

Anomaly-induced effective action of gravity and its most important applications

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The effective action of gravity is supposed to contain the main information about quantum corrections to gravity. However, in many cases it can not be calculated exactly. A remarkable and important exception is the effective action of vacuum for massless and conformal-invariant matter fields. In this case the effective action can be easily derived by integrating trace anomaly. The integration constant is an unknown conformal functional of the background metric, but for zero-order cosmology this functional is irrelevant and the solution becomes exact. Until recently the integrated anomaly was known only in dimensions $d=2$ and $d=4$, but recently we achieved the explicit result for $d=6$, which confirms the universal functional structure of the effective action. The most important applications in $d=4$ include systematic classification of vacuum states in the vicinity of the black hole and the Starobinsky model of inflation. In the seminar I will give a non-technical introduction to the subject and also discuss the recent works on the transition from stable to unstable (Starobinsky model) branches of anomaly-induced inflation.