THE BASIC PROPERTIES OF TIIE NON-LAGRANGFAN THEORIES OF GRAVITY

P. A. Nakaznoy
Kiev Institute for Nuclear Research NASU

The possibility of a weak space-time dependence of the energy momentum tensor for the physical vacuum that expresses the response of the vacuum to its curvature cannot be ruled out. In this case, the cosmological constant alone will be not enough to describe dark energy, because it will also be necessary to apply the corresponding corrections dependent on the space-time curvature (metric). It is important to emphasize that, in general, when a variable vacuum $T^{mv}=T^{mv}(R)$ is introduced; the theory becomes non-Lagrangian in the sense that this term cannot be obtained by varying some scalar function, an analogue of the action for the gravitational field.

As we show, the assumption about the breakdown of

the classical law $V_m T^{mv} = 0$ for the matter that follows

from the introduction of a variable cosmological term into the theory gives rise to additional terms in Newton's second law, which describes the effective acceleration of a particle in a gravitational field. In general, we can assert that the results obtained do not yet allow the model with a variable cosmological term to be ruled out: they require a deep understanding and a more careful analysis. However, since the hypothesis considered has radical corollaries (in both positive and negative aspects with regard to the present physical views), it may be concluded that the question about its recognition will be solved in the near future.

1. Nakaznoy P. A. // JETP, 2008, Vol. 107,№ 3 (9), P. 405.
2. Nakaznoy P. A. // Astron. Reports, 2010, Vol. 54, № 2, P. 121.