An unification scheme for classical and quantum mechanics at all velocities (I)

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Abstract

Based on pivotal experimental indications we first depict the *microscopic structure of the vacuum medium*, which comprises substantial entities termed as the familiar *aethers*, and *the law of the motion of the electromagnetic waves*, which consistently obeys the Galilean transformation. This facilitates a *general scheme* for the microscopic formation of a material particle, which we thereupon carry out. We infer that, given the disturbance of a bare charge – an *aether-pole*, as a direct result of the Newtonian-mechanics solution of equations of motion of the aethers in the vacuum medium, a (basic) material particle evolves thereby into existence. The particle may be an electron, a proton, or an anti-particle of either; or a "photon" and a "phonon" if associated with the detached waves. The resulting particle has an *inertial mass*, *electric charge* and *basic size*, as well as a built-in scheme for spin to be implemented in a separate paper, conforming to the experimental exhibitions. Meanwhile, the resulting particle is from its formation generically a de Broglie wave, here called a *Newton-de Broglie (particle) wave*, resulting from a *first kind source effect*. This particle wave at low velocities generically obeys Newtonian wave mechanics which, as combined with the NdB particle wave, identifies with Schrödinger's quantum mechanics. At higher velocities, the governing law converges to Newtonian mechanics for particles. We hitherto accomplish a basic part of the task of the *unification of the classical and the quantum- mechanics*, both in terms of the deduction of the latter from the former, and in terms of the convergence of the latter into the former in a high kinetic regime. Through this *general scheme*, the origin and the nature of a series of fundamental phenomena and empirical notions, to-date yet unexplained, unfold themselves naturally. These include the nature of the *electromagnetic waves*, the origin of *inertial mass*, the nature of *radiation, absorption* and *excitations*, the origin of the de Broglie wave and Schrödinger's wave function, the origin of Heisenberg's uncertainty relation, etc. Through this *general scheme*, a series of fundamental relations and rules, already formulated by quantum mechanics and other contemporary physics as phenomenological laws and demonstrated by experiments, evolve into existence naturally, these including the *de Broglie relations*, the *simultaneous existence of electron and positron* or, generally, of *particles and their anti-particles*, the *(rest) mass energy equivalence principle*, the *uncertainty relation*, etc. As a separate but correlated context, we further infer that, the very *general scheme* leads to also a *second kind source effect*, which results in augmentation by a factor $\gamma = 1/\sqrt{1 - v^2/c^2}$ in the inertial mass, the wavevector and frequency of the constituent waves, etc. of a particle moving at the velocity in the v-direction; and conversely for their reciprocal properties. In a body composed of these particles, this accordingly leads to a *simultaneous length and time contractions* as measured in the frame in which the body resides. This, combined with

the Galilean transformation, leads to a set of coordinate transformation equations between an inertial reference frame at rest (in vacuum) and one moving relative to it, called *Galileo-Lorentz transformation*. The content of this separate context gives rise to a consistent *theory of relative motion*. With the theory, the unified classical and quantum mechanics are thereby both vigorously expressed at velocities comparable to c. Employing the theory of relative motion, which in turn justifies the theory itself, we predict the experimentally observed null-fringe shift result of the Michelson-Morley experiment, the Doppler effects and particle dynamics at $v \sim c$.

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Contents

I. INTRODUCTION

The IED particle model and vacuum structure described here are in the final form. Some views, terms and ways of introductions are not updated or out of dated. Regarding their updated editions recent publications are to be referred to. /JXZJ, 2010-06-04.