

# Exploring the primordial Universe with CMB polarization

*Tuesday 5 October 2010 09:30 (1 hour)*

Observations of the Cosmic Microwave Background anisotropies have led over the last decade to spectacular results concerning the cosmological model describing our Universe. The specific angular scales of the temperature and polarization anisotropies, along with other cosmological probes, have allowed for an accurate measurement of the cosmological parameters leading to the  $\Lambda$ CDM model. All observations are consistent with scale-invariant adiabatic primordial perturbations, a prediction of the inflationary paradigm that would also solve other issues concerning the primordial Universe.

A direct evidence for inflation would be the detection of so-called B-mode CMB polarization anisotropies, related to tensor perturbations of the metric (primordial gravitational waves) naturally produced by inflation. The level of these B-modes (characterized by the tensor-to-scalar ratio  $r$ ) is directly related to the energy scale of inflation while the spectral index of these fluctuations, along with that of scalar perturbations and  $r$  would allow for efficient selection and consistency tests among the many inflationary models.

Although  $r$  is expected to be small (the present limit is  $r < 0.25$  at 95% C.L.) the quest for B-mode polarization in the CMB has started and many collaborations are now tackling this challenging task from ground, balloons or space.

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