THE GEOMETRODYNAMIC NATURE OF THE QUANTUM POTENTIAL

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S u m m a r y

The de Broglie–Bohm theory allows us to have got a satisfactory geometrodynamic interpretation of quantum mechanics. The fundamental element, which creates a geometrodynamic picture of the quantum world in the non-relativistic domain, a relativistic curved space-time background, and the quantum gravity domain, is the quantum potential. It is shown that, in the non-relativistic domain, the geometrodynamic nature of the quantum potential follows from the fact that it is an information potential containing a space-like active information on the environment; the geometric properties of the space expressed by the quantum potential determine non-local correlations between subatomic particles. Moreover, in the de Broglie–Bohm theory in a curved space-time, it is shown that the quantum, as well as the gravitational, effects of matter have geometric nature and are highly related: the quantum potential can be interpreted as the conformal degree of freedom of the space-time metric, and its presence is equivalent to the curved space-time. It is shown on the basis of some recent research that, in quantum gravity, we have a generalized geometric unification of gravitational and quantum effects of matter; Bohm's interpretation shows that the form of a quantum potential and its relation to the conformal degree of freedom of the space-time metric can be derived from the equations of motion.