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A new method for calculating false vacuum decay rates on the lattice

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Many quantum field theories, including (potentially) the Standard Model, have metastable false vacuum states. Usually, false vacuum decay rates are calculated using the semi-classical approximation. We present a method for calculating false vacuum decay rates using lattice Monte Carlo simulations. As a proof-of-concept, we test the method using one-dimensional quantum mechanics. This method does not rely on the semi-classical approximation, and it works even when the decay rate is very small.

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