Measuring Inflation with CLASS

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Abstract

Using the Cosmology Large Angular Scale Surveyor (CLASS), we will measure the polarization of the Cosmic Microwave Background (CMB) to constrain inflationary theory. The gravitational waves generated during the inflationary epoch imprinted specific polarization patterns – quantifiable by tensor-to-scalar ratio r – onto the CMB, which CLASS is designed to detect. Furthermore, we will be able to make assertions about the energy scale during inflation by discovering the features of the polarization power spectrum, providing a probe into physics of energy scales not conceivable in particle-accelerator physics. CLASS is a unique ground based experiment with extensive consideration given to mitigating systematic uncertainties, which will allow us to measure the polarization patterns on large-angle scales and thus to reject or support models of inflationary cosmology.

A brief introduction into inflationary cosmology and review of current scientific results will be presented in the light of the upcoming measurements with the newly built CLASS detector. I hope to stimulate further discussions on current and future inflationary probes as well as to convey my appreciation for the physics responsible for creating the universe we know.

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