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Modular invariant Inflation, reheating and leptogenesis

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We propose new classes of inflation models based on the modular symmetry, where the modulus field τ serves as the inflaton. We establish a connection between modular inflation and modular stabilization, wherein the modulus field rolls towards a fixed point along the boundary of the fundamental domain. We find the modular symmetry strongly constrain the possible shape of the potential and identify some parameter space where the inflation predictions agree with cosmic microwave background observations. The tensor-to-scalar ratio is predicted to be smaller than 10^{-6} in our models, while the running of spectral index is of the order of 10^{-4} . We will also give a concrete model where modulus field can be used to realize the inflaton as well as the correct lepton masses and mixing structures through a Seesaw mechanism. This naturally give channels for reheating and leptogenesis.

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