Fundamental quasi-particles of the real space

Volodymyr Krasnoholovets

Institute of Physics, National Academy of Sciences, Prospect Nauky 46,
UA-03028 Kyïv, Ukraine (Home Page: http://inerton.cjb.net)

The first quantum theory, quantum mechanics, was constructed in the phase space. Further quantum theories (quantum electrodynamics, chromodynamics, etc.), though describe actual entities, are also developed in the phase (rather abstract) space. All the theories do not deal with spatial images of entities studied and focus on the study of stable energy states, kinds of symmetries and so on.

Quite recently submicroscopic quantum mechanics developed in the real space has been constructed by the author [1]. The theory is based on a concrete constitution of the real space and considers canonical particles as local deformations of the space. The space is treated as a substrate, which is densely packed with building blocks – balls, or cells, or superparticles whose size is $\sim 10^{-28}$ cm that is in agreement with the scale on which all kinds of interactions coincide. A canonical particle (electron, quark, etc.) appears from a superparticle when a stable deformation is formed in it. The study of the motion of a particle in such a densely packed space brings about quantum mechanics in which the moving particle is accompanied by a cloud of spatial excitations called "inertons," which appear due to the interaction of the particle with superparticles of the space. Inertons are carriers of inert properties of the particle and yet they represent a substructure of the particle's matter waves. Thus the probabilistic indeterminism is replaced for the entire determinism. The inerton cloud is a hidden subsystem of a sort and the particle exchanges the momentum and the energy with its inerton cloud. Transitions to the Schrödinger and Dirac formalisms, which are constructed in the phase space, have been carried out in Refs. [2] and [3] respectively. The problem of the spin has been successfully solved in work [3]. The existence of inertons has been verified experimentally [4-6]. The range of spreading of the particle's inerton cloud is restricted by amplitude $\Lambda = \lambda c/v$ where λ is the de Broglie wavelength, c and v are velocities of light and the particle respectively. In the case of high energy, inerton excitations are closed inside of the particle's deformation coat (whose size equals the Compton wavelength) and manifest themselves as gluons. An inerton is also a substructure for the photon [7].

Quantum mechanical force whose carriers are inertons makes itself evident in the macroscopic range as well. A device that measures the inerton radiation of the Earth will be demonstrated at the Conference. The device can be available for the quantum curriculum.

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