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Surprises in Vacuum Decay

Tuesday, September 23, 2025 11:00 AM (30 minutes)

Alternative Titles:
1:*Vaccum Decay: Bounces, Antibounces and Pseudo-bounces*
2:*Exploring Vacuum Decay Valleys*

In the standard lore the decay of the false vacuum of a single-field potential is described by a semi-classical Euclidean bounce configuration that can be found using overshoot/undershoot algorithms, and whose action suppresses exponentially the decay rate. While this is generically correct, the vacuum decay structure can be far richer. In some cases there is no bounce and decay proceeds via the so-called pseudo-bounces. In the general case with bounce, there are 2n+1 bounces, with n ranging from 0 (the standard case) to ∞. Some of these decays occur via "antibounces" which have the wrong behavior for overshoot/undershoot algorithms, that can miss them. Bounce and antibounce configurations form n pairs connected by pseudo-bounces.

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