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MAGNETIC MOMENT OF A CHARGED QUANTUM PARTICLE AS A RELATIVISTIC DISTRIBUTION OF MATTER

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The starting point of our research is an error in the conventional quantum mechanics based on the Schrodinger equation: the solution of this equation is a wave packet in the coordinate space with the time-dependent phases proportional to the Hamiltonian, while the group velocity in this space is in agreement with one of the Hamilton equations, the group velocity in the conjugated space, of the momentum, is contradictory to the other Hamilton equation. The agreement with the Hamilton equations is obtained only by replacing the Hamiltonian with the Lagrangian. In this case, instead of the conventional Schrodinger equation, one obtains a Schrodinger-type equation which, besides the Hamiltonian, includes the product of the momentum with the velocity as an additional term. It is reasonable to consider the relativistic Lagrangian. Since the Lagrangian of a quantum particle is proportional to the time-space interval, which includes the gravitational field, the relativistic quantum principle can be defined as the invariance of the time dependent phases of the wave packet describing a quantum particle. On the other hand, if the invariance of the time-space interval is considered as a principle, in the framework of the general theory of relativity we find that any acceleration of a differential element of matter under the action of an external field is perpendicular to the velocity of this element in the internal, gravitational field. This means that the matter dynamics in a central field is a rotation around the center of this field. For the distribution of the rotating matter in a standing state, a Fourier series expansion can be considered. The matter corresponding to a Fourier component is called quantum particle. In this way, quantum mechanics can be considered as a Fourier representation of the relativistic mechanics of a distribution of matter. In this case, the Schrodinger-Dirac equation and the spin are obtained for a low velocity, when the momentum-velocity product is negligible compared to the particle energy, which includes the rest energy. When the spin is neglected, the conventional Schrodinger equation with the classical Hamiltonian, which does not include the rest energy, is obtained. The particle interaction with an electromagnetic field is described by a time dependent phase variation, with a vector potential conjugated to the coordinates and a scalar potential conjugated to time. From the invariance of this phase variation, the Maxwell equations of the electromagnetic field are obtained, while the matter dynamics of the particle is characterized by a magnetic moment interacting with this field.

Biography

Eliade Stefanescu has graduated from the Faculty of Electronics, Section of Physicist Engineers in 1970, and after a long activity in the field of the research and development of the semiconductor devices, he obtained a PhD in Theoretical Physics in 1990. He discovered a phenomenon of penetrability enhancement of a potential barrier by dissipative coupling. He developed a microscopic theory of open quantum systems, discovered a physical principle and invented a device for heat conversion into usable energy, and produced a unitary quantum relativistic theory. He is member of American Chemical Society and of Academy of Romanian Scientists. He received the Prize of Romanian Academy for physics in 1983, and the Prize Serban Titeica in 2014, for his book entitled "*Open quantum physics and environmental heat conversion into usable energy*". He has been invited to present his results in numerous international conferences, as Speaker, Keynote Speaker, and Member of the organizing committee.

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