17. Lagrange and Hamilton Geometries and Their applications
Radu Miron (Ed.), Handbooks. Treatises. Monographs,
Volume 49 (2004), Pages 133 - 143

Quantum Deformed Problem of Electrons in the Dirac Theory

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In memory of professor Gregor Tsagas

Abstract

In the present paper we investigate the deformed problem of the Dirac electrons in the non – commutative geometry and in the Lie – admissible formulation of the Quantum Gravity. The time and momentum deformations are introduced through the Caldirola – Montaldi (C.M.) model as well as the Small – Distance – Derivative (S.D.D.) model. The above models are special cases of the Lie – admissible theory. The results are based on the theory developed by Gonzalez - Diaz who used the (S.D.D.) model to construct a modified Lie – admissible Wheeler – De Witt equation. The interpretation of this equation is that the universe has a non zero total energy where values coincide with the corresponding values of a harmonic oscillator with Planck mass M^*. It is an open system which interacts with some sort of "exterior" World and it is created by a kind of physical reality. Also the group velocity, after applying the two models, to the Dirac theory, leads to a velocity greater of c and satisfies the Santilli's hypothesis.