

ABSTRACT

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General Relativity as an Eikonal Approximation to the Quantum Mechanical Stueckelberg-Schrodinger Equation

We show that the geodesic equations of general relativity follow as the eikonal approximation to 5D wave equations, and, in particular, of the Stueckelberg-Schrodinger equation on a curved manifold. One may therefore consider the study of the quantum problem underlying the classical general relativistic description, for example, in the neighborhood of singularities such as the Schwarzschild radius, as an alternative approach to an attempt to quantize the gravitational field itself. We also discuss how, according to Nelson's construction of the quantum evolution equation from Brownian motion, a relativistic quantum evolution equation such as the Stueckelberg-Schrodinger equation on a manifold can arise from spacetime coordinate correlations.