Contribution ID: **6** Type: **not specified**

Solving the Quantum Nonlocality riddle by conformal geometrodynamics

Wednesday, 20 June 2012 11:35 (30 minutes)

Since the 1935 proposal by Einstein Podolsky and Rosen the riddle of quantum nonlocality, today demonstrated by innumerable experiments, has been a cause of concern and confusion within the debate over the foundations of quantum mechanics. The talk tackles the problem by a non relativistic approach based on the Weyl's conformal differential geometry applied to the Hamilton-Jacobi solution of the dynamical problem of two entangled spin 1/2 particles. It is found that the nonlocality rests on the entanglement of the spin internal variables, playing the role of "hidden variables". At the end, the violation of the Bell inequalities is demonstrated without recourse to the common nonlocality paradigm. A discussion over the role of the "internal space" of any entangled dynamical system involves deep conceptual issues, such the indeterminism of quantum mechanics and explores the in principle limitations to any exact dynamical theory when truly "hidden variables" are present. Because of the underlying geometrical foundations linking necessarily gravitation and quantum mechanics, the theory presented in this work may be considered to belong to the unifying "quantum gravity" scenario.

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Session Classification: Part I