum field. An alternative here is supersymmetric string theory. The point particle of the quantum physics is replaced by a unidimensional entity called a string. It is thus noted that the concept of particle of physics is not yet well understood. It is subject to different fortunes depending on the type of physical theory. There is therefore a problem of unification of the various theories of physics which remains open. Consider again the photon, which is the particle responsible for the electromagnetic interaction. In particle physics, it is characterized by a zero mass, a zero charge and a spin that is equal to 1. The photon belongs to the family of bosons. But the spin is a purely quantum concept since it has no classical equivalent. This is because the particle in quantum physics is a point object, without dimension or structure, that is to say a corpuscle. The spin being defined as an angular momentum, this would lead to consider the photon as a material point turning on itself, which is totally incoherent and devoid of physical significance. In this perspective quantum physics moves further away from classical physics and any attempt to consider classical mechanics as the limit of quantum theory in this sense becomes almost impossible. There must nevertheless be a possibility of reconciling quantum physics with classical physics if one considers the photon or the other elementary particles in general as having a structure. The objective of this work is to describe elementary particles, in particular the photon as a geometric particle that is crystalline polyhedron of quantum vacum.