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The cosmological constant problem in piecewise-linear models of quantum gravity

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We will present a recent result [1] regarding the cosmological constant problem. In the framework of the piecewise-linear approaches to the construction of the gravitational path integral, there are three contributions to the total cosmological constant (CC): the bare term, the matter vacuum fluctuations term, and the quantum gravity term. The existence of the quantum gravity term is necessary due to the requirement of the finiteness of the gravitational path integral, while its smallness is a nonperturbative consequence of the semiclassical limit of the theory. As it turns out, one can exactly cancel the bare term with the matter vacuum fluctuations term, leaving the quantum gravity term as the sole contribution to CC, which is moreover automatically small. This result opens the door to an alternative explanation of the observed smallness of the cosmological constant.

[1] A. Mikovic and M. Vojinovic, Europhys. Lett. 110, 40008 (2015).

Summary

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