

Scalars 2015

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Fate of false vacua at one loop

Content :

It can be the case that we are in a meta-stable vacuum and its decay time is longer than the age of universe. In most papers, the decay rate is estimated without calculating the pre-exponential factor because they believe that it is much less significant than the exponential suppression factor. What we point out is that this estimate can involve a large error owing to the uncertainty in the renormalization scale. Since the potential itself is scale dependent, it modifies the bounce solution and thus the decay rate. The uncertainty can be comparable to the exponential factor and it should be controlled to get a consistent result. We explicitly calculate the pre-exponential factor and show that it is greatly reduced.

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