

High Energy Physics - Theory

The Cosmological Constant in the Quantum Multiverse

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Recently, a new framework for describing the multiverse has been proposed which is based on the principles of quantum mechanics. The framework allows for well-defined predictions, both regarding global properties of the universe and outcomes of particular experiments, according to a single probability formula. This provides complete unification of the eternally inflating multiverse and many worlds in quantum mechanics. In this paper we elucidate how cosmological parameters can be calculated in this framework, and study the probability distribution for the value of the cosmological constant. We consider both positive and negative values, and find that the observed value is consistent with the calculated distribution at an order of magnitude level. In particular, in contrast to the case of earlier measure proposals, our framework prefers a positive cosmological constant over a negative one. These results depend only moderately on how we model galaxy formation and life evolution therein.

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