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How does the Higgs potential survive inflation ?

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After the discovery of the 125 GeV mass Higgs, it was shown that the value of the Higgs quartic coupling becomes negative on renormalization at high energies. The energy scale at which the Higgs potential becomes unstable is 10^(11) GeV. During inflation quantum fluctuations will drive the vev of the Higgs field to $< \phi^2 > ~ H^2, where H the expansion rate of the scale factor at the time of inflation is expected to be 10^{14} GeV. Therefore during inflation the Higgs field will roll down to large negative values. This inconsistency between Higgs potential and inflation even when the Higgs field is not the inflation is an open problem. I will discuss ways on which this problem has been solved by introducing new physics beyond the standard model. I will also discuss one idea where the solution to the Higgs instability problem is provided by the Hawking-Gibbons temperature of the de-Sitter space during inflation.

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