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Avoiding the Higgs deflation

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It has been shown that Higgs inflation could be realized even if the Higgs potential has a negative energy minimum separating the inflationary part from the low-energy SM regime. The precise shape of the potential is dictated by the running of the couplings which necessarily differs from SM predictions at high-energies. We explore how the high-energy running affects the details of the reheating state after Higgs inflation. In particular, we establish the conditions necessary for avoiding Higgs deflation: an anti de Sitter stage caused by the Higgs field trapped in the negative energy minimum after inflation. This places interesting constraints on the viable β-functions connecting the SM Higgs potential to the inflationary regime.

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