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Modified equations in the theory of induced gravity. Solution to the cosmological constant problem

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Abstract

This research is an extension of the author's works, in which conformally invariant generalization of string theory was suggested to higher-dimensional objects. Special cases of the proposed theory are Einstein's theory of gravity and string theory. This work is devoted to the formation of self-consistent equations of the theory of induced gravity in the presence of matter in the form of a perfect fluid that interacts with scalar fields. The study is done to solve these equations for the case of the cosmological model. In this model time-evolving gravitational and cosmological "constants" take place which are determined by the square of scalar fields. The values of which can be matched with the observational data. The equations that describe the theory have solutions that can both match with the solutions of the standard theory of gravity as well as it can differ from it. This is due to the fact that the fundamental "constants" of the theory, such as gravitational and cosmological, can evolve over time and also depend of the coordinates. Thus, in a rather general case the theory describes the two systems (stages): Einstein and "evolving". This process is similar to the phenomenon of phase transition, where the different phases (Einstein gravity system, but with different constants) transit into each other.

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Keywords

Cosmological constant, Cosmology, Dark energy, Inflation, Phantom energy, Quintessence, Universe