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New results on the conformal anomaly and anomaly-induced effective action of gravity

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Abstract:

Trace anomaly is one of the most relevant manifestations of quantum field theory in curved spacetime. It was shown long ago that anomaly is behind such important applications as Hawking radiation from black holes and the full version of the Starobinsky inflationary model. In many cases, such as using conformal anomaly in black hole physics or exploring quantum effects on the gravitational waves in curved space, it is more useful and, in some sense, necessary to work with effective action. In four spacetime dimensions (4D) the relevant forms of anomaly-induced action were derived between 40 and 30 years ago. However, recently we got some new results in this area, including integration of anomaly in 6D and the covariant nonlocal forms of the induced action with external scalar fields and external torsion. On top of that, now we have a better understanding of the ambiguities related to local terms, in both semiclassical theory and conformal quantum gravity

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