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The Schrödinger equation for a spherically symmetric system, its structure, and the interpretation of its solutions.

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The Wheeler–DeWitt geometrodynamics, which was the first attempt to develop a quantum theory of gravity, faces some problems, such as the problem of time or the interpretation of the wave function. In this work, as an alternative to Wheeler–DeWitt quantum geometrodynamics, we consider the extended phase space formalism. Within this framework, one can derive the Schrödinger equation, which describes the evolution of a physical object over time and incorporates gauge degrees of freedom. This work generalizes the existing quantization method for models with a finite number of degrees of freedom, as proposed by Cheng, and enables us to derive the Schrödinger equation for systems described by field functions. As a result of our research, the integro-differential Schrödinger equation for a centrally symmetric model was obtained, its structure was studied, and its solution was interpreted. Additionally, the analytic solutions of the Wheeler-DeWitt equation and the Schrödinger equation were compared in the gauge condition N=1/V, corresponding to the Schwarzschild solution, and in the gauge condition N=1, corresponding to the Tolman solution.

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