Finite modular Coleman-Weinberg inflation

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Abstract

We propose a finite modular symmetric inflationary model in which a Coleman-Weinberg potential is generated by heavy vector-like quarks coupled to a complex modulus τ through modular forms. The imaginary part of the modulus is identified as the inflaton, while the real part is stabilized at a fixed point. We show that the model can yield inflationary predictions consistent with current cosmological constraints, i.e., the spectral index $n_s \simeq 0.965$ and the tensor-to-scalar ratio $r \simeq 0.003$, for a single axion-like degree of freedom in this framework.

Keywords: finite modular symmetry, inflation, axion, moduli stabilization

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