



Scope of the action principle

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Abstract

Bohmian quantum gravity is a non-classical geometrodynamics (in the ADM formalism) which describes the time evolution of a 3-geometry and of a matter field (or other matter degrees of freedom). From this dynamics a modified form of the Einstein field equations can be derived. The Bohmian dynamics entails novel features, such as singularity avoidance and the possibility of accelerated expansion as a quantum effect. We will consider the latter in a simplified model of quantum gravity using a mini-superspace description of an isotropic and homogeneous universe with dust. We derive the modified Friedmann equations for the scale factor, which now contain a dependence on the wave function. We identify wave functions for which the quantum effects lead to a period of accelerated expansion that is in agreement with the apparent evolution of our universe, without introducing a cosmological constant.