

1/N Resolution to the Inflationary η Problem

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Abstract content

We observe that the dominant one loop contribution to the graviton propagator in the theory of N ($N \gg 1$) light scalar fields ϕ_a (with masses smaller than M_{pl}/\sqrt{N}) minimally coupled to Einstein gravity is proportional to N while that of graviton-scalar-scalar interaction vertex is N independent. We use this to argue that the coefficient of the $R\phi_a^2$ term appearing at one loop level is $1/N$ suppressed. This observation provides a resolution to the η -problem, that the slow-roll parameter η receives order one quantum loop corrections for inflationary models built within the framework of scalar fields minimally coupled to Einstein gravity, for models involving large number of fields. As particular examples, we employ this to argue in favor of the absence of η -problem in M -flation and N -flation scenarios.

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