

Fine Tuning May Not Be Enough

Shunpei Miao
National Cheng Kung University
Taiwan

We argue that the fine tuning problems of scalar-driven inflation may be worse than is commonly believed. The reason is that reheating requires the inflaton to be coupled to other matter fields whose vacuum fluctuations alter the inflaton potential. The usual response has been that even more fine-tuning of the classical potential $V(\phi)$ can repair any damage done in this way. We point out that the effective potential in de Sitter background actually depends in a complicated way upon the dimensionless combination of ϕ/H . We also show that the factors of H which occur in de Sitter do not even correspond to local functionals of the metric for general geometries, nor are they Planck-suppressed.