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Instantons: thick-wall approximation

Wednesday 31 August 2022 10:00 (30 minutes)

We develop a new method for estimating the decay probability of the
false vacuum via regularized instantons. Namely, we consider the case where the potential is either unbounded from below or the second minimum corresponding to the true vacuum has a depth exceeding the height of the potential barrier. In this case, the materialized bubbles dominating the vacuum decay naturally have a thick wall and the thin-wall approximation is not applicable. We prove that in such a case the main contribution to the action determining the decay probability comes from the part of the solution for which the potential term in the equation for instantons can be neglected compared to the friction term. We show that the developed approximation exactly reproduces the leading order results for the few known exactly solvable potentials. The proposed method is applied to generic scalar field potentials in an arbitrary number of dimensions.

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

No

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