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Inflationary Predictions and Moduli Masses

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The predictions for all the cosmological observables of any inflationary model depend on the number of e-foldings which is sensitive to the post-inflationary history of the universe. A generic feature of inflationary models in supergravity/string constructions is vacuum misalignment for the moduli fields. The associated production of moduli particles leads to an epoch in the post-inflationary history in which the energy density is dominated by cold moduli particles. This modification of the post-inflationary history implies that the preferred range for the number of e-foldings between horizon exit of the modes relevant for CMB observations and the end of inflation depends on moduli mass. This in turn means that the precision CMB observables are sensitive to moduli masses. Our results illustrate the importance of understanding the full post-inflationary evolution of the universe in order to derive precise predictions at the level of sensitivity of future CMB missions.