

Non-Minimal M-flation

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We show how in a matrix inflationary model, in which there is a non-minimal coupling between the matrix inflatons and gravity and we call non-M-flation for brevity, some of the disadvantages of the minimal model, M-flation, can be avoided. In particular, the number of D3 branes can be reduced to $\leq \mathcal{O}(10^2)$ which can alleviate the “potential” backreaction problem of large number of D3 branes on the background geometry in the minimal model. This is achieved by values of non-minimal coupling of order few hundred, which is much smaller than what is required in Higgs Inflation. The prediction of the model in the symmetry breaking part of the potential $\phi > \mu$, which is a local attractor and can support eternal inflation, consequently becomes compatible with the latest PLANCK result. Contrary to minimal model, in which the spectator fields failed to deplete the energy of the inflation at the end of inflation around the symmetry-breaking vacuum, in non-MM-flation, they can successfully reheat the universe. We also comment on how this non-minimal coupling can arise in the string theory setup.

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